

**WALTER M. CARLSON**

**Oral History interview**

**with Thomas Haigh**

Conducted in Los Gatos, California

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### **Abstract**

Walter Carlson discusses his entire career in the computing field. Born in Denver in 1916, Carlson studied Chemical Engineering at the University of Colorado, gaining both bachelor's and master's degrees in Chemical Engineering. On graduation Carlson went to work for DuPont, where he worked as part of the corporate Engineering Department to improve industrial processes in different plants. In 1954 his involvement in a feasibility study to investigate computer procurement won Carlson a job as "Manager of Operations Analysis," heading technical computing for DuPont's Univac I installation. Carlson explains the steps taken to create the new installation, its staffing and operations, early computing applications, early compilers and programming techniques, and his involvement in the Univac User's Association and the Operations Research Society of America. Carlson worked within the American Institute of Chemical Engineers on a committee to explore mechanical computing.

Carlson comments on the activities of a number of computing pioneers including Paul Armer, Willis Ware, Harry Huskey, Fred Gruenberger, Isaac Auerbach, Herb Grosch, Richard G Canning, George Glaser and John Postely. His involvement in computing led Carlson to the Association for Computing Machinery (ACM). Carlson saw himself as representing the broader world of industrial and administrative computer use, against the predominantly academic traditions of the association. In 1960 and 61 he was involved in its establishment of Special Interest Groups (SIGs) to support the creation of a SIG in Business Data Processing. He was one of the founders of AFIPS, the American Federation of Information Processing Societies, serving as an ACM representative. Carlson discusses its origins and development, including its 1970s

historical program with the Smithsonian. In 1968 Carlson was elected Vice President of ACM and in 1970 President. He explores his achievements and failures as leader, including a restructuring and downsizing of the headquarters staff, the improvement of relations with the Data Processing Management Association (DPMA), a failed initiative to greatly increase the size and scope of the ACM, and an ambitious reform agenda for the association's government that was scuppered by lack of support from ACM Council members. Carlson explores his relations with Bob Bemer, Jean Sammet, Anthony Ralston, Frederick Gordon Smith, Bernie Galler and other prominent ACM figures.

Carlson's other main interest has been the handling of engineering and scientific information. After serving on a Joint Engineering Council committee devoted to the topic in the early 1960s, he was hired by the Defense Department in 1963 to run its newly created Office of Technical Information. Carlson describes his work at the Pentagon to improve technical information procedures, and his related involvement in COSATI (the Committee on Scientific and Technical Information) and his attitudes toward ASIS (the American Society for Information Science). After leaving the Defense Department in 1967, Carlson worked at IBM until his retirement in 1985 where he served as a staff expert mediating between marketing and research groups within the firm to bring research to focus on customer needs.

HAIGH: Thank you very much for agreeing to take part in the interview. I wonder if we could begin by talking a little bit in general terms about your early life and family background.

CARLSON: Happy to do that.

HAIGH: I saw from your resume that you were born in Denver in 1916.

CARLSON: Correct. My father was a lawyer from the University of Colorado, and my mother had been a sorority basketball player from the University of Colorado. We were living on a ranch in Masters, Colorado out near between Greely and Fort Morgan, Colorado on a ranch that my grandparents owned and operated. So I was born in a Denver hospital, and papa moved out to that ranch area, where I stayed for about nine or ten years because my family needed to get something else done, and we moved to Denver, bought a house in which my brother still lives in Glencoe Street in Park Hill, Denver.

When I was in first grade in school, my parents told my first grade teacher that they did not want me to be left-handed, which I certainly was. When I came out of the first grade, I was right-handed. The woman took care of that very neatly, and best I know I've had no mental difficulties over that, although physically it's been somewhat difficult. I throw right-handed, I write right-handed, and generally stay on the right side now when I do things. So that took care of that first problem for me.

During grade school in Denver, I graduated from Park Hill school and then went to an intermediate school for a year, which was being overloaded so there was a new one being built

called Smiley Junior High School in eastern Denver. From there I went to East Denver High School. There was nothing unusual about the education, with the singular exception that in the eighth grade as I was trying to follow along in some of the singing groups, the teacher took me aside one day, and she said, "Walter, you're the one who put harm in harmony." And I've maintained that tradition all these years, I'm afraid.

But going through high school it got to be graduation time in 1933, deep in the Depression. The family wasn't doing that well to send me off to college or anything like that. So I applied around the high school and discovered that I could be hired as an assistant in the chemistry lab helping the teacher run the laboratory and do all the necessary things that go with making students productive, with the tests and so on in the laboratory. So I took on that task as a graduate in high school, and took other classes in calculus and in other kinds of special studies. I think I even caught up a little bit on Latin, which I had had in intermediate school. Oh, and I did some typing in the typing class and proceeded then to think about where to go to university.

HAIGH: So those things then you were doing in preparation for university so that you would be able to support yourself when you got out.

CARLSON: Just things to help me get a better range of skills to get on with my education.

HAIGH: Let me ask a follow-up question. How old were you when you first developed an interest in science?

CARLSON: It was only during that graduate year in high school when I had to know a lot more about chemistry.

HAIGH: So before then you hadn't had a particular interest in science?

CARLSON: Nothing especially; it was just the driving force of the job that made me really need to understand what was going on and be able to explain that to people.

HAIGH: So what kind of interests and hobbies did you have as a boy?

CARLSON: Well, my first money making job was distributing *Saturday Evening Post*, *Country Gentleman*, and *Ladies Home Journal* around the neighborhood on my bicycle. That got me doing so much of that that when an opportunity came to get a drugstore job using my bicycle to deliver orders, I got that job through a couple of guys who were really interested in making that drugstore work differently. They had been head of a larger store and head of drug sales and knew the doctors—they had a very close relationship with all the doctors in the area—so they saw to it that we gave excellent service to people who wanted prescriptions delivered, and that became quite a task. Another associate by the name of Hugh Land and I were on our two bicycles made that drugstore successful in providing that service because we got around on our bicycles very, very well and for a long number of hours. So it was that kind of income that led me to the 1929 crash, and my father bought a bunch of stock that he thought was good stuff, most of it being Cities Service, which I think went to zero when the stock market crashed. So there I was again, building myself back up being able to earn.

HAIGH: Do you think that experience of growing up in the Depression had an influence on how you approached your career later on in life?

CARLSON: Thoroughly, because I learned that there were ways to do a job which satisfied someone in charge and who paid. My experience at the drugstore, for example, taught me that you better pay close attention to how you're doing what you're assigned to do. And that became kind of a hallmark of my career.

HAIGH: Did you do well in school? Were you academically minded?

CARLSON: When I went to University of Colorado, my grades were essentially all A's for the first year I was there, which was a follow-on of how I'd been doing. But the reason I went to the university was straightforward. Both my parents had gone, and I had a bunch of uncles who had gone elsewhere and who had stories to tell about their college careers that had me continuously focused on the University of Colorado. I said I was going to go to the College of Engineering. Then when they asked me for more details since I'd spent the year working in the chemistry laboratory, going into chemical engineering was an obvious easy choice. So that's how I joined into that program.

HAIGH: Was the University of Colorado considered a prestigious school for engineering at that point?

CARLSON: For engineering it was doing well. Chemical engineering was not that hot. They had to bring some people in to get that better organized the five years I was there.

HAIGH: Was there a strong local chemical industry?

CARLSON: Well, the minute I chose chemical engineering I knew that at that time I graduated four years later there would be no jobs in Colorado for me. There were just none. That was an obvious and well-known choice that I had to make.

HAIGH: So did you consider other possible majors?

CARLSON: Not really. I felt so well qualified to deal with the subject matter that I just didn't see any reason to try to branch out to law or business or any other part of engineering. Electrical engineering at the university was a much better. Of course people graduating from that went into large firms all over the country, and the professors were really quite good. So off we go into chemical engineering.

As I said, my first year was essentially all A's. Nothing really tripped me up because I had the kinds of background coming out of high school that made me work for whatever the professors wanted. So much so that at one point joining a fraternity called Phi Kappa Psi, I then had to think, well, what kind of other extracurricular activities on campus should I be involved in? A friend whose family had owned the drugstore across the street was there on the campus and working on a campus newspaper. So I went to see him and told him that I was looking around for something to do, and I could type because I had learned how to type in high school. He said, "Well, come on. We'll put you on the staff and see how you make out as a reporter." So that's how I suddenly became a member of the staff of the University of Colorado Silver and Gold, which is what its campus name was. That followed on through to the point that I became editor of the paper in my senior year. But at the end of my sophomore year and going into junior year, we had a practice on the paper of taking in some 15 or 20 freshman who wanted to work on the

paper and giving them a story to tell, and then they had to go out and use typewriters and write a story. A group of four or five of us on top of the staff chose who was going to be selected to join the paper. We announced that on a bulletin board. And about a week later here comes this letter from some gal named Nancy Ellzey from Roswell, New Mexico who told us we just didn't know exactly enough about how to select reporters. She thought we could do a much better job if we really paid attention to what she had done. I'd just met her [chuckles]—62 years we've been married. I had a total of one date with her while I was at the university. She became editor two years after I was. I think we were the only two married graduates who were former editors of the paper. But in any event, that's how we got acquainted.

The year of getting out of the university and thinking about going for a job was 1938. Now it's not a depression, but a recession. The interviewers had come around and talked to us, and one guy, the DuPont guy said, "Can't do a thing for you. We're just not hiring." But I had an uncle who was then head of the Socorro, New Mexico mining school, and he knew some DuPont people, and he told them that they were making a big mistake by not hiring me, but they said, "Well, we can't." So I decided all right, I'll go take a graduate year at the University of Colorado.

The professor and head of the Chemical Engineering Department had left and gone to Alabama, and somehow he heard that I was looking and sent me an offer to join the University of Alabama for a graduate degree in chemical engineering. It wasn't long after that that the university President's secretary at the University of Colorado drew me over. Since I was editor of the paper I wondered what's the President going to complain about now? But she said, "Walter, Dr. Norlin

has heard that you have got an offer from Alabama, and he would like you to know it would be unwise for you to take that offer. We think we can do better for you here at the University of Colorado.” That made that decision easy. I stayed, and the paper I wrote, the research I did had to do with getting a thing called Glauber’s salt, a chemical salt, sodium sulfate. But anyway, there was a bunch of lakes up in Wyoming. Water would come in the rain, and some of it would pour out in the lakes down below, and they would leech the soil, filling up with more and more of those chemical, so by the time you got to the bottom lake it was pretty concentrated. So now comes the question: do you have a chemical engineering answer to boiling off that water and getting a marketable product? Because the salt was quite in demand for a whole variety of commercial uses. So the search began how to take that water out and get the chemical out in a way it could be packaged and sold. That was my thesis. So that then helped satisfy the requirements so I could go on through. I took a lot of German and stuff like that in the graduate course.

HAIGH: Was that because of the prominence of German in chemistry at that point?

CARLSON: Yes. There was a lot to read if you wanted to work at it at all. So that the next time the DuPont guy came through, he happened to be one of the family relatives. This time he had enough pings at him I think through my uncle’s efforts that he wanted to know more about me, and said, “Come on back to Wilmington.”

An associate of mine had an interesting problem to solve. I had worked with him at the university and we roomed together as we graduated. He’d been offered a Rhodes scholarship in England, and the Pittsburgh pro football team wanted him to play football. Now which was he

going to do, was his question. He and I had sat for five or six Sundays at a bar there on the college campus, drinking beer and arguing. One week I would have the Rhodes Scholarship, and the next week he would have it. Back and forth, bang, bang, bang. When we went and moved into this house after college, about a week later he went out to get into his car to drive to Denver to make his announcement as to which he was going to do. I couldn't have told you. His name was Byron White, sometimes known as Whizzer White. He went off to England, and I went back east in New York to see him off, and then went down to Wilmington, Delaware to see what they were going to do for me.

They got into one office, and a fellow named Granville M. Read, sometimes known as Slim because he was so big, sat and interviewed me and asked me a whole bunch of questions, and he said, "You'll do." I said, "Does that mean something?" He says, "You're darn right it means something. You'll do!" So they hired me. And I went to work ten months later.

HAIGH: That was in 1939?

CARLSON: 1939, at the end of my graduate year.

*Session Two begins on the afternoon of Saturday the 26<sup>th</sup> of November.*

HAIGH: So you had talked about your early life and upbringing and had also discussed your university education and the process by which you were hired to work at DuPont. Now let me just ask a couple of follow-up questions on your time at university. So as you progressed through the curriculum of your bachelor's and master's degrees in chemical engineering, how did you find the subject? Was it something that you discovered that you were very interested in?

CARLSON: The answer is yes, because the kinds of problems which we were working on in classes were all drawn from industrial experience. The whole idea of distillation, you know exactly what happened out in the plant. In the subject of filtration, you had to know exactly why fillers did the jobs they did and what to do about it. So as we go through the various courses, we were on subjects that were real and practical. There wasn't any science in the sense that you had to have some basic knowledge. You had to have a basic knowledge in chemistry, you had to have a basic knowledge in physics, and then you could do the engineering jobs that you handled or were being taught about. So those were the things that drew my attention. And especially some of the calculation that had to be done, onerous as they were, were impressive.

So when I went back to go to work for DuPont, a guy named Ford McBerty brought two of us into his office in Wilmington, Delaware and introduced me to the other guy who had just graduated from the University of Michigan. McBerty said, "Well, we have two jobs open. We have one here that's in East Chicago, Indiana, and one here in Maryland. Which would you like?" The guy goes, "Well, I'll take the one in Indiana. It's close to my home. I could get there easy." McBerty says, "Fine, you go to Maryland. Walter, you go to Indiana." So that was how I got my assignment.

The plant was a Grasselli purchase. DuPont had bought the Grasselli company in the late '20s. So it was now about ten years of DuPont trying to bring Grasselli into its mode of operation. I was put into a group that was called industrial engineering, and our task was to help solve plant problems. We were asked to dive into and do something about them, whether they were yield problems, physical piping problems—anything that was holding up the plant's performance.

HAIGH: So was that a corporate staff group that was--

CARLSON: A corporate staff group. I was in the Engineering Department of the DuPont company, but assigned in this industrial engineering group in East Chicago, Indiana.

There was an operation which is making silicate crystals of some kind or another. In the process the operator would go over and pick up a five gallon carboy of acetic acid that he would then take over and dump into the tank to help the reaction along. What they wanted was somehow to get rid of that safety problem of a guy carrying this glass carboy around, as well as perhaps save money in not having a human transfer this liquid. So I was given the task of designing a pipe and a rotameter that would measure the flow, control the flow to get the stuff over from a tank into the reactor, and justifying it on the basis of saving. It didn't take me very long to learn that way back in the 1920s DuPont had setup a system for evaluating their investments based on return on that investment; you had to have savings over a certain period of time, and those periods of time were adjusted according to the nature of the problem. But anyway, there I was right in the middle of this thing and had to come forward and solve this basic transfer problem in the DuPont way, as it were. It was very educational because it satisfied my interest in how the corporation worked as well as getting the thing done and getting the piping installed.

HAIGH: Had your engineering training covered those kinds of return on investment calculations?

CARLSON: No, not at all. This was a brand new subject area.

HAIGH: Would you say that there was any kind of management component to your training in the university?

CARLSON: Not in the university, no. Everything there was practical solution of class problems, as it were.

HAIGH: Did you always have a feeling that you would be interested in getting more involved with the business side of things, or did you just want to make things?

CARLSON: Not at all, no. Because I went in to become an engineer with DuPont, and all of a sudden there I was, and it was very helpful because some of the people in the plant including a supervisor by the name of Wayne Marshal appreciated the learning process I had to go through, and took me out socially as well as helping me out. So my new education was very rapid. So much so that when the war started, then I got transferred back to the plant in New Jersey that made tetraethyl lead. Tetraethyl lead goes into gasoline to increase its octane rating. The task there was to experimentally run these large autoclaves about four or five feet in diameter and about eight or nine feet long, just filled with stuff that was gurgling away and treating lead into tetraethyl lead liquids. There was a process that had to be followed, and it was up to us to come up with a way of making that process work better by adjusting temperatures or times and what have you. Big experiments. In one case, we were spending over \$100,000 making adjustments to the equipment to try to improve the process. So it was worthwhile education, in any event.

HAIGH: Did each part of the country have its own industrial engineering team?

CARLSON: Each major DuPont plant had an industrial engineering group. In one group there were four or five of us assigned to that particular Grasselli plant, and each had assignment in the different product areas.

HAIGH: Was it common that people would be rotated around a lot, or did they tend to stay for a while in the same plant?

CARLSON: Yes. That was the nature of it. If the seniors inside industrial engineering thought you were good, then they found other places for you to grow and then that became a career path. Well, I did enough of that that I got put over into a planning unit back in Wilmington, Delaware in 1950.

HAIGH: Oh, by the way, wasn't World War II there. So did you...

CARLSON: World War II just went right on through making tetra-ethyl lead.

HAIGH: So was that work considered relevant to the war efforts?

CARLSON: Exactly, because of the nature of having improved the ability of gasoline to run engines. Then there was another part of the plant that was making Freon, which were the chemicals used for refrigeration. Among the things that plant made was of course some spare gas that's been going up into the atmosphere over these years. But in any event, the assignment was to help figure out how to make the kettle producing Freon work better and cheaper and so on. We made a whole series of experiments which I helped run. Then since hydrofluoric acid was the thing that really produced the Freon, we helped put the hydrofluoric acid plant together. It had three furnaces that took fluorspar ore and with sulfuric acid created hydrofluoric acid, which

was then spilled off and captured. As a matter of fact, I even went off on a project out in New Mexico looking for fluorspar for DuPont to buy at a cheaper rate than they were paying the mines in Illinois. So that was an extra bit of engineering experience that I enjoyed.

HAIGH: What year was that?

CARLSON: That would have been about 1944 or '45. Just before the war was over. But then kept right on working. After I got through with that kind of engineering stuff, I got into this planning unit whose mission was not very clearly defined, but it did a lot of special projects. Especially in one that I got involved in, the Chief Engineer who by now this fellow Read that I told you about had become Chief Engineer. He was on the board of directors of the Remington subsidiary of DuPont, and some engineers and scientists in Remington had worked with titanium ore and produced titanium metal in significant enough quantities to show around. The question, it's a gun company, it's not going to be making titanium metal—what do we do with this process? So I got assigned to go up to Bridgeport, Connecticut, which is where these people in the plant were to help them figure out what was next with this great process that the government in Oregon had come up with and these people had perfected into something that worked at a plant level. Well, fussing with them, another guy who had worked way back in the '20s on some other problems was now also on this planning unit, and he and I spent months discussing with the Remington people, "Well, how do we do something about this?" As a matter of fact, George Foster and I would get together at breakfast, and part of our breakfast duty was who do we frustrate today [chuckles] because we would go at these people. At one point, when I was in his office on the 11<sup>th</sup> floor of the building, the Vice President of Remington said "Walter, one more

time you bring up our selling this process, I'll take you by the heels and drop you out the window." So that was the relationship we had with those people, but finally decided that it worked. I went out to some steel plants and watched them mill these ingots of titanium into sheets. So the thing worked.

HAIGH: Was that the first process that was able to produce sheets of titanium?

CARLSON: There was nothing else around, and of course titanium was then beginning to be used experimentally to replace aluminum in planes and a lot of other places where the advantages were obvious in terms of size, weight, and chemical resistance. So it finally got to a point where a project was put forward, and we had bids from a couple of steel companies. Most of the steel companies said, "To Hell with that. We don't want to have anything to do with this kind of business because we have the stainless steel. We've got what we need to maintain our operations." So a project went to the board of directors of Remington over selling the process to Allegheny Ludlum. The Chief Engineer grabbed me along the way and took me to the board meeting. I was sitting there beside him listening to the debate go back and forth, and finally he punched me and he said, "You've been sitting here. Why don't you say something?" So I spoke up on what we had learned as to the satisfactory operation of the process and the ability to use the materials that came out of milling this stuff and so on, and shut up. They went ahead and passed the project and went and sold the process to Allegheny Ludlum. That was in about 1950. By 1953, '54, I'd had another more senior job that covered a larger set of plants. I had people at different plants working for me in the same industrial engineering division. I was back in that.

HAIGH: Was the planning team that you mentioned part of the industrial engineering division?

CARLSON: No, it was a separate unit of the Engineering Department.

HAIGH: So you went away to planning, and then you came back to industrial engineering.

CARLSON: Came back. What they did was they gave me a promotion because of all of this and put me in charge of the plant groups instead of working in one. Whereupon as I was looking at one of our plants in West Virginia, I realized that the people making the key decisions at that plant were not getting data on a timely basis. The costs and production rates and all the accounting systems would take weeks to give these people current numbers, meaning the start of the month or whatever, even sometimes two months before. So I was running up and down the halls saying, "Hey, we need to get something done to speed this accounting process up, and there are people out at our research division who are using computers to run calculations. Why can't we get computers to run the accounting system?" "Well, we have all this punch card equipment," they'd say, "and we're using that to help do all of this data processing." Well, somewhere in the midst of all of that, the Chief Engineer decided that his people doing all these calculations, he saw what the engineering research division was doing--

HAIGH: The engineering research division had an electronic computer?

CARLSON: They had a group that brought in electronic computers and would--

HAIGH: What kind?

CARLSON: Well, IBM had come up with this CPC, Card Programmable Calculator. Then another firm had something called the 101, a Burroughs machine I think. So they brought one of those in and were using it to expedite a whole set of engineering research calculations that they

were interested in. It was easy to listen to them talk about it because at the various meetings they would stand up and wave their hands and show how much they were doing that they couldn't do before. I don't think my fussing with that had anything to do with the chief engineer deciding that he wanted to get a computer to help with the design and other engineering work that he was responsible for. So he put together a team of three guys. One of them happened to be an old roommate of mine, so I had some input. He would tell me what they were discussing, and I'd tell him why it was important that they discuss it and so on.

[Tape 1, Side B]

HAIGH: You've been talking about putting together a team of three people in DuPont. Was that team intended to run the feasibility study with respect to acquiring a new computer?

CARLSON: Yes because there was a whole series of calculations involved in design and other parts of our engineering activity, which were obviously handled mathematically, and it was easy to run with some experience in punch cards. One guy could calculate what putting a computer in would do to speed up and make cheaper a lot of this engineering work that the chief was responsible for. So along about April of '54 they gave him a report saying here's the justification for getting one. He said, "Fine. What do we get?" There were two on the market. There was the Univac I and the IBM 702. He said, "All right, let's put together a project to go out and get one and you guys go figure out, working with the companies, IBM and Univac, which one we should go up and ask money for.

HAIGH: So that was a two-stage process then? You made the decision to acquire a computer before they even looked at specific models.

CARLSON: Yes because they needed something in the market that could offer these two.

HAIGH: Do you know what kinds of things they did during that initial phase of the feasibility study?

CARLSON: I do not. All I know is that they looked at a number of ways of handling the engineering design problems and how much labor went into performing the calculations and design activities related to designing these plants.

HAIGH: So the justification would have been done purely in terms of displacing human labor?

CARLSON: Almost entirely on labor, and that was good enough. Univac as I recall was going to sell for \$800,000 or something like that. They could justify that with the savings with an engineering department of some size. So he said, "All right, go ahead and see what we can buy. We'll have two or three guys to come in and tell me who should be put in charge of making this thing happen." So they went and shook their heads and it included putting their names on the list, I think. But anyway, they went in and each of them said, "Here's a name." The chief said, "That's fine. Thank you very much. I have a name." And he went to my division manager and said, "See if you can get Walter to accept taking this thing on." Because he had remembered what I had done in this other project and he thought I was a useful guy, apparently. So the division manager called me in and said, "The chief says we're going to buy a computer, and he thinks you might be of some use in running the project to install it and use it." This was on a Friday. I said, "Well, how long do I have to think about that?" He said, "Well, we'll give you the weekend." [Chuckles] On Monday I went back in and said, "Okay, I'll tackle it."

HAIGH: At this point the decision to purchase a computer had been made, but they hadn't decided which one.

CARLSON: That's exactly right. The project had not gone up to the executive committee. There was no money yet authorized to make the purchase. Well, this discussion took place in late May, and early July the project had been brought together. First of all, I hadn't changed jobs. I didn't get the appointment even until the first of August, 1954. Then going into July while the project got actually written down and put on paper and hauled it up to the executive committee of DuPont for several hundred thousand dollars, whatever it took to buy in this case Univac, because in late June IBM withdrew the 702 from the market. There was one company left, and that was it.

HAIGH: So the 705 wasn't available yet?

CARLSON: The 705 hadn't even shown up yet.

So the project went forward. I wasn't there, but what happened at that executive committee meeting must have been very dramatic because some of the people who were there told me that the President by the name Crawford Greenwalt listened carefully to the argument going forward. The Chief Engineer had made his presentation as well as the document. And the President reaches out, takes the project, and rips it up and says, "We're not going to authorize this. But what I think we should do is get you, Mr. Engineer, and the Treasurer together as a team to help us figure out how best to use this technology. You make it sound so good. It probably ought to be useful somewhere else in DuPont as well—we need to know where. And these people here and treasurers have all the experience with punch card equipment in all these calculations they

do. So let's find out." So apparently they called somebody in and dictated their project for purchase of the Univac and a two-year program jointly sponsored by the Chief Engineer and the Treasurer to discover where in DuPont this technology was going to be useful. Typically DuPont way of looking at new technology, as it turns out.

HAIGH: So what didn't they like about the proposal that you had?

CARLSON: It wasn't broad enough. It was too narrow with only one small part of the company. The President was obviously so well taken by what was being said that he wanted more of it! Literally ripped up the project and called somebody to dictate a broader one with the Treasurer and the Chief Engineer.

HAIGH: You said that was a typical DuPont way of doing things. What would be your general impression of the corporate culture there in the way that the company was managed during this period?

CARLSON: At that time the people at the top were chosen to produce financial success from the science and technology that DuPont was very rapidly developing. A number of patents and things like that were continuing to flow into the company from the government. So the question always was, "How do we make something out of this?" There was an attitude that if they could look at the last five years of profit and define how much of that came from products that were created and sold first in that five-year period they were in a successful mode. So the whole theme was: do what you can that's the best you can with new stuff to make the market grow for us.

In this planning group I was on, some of us had fussed back and forth over how to judge the growth of the few billion dollars a year that DuPont was making in sales to multibillion, tens of billions of dollars through all of this new development. So that was the mode in which I was operating and learning from. But at the same time, I also had to be careful because I tried to oversell the computing on occasion. So I made a presentation to some top DuPont executives that the Chief Engineer had brought in to hear me, and he gave me a tutorial on how to make a presentation and all that kind of stuff so I didn't mess that up. So I went ahead, and in the course I would explain how in this one plant, the chemists were giving us the information which we could put into computer programs and demonstrate how to make changes in the process to make it work better. I said, "With that knowledge that they've provided, we are really doing a good job for them." Well, one of the vice presidents who was in the audience came up to me at break time (who had happened to have gone to the University of Colorado, by the way), and he said, "Walter, I have a word for you. We deal directly with those chemists, and they haven't the faintest idea how that process works." So he said, "You had better be careful in what you're selling." Indeed, that was extremely important advice. At the end of the two years we had redone the stockholder relations, we had done with yields, we had done with scheduling, plant schedules. We had an enormous range of applications.

HAIGH: To be clear on this then, after the first proposal was ripped up, you spent two years going around the whole company trying to find out--

CARLSON: Yes. The Treasurer setup a group of some 25 or 30 people. I had a group of about 23 people, who by the way, were an interesting group, because the Chief Engineer said, "Get that

thing staffed,” so my management was to go around to the other division heads and say, “We need some people to help with this computer project.” Well, almost uniformly those people said, “Ah, good chance to get rid of somebody.” So I was getting these dregs, in their judgment, but these were the bright people who couldn’t stand just day-to-day work; they wanted to do something exciting. So we had some really great efforts.

HAIGH: What kind of background did they have? Were they coming from industrial engineering?

CARLSON: No. I was called Manager of Operations Analysis. Since there was a statistician available who got put on and another guy who had done some operations analysis research type work, I became the Operations Research Advisor to the corporation as well, with this one guy as my lead staff guy, a fellow named Ralph Reath. So using those skills, I went ahead and I could assign, since I had accounting backgrounds and other kinds of backgrounds in the team, all of whom used the Univac language, we could develop a project with one of the departments and staff it with people who could program it and test it. So that was what we actually did. Within the Engineering Department, we chose the Wilmington shop with 100 people that showed us how to write great computer programs for writing paychecks.

HAIGH: How long after the first proposal was ripped up was it until that order was actually placed for the computer?

CARLSON: Well, the order was placed in early August, and the machine was delivered in early December. So we had those few months to get ourselves kind of organized. It was serial number 12 of Univac, by the way.

HAIGH: What was the name for the new computer group or department or whatever it was?

CARLSON: It was Operations Analysis.

HAIGH: So the whole computer group was called Operations Analysis?

CARLSON: Correct.

HAIGH: Now that brings up a couple of questions, then. One of them would be whether you were aware of something called the “systems and procedures” movement.

CARLSON: Those words had no meaning to me at the time. What I was doing was listening to what these people could do and then finding ways for them to do it.

HAIGH: That’s interesting. Because of your background, you thought of it as being an extension of industrial engineering.

CARLSON: Exactly the point. Without digging into the systems and procedures, for example, were messing up something that needed to be changed. We got into a lot of that because of the way we were applying steel the way we did.

HAIGH: Where did the Operations Analysis group fit within the company as a whole?

CARLSON: We reported to a man by the name of Frank Middleswart who was in industrial engineering division as head of management consulting or management engineering consulting, which is an interesting aspect. But that’s where the computer group landed in the management consulting side, and I think that had a profound effect on what went on later. Now that group

then worked within the consulting part of the industrial engineering division, which also had these small groups out around. The chief division manager of the industrial engineering division reported to the Chief Engineer, or the assistant chief engineer. The accounting side of the house had its own operating division to handle all of the cost data and stuff.

HAIGH: So then the new proposal was the computer stayed within the authority that you mentioned earlier, but just was applied to a broader range of applications?

CARLSON: Yes. We installed it in the engineering office building in December, and then it was my task of pulling together staff to operate it.

HAIGH: So “operations analysis.” That sounds like a term that might be inspired by this then new idea of operations research. Can you remember when you first heard operations research?

CARLSON: At least by 1956 I was going to operations research meetings.

HAIGH: Your resume says that you were an associate member of the Operations Research Society of America since 1955.

CARLSON: Well, it must have been 1955 then, because what I recall is that I was going to more meetings early on in this whole activity. The Chief Engineer had a couple of people as his deputies who were interested in change, and they of course had helped him with the whole computer idea as well. But I could draw on them to say, “How much can I afford to spend in DuPont money helping the Operations Research Society do its job?” Because it was really in a tough operation: didn’t have a lot of money; it was publishing all these articles that made everything sound so good, but almost nothing had ever worked. I found myself in almost

constant conversation with these key top people in the Engineering Department over extending my activities and my activities at DuPont in this whole operations research area. None of that ever really came to much, even though I guess I must have taken on some assignments along the way.

HAIGH: What kind of people were going to the operations research meetings in the mid '50s?

CARLSON: I'd go to those meetings. It was heavily academic. On occasion, somebody from industry would show up, and one guy from General Electric showed up and told how he had used computers to change most of the processes at the Louisville plant, which made household appliances. So on occasion it would be this kind of nonacademic discussion of the mathematical tools. Most of the emphasis was the mathematical tools that everybody in operations research enjoyed.

HAIGH: Were there people there from the military?

CARLSON: Very few. On occasion there'd be some reference, but the minute you started asking questions you'd suddenly find yourself being threatened with classification. So getting changes in the military was not an easy thing, and when they got it they weren't going to talk about it.

HAIGH: Right. So they would keep themselves more to themselves.

CARLSON: Exactly. Routinely.

HAIGH: At that point if you would have been asked to define operations research, what do you think you would have said it was?

CARLSON: Well, I had no problem with that at all. I had to do it. I had two cards, I wish I had kept these. On one of them I took the basic tools, and on the other one I took the problem areas of finance or manufacturing and so on, and showed that in the middle of it there were things where people could use these tools to help improve the performance of some of these operations that were inherent in these different industries or categories. I would go around the DuPont company, and elsewhere, showing them these two cards how they came together. That was my idea of what operations research was. I was lucky because when they cleared my group in the end of July, one of the people they gave me was one man named Sig Anderson, who had gotten his Ph.D. in statistics at North Carolina State, and could understand the tools that we were talking about and on occasion would use them. So I could say not only did we know about operations research but we were doing operations research, because I would put Sig to work on something and he was very efficient, and ultimately got a job with DuPont's corporate facilities doing planning for the corporation. He got a job there (and retired from it) I think because he was so skilled at operations analysis, operations research.

HAIGH: As the project developed, how much of the work that the computer finished up doing was this kind of sophisticated statistical operations research and how much was straightforward data processing?

CARLSON: I would say something in the range of 60-70% was data processing, and 20-25% would be operations analysis type of work, and then another 4-5%, whatever small percentage was devoted to using Grace Hopper's products, such as the story I could tell about this overnight change in the system.

HAIGH: I'll ask you about that a little bit later. So can you give some examples of what the first data processing applications would have been?

CARLSON: Since I had worked at what was then known as Chambers Works, a big plant for tetraethyl, Freon, dyes, and a whole host of organic chemicals, we went to the guy who was handling the scheduling of these intermediates through the various plant units to come up with product. He was an incredible genius. He could sit there at his desk and just rotate the systems in his mind and tell you what was going to happen when and what. Well, I put a team of three guys to work to go back and understand what he's doing and see if that can be programmed. It took them about six months, but they finally came in. He was thinking of retiring when he discovered what he'd been doing could in fact be put on a machine. That was a real blow to him. So he decided to retire, and we put the thing on the air. I thought that was one of the major contributions that here we just unwrapped this guy's mind which was brilliant, absolutely brilliant, and put in on a machine. So I always felt that was one of the great accomplishments that we could point to.

HAIGH: Would you consider that a data processing application or an operations analysis application?

CARLSON: Well, I considered it an operations analysis application, but the data processing had to be exceptionally accurate and timely to be useful, because this guy had it all in his mind that he knew exactly when and how, so the programs had to have that same data processing capability. The real tough part of it was the data processing part, because once you started the machine going, if it didn't come up with answers that people used, uh-oh, you were done!

HAIGH: It seems that in general payroll, accounting, and inventory were important applications for early computers.

CARLSON: Yes, we had the payroll accounting right off the bat—that was the very first thing we did.

HAIGH: Why was that?

CARLSON: Because it was a part of the Engineering Department. The Chief Engineer could say, “Let’s do this.” I gave him the project proposal and he accepted it, and the poor guys running the Wilmington shops plant had no choice.

HAIGH: So I know payroll was the first application of the Univac at General Electric. Was that because it was a relatively straightforward thing to do?

CARLSON: That’s what we thought. What we discovered was that the rules that affected each individual ended up being provided by 12 different people down at the Wilmington shops. There were 12 sets of rules for each of these different work shoes, time off on vacation—anything that had to do with the pay, someway somewhere had to handle how to deal with it across the 300 people by name. So it wasn’t that easy. We had to unwrap all those 12 different sets of rules into the system.

HAIGH: Did you have the authority to simplify the rules, or did you have to computerize it exactly how it was?

CARLSON: We did not have the authority. We had the opportunities to convince the people involved who could then go either to DuPont financial controls or even to the state of Delaware and ask for exceptions or modifications that would make it easier.

HAIGH: So how much of the complexity was legally mandated, and how much was just custom and tradition?

CARLSON: It's my recollection that at least 50% of it was legally mandated. The rules set forth by the state legislature were very clear and very firm, and by God you followed them! But as I say, the startling thing to discover and to follow through on and to do something about was to find there were 12 different sources of rules, not one.

HAIGH: Let's talk about what it was like in a practical kind of sense, then. When you were asked to take charge of this group, did you know anything at all about computers?

CARLSON: No, because the engineering research division out of its laboratory had whatever knowledge there was. All I knew about computers was that they did good things, and therefore I thought this would help that plant down in West Virginia if we could find some way to do that, and that's what I was pounding the table on, until the Chief Engineer suddenly handed me the task.

HAIGH: When you were handed the task, how did you go about finding out about computers?

CARLSON: Well, there were two things that needed to be done. I talked to the Univac salesman and to the IBM salesman and said, "We're in the process now of wanting to get a computer. What can you do for me?" Well, both of those two salesmen knew punch cards. That's what

they'd been selling DuPont for a longtime. The Univac guy never did get off the hook. Long after we got the Univac, he was still a punch card salesman, and I finally had to go to the top management of Univac and get another representative.

HAIGH: So was it your opinion that the Univac sales staff weren't very well organized?

CARLSON: The sales effort under a guy named Luther Harr was really quite well operated, but above him was a man by the name of John Parker. Parker's name has shown up in more recent years; Harr has disappeared. But I would go to the salesman who would take it up through the channel. It didn't take me long to discover that these marketing people, Parker and Harr, couldn't communicate with the top engineering guy in Univac. One of the things we accomplished was that I forced a meeting up in a hotel conference room in New York between the marketing guys and the engineering guys in Univac to talk about the problems that we wanted solved, made those two guys talk to each other. It was the first time they'd said anything to each other in months! We had to do something about it.

HAIGH: So you found out about computers primarily from the sales representatives.

CARLSON: And by the sales representative getting me in charge of people like Harr because they had to report up the line a bit. Then I learned about Grace Hopper and the Philadelphia group, and even later once we got a good computer salesman, learned about ERA and the Minneapolis operation.

HAIGH: So at that point there weren't really any independent sources of information? You were relying on the manufacturers.

CARLSON: Nothing hit me in the face that I can recall. It might have been there, but if it was, I couldn't understand it, I guess.

HAIGH: Once the order was placed, did you have any access to a Univac machine anywhere else to practice on, while you were waiting for delivery?

CARLSON: Oh, sure. In late August, we had our first computer programmer training session. I think there were 23 people in the room, something on that order, and they would go off and write programs of one kind or another. Some of us were interested in what those programs did. We sent them the programmer and the program up to Philadelphia and ran the machines up there.

HAIGH: You said that was the first training session. So did somebody come from Univac to do the training?

CARLSON: Yes. Noel Zpkin. But he took the thing on and was enthusiastic enough to make things happen, which is really what counted.

HAIGH: Were those people part of the team that had been assigned to you? So someone was sent from each part of the company to join with you.

CARLSON: No. This was an Engineering Department group. Or I'll take that back. We had something out of that 23 there were 12 people from the Treasury Department; these were programmers in this two-year project. So it was split about 50/50 between Engineering and Treasury since the term of getting those two staffs gung-ho.

HAIGH: And how were the programmers selected internally?

CARLSON: As I've been saying, the best I could see just from the way some of these people behave was that when my division manager went to the Chief Engineer or to the other division managers for some people, two or three people or whatever, the other division manager says, "Ah, I can handle that one quickly." He'd let go of two guys he didn't want. But the reason he didn't want them was that they were dissatisfied with the way the work was being done. They were happy as hell to be able to do something like program a computer and solving problems.

HAIGH: Did you have any kind of aptitude test or weeding out process, or did pretty much all these people go on to be programmers?

CARLSON: No, no. A group of people showed up about the second year that wanted to do training, and I thought that was a great idea because we had struggled a lot with that. And then they said, "Well, how do we select the people we want to train?" I said, "Well, here's a guy who doesn't work for us but is tremendously interested. His background is music. And by the way, here's a guy on my staff whose background is music. They communicate and have no difficulty getting along and doing good programming." So I said, "Let's look at not subjects; let's look at skill sets." And they went off and said, "What are you talking about? We don't deal with things like that." I said, "Well, what I discover as I look around my staff is that we get good performance if people have the right kind of backgrounds and interest." So it's backgrounds and interest that will make the difference.

It was further exemplified when I hired a gal who had worked out in GE in Louisville and had some trouble with some guy who put a sex act on her or something. Anyway, she came back east and applied and we hired her. And I had another gal who had just graduated from Massachusetts

University or Brown or somewhere, in mathematics. Got her on the staff and she did an outstanding job of really understanding problem structures and problem analysis. The combination of the first two I brought in from the outside and the fact that they were women had all kinds of eyebrows raised. But, when we got the Univac, the staff person from the company who came in and helped with all of the activities was a woman, what IBM had been calling a system engineer. She was very bright. She had worked with Grace Hopper for about four years. She knew computers from A to Z and back, and had no difficulty at all understanding what we were trying to do fortunately. So she made an enormous help in making sure that we looked at things the right way, which was really what we had to do.

HAIGH: So do you know how big the initial programming team was?

CARLSON: I have no idea how many of those Treasury Department people did actual programming, but I think all 12 of them did. One of them was quite senior and even went into the CODASYL Committee, as an example, he was so good. At some point or another, I had at least ten, maybe as many as fifteen people on these different projects that we were running because they were all over the company. They learned the A10 language, and then we taught them whatever that first compiler from Grace [Hopper] was, and then the B0.<sup>1</sup> I don't think more than three or four of my guys ever worked with B0.

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<sup>1</sup> UNIVAC's B0 compiler was enhanced and marketed as "Flow-Matic," an early high level language for business applications. Like other proprietary business languages of the late 1950s it was replaced by COBOL before reaching its full potential.

HAIGH: Did you have a separate team of systems analysts, or was that work put together with programming?

CARLSON: Those we made them as well as programmers, because that's the kind of level of their intellect that I was fortunate enough to have received. There were very few dummies.

HAIGH: Did you ever have separate coders? I know in some installations they tried to separate into programming and coding.

CARLSON: No. Over that two-year period, the people who did the programming did the coding. As I said in the language, we would follow the progress of Grace Hopper's languages and the Univac languages as we went along. We were their test bed.

[Tape 2, Side A]

HAIGH: Was there a separate team of keypunch people putting the data into the system?

CARLSON: There was the Accounting Department at the Treasury as well as the accounting people in the Treasury. Both departments had their keypunch people because they were still using punch card machines. We were the interlopers! So they had their own staff with which we did not have much contact. We just let them go ahead and do their job. Once we got a project, we might have something to worry about this scheduling thing at Chambers' Works. An enormous amount of what he did was to run things through punch card machines to produce the schedules, which then became the printed documents that went out. So we had a client impact on those people and worked with them to make sure that what we did satisfied the need.

HAIGH: So once the computer arrived there were these two parallel groups of people using it: the Operations Analysis people and the Treasury people?

CARLSON: Yes.

HAIGH: And they have their own programmers and their own keypunch people and so on.

CARLSON: They had a complete staff under a guy name Herb Samworth. He was chosen by the Treasurer for a very singular reason. DuPont had sued General Motors back sometime right after the war over General Motors trying to manage DuPont activities because of their large holdings. It seems like it was as big as a couple hundred people handling that case, and Samworth got put in charge of that team, and managed it so well that when this question came up of handling the computers the Treasurer put Herb right there and said, "Work with Walter and make this thing happen." It was one of these wonderful things where Herb would say something and I would finish it and vice versa.

HAIGH: Presumably there would also have been a team of operators.

CARLSON: Oh, yes. We had no background, no experience whatsoever in terms of operating a Univac I. Have you ever seen one?

HAIGH: I've seen pieces of one.

CARLSON: We had 18 memory cells, mercury tanks. It took a very good-sized room to put the machine in and the tapes, the console, and everything else was in a room that got sort of opened up and set aside for that purpose in December.

HAIGH: I know in many cases the early computer installations required novel features like air conditioning and false floors. Was it a challenge to get the space ready?

CARLSON: No. It was the Engineering Department, so all I had to do was tell them what we needed and they took care of it. The chief was very sure that nothing like that got in the way.

HAIGH: Would you have a stream of visitors coming through to admire it?

CARLSON: No. We set it in such a way that there was this glass wall. Everybody could look in, and all our people were inside working it.

HAIGH: So it'd be like going to the zoo?

CARLSON: Exactly. Then this operations question you've asked was important. I had a guy who I was handed when my group was set up to have a statistician. He was technically not superior. He handled statistics, but not very well. So I asked him if he would be more satisfied putting together a team to run this facility. It turned out the answer was yes. So then I went to Grace Hopper and said, "Got to have somebody that really can run it, run the machine. Knows enough about it." She said, "I'll give you Mario." So she sent down Mario Schiavarelli. He became a part of our staff working for **Bill Shelgrin**, and was the guy that really knew how to run the machine. When we had other special problems he could bring somebody down from Philadelphia to get us over the hump. On occasion we had two or three operators down from Philadelphia just for short periods to take care of some schedules that we needed.

HAIGH: How big would the internal operations team be?

CARLSON: At one point I think I counted I had 54 different bodies reporting. I had two deputies, one to handle my technical issues, and one to handle my accounting and operating problems. Then on down to an organization that I think got up as high as 50 people.

HAIGH: Do you have a sense of how many of those would have been running the machine itself?

CARLSON: Four or five.

HAIGH: So relatively small.

CARLSON: They could bring their tapes in, set them aside, and we would run the tapes for them and get the output.

HAIGH: So the programmers themselves would never touch the machine?

CARLSON: Well, it wasn't never. It would have been a strange occasion like this one night that we had a programmer in to redo the whole payroll. Want me to put that on tape?

HAIGH: Sure, but just answer another question first. How many shifts did you run it?

CARLSON: Three. We had enough programming activity that the machine was being used an awful lot for experiments of running programs just to see whether the program worked or not. We learned an awful lot of things about the code that Univac provided<sup>78</sup>. Dig into the corner, pull out something out and put something else back in. But they overlooked what they had done improperly so the program they gave us wasn't working and we had to find out why and fix it. We did an awful lot of such fixing. So the machine got used an awful lot in its early stages to

make sure that it worked. Then once we had these large programs going, it was time to give up. The thing stayed on three shifts.

HAIGH: Would you tend to run the production jobs in the day shift and the development at night, or was it all mixed up together?

CARLSON: It depended on how important the experiment was. I could schedule all of the things that we would promise people in the way of production anytime during the day because most of them were written to run unattended by the programmer, and we insisted on that—if we were going to write a program that we were going to use for production, it had to run for production and he or she could go do something else. No, this system was pretty hardnosed in terms of making things happen properly. Guys like Mario were very good at finding out quickly when something needed to be changed.

HAIGH: How reliable was the Univac I?

CARLSON: I recall some numbers that were in the 98% uptime, because we had signals from the mercury tanks, which were really the itchy babies on the system. They would signal sometimes that they were having difficulty, that the electric charge running through the mercury wouldn't hit because of the temperature of the tank or some strange reason. We nearly always had one of those tanks out and under repair before it could shut down the machine. Again, people like Mario were quick. As a matter of fact, you could hear that Univac run, and if it didn't hit that right set of notes, look out!

HAIGH: So you could hear the memory working?

CARLSON: You could hear the machine. It had tones.

HAIGH: Now was that something that they had built-in on purpose, or was it just a side effect of the machinery?

CARLSON: No, it was just the effect of the machinery as far as I could tell. I asked a lot of times around, "How did this get designed?" "Oh, it didn't get designed. It happened." But it did. The operators became very skilled at listening.

HAIGH: So you were able to manage the memory issue. I also remember that the tape drives could be a real problem with the Univac.

CARLSON: Tape drives started to be. They were made up in Connecticut by a Univac subsidiary, I think; I can't remember. But in any event, I put one of my engineers on my staff to work, and I said, "These things need to be up and running whenever we need them. See what you can do to get that happening." He went to work. As I recall he actually went to Connecticut, and sat down with the people making the machines, and in a matter of a few months, just two or three months, we had stuff coming in that we could put on the tape drives and forget about them—they ran. There's nothing I can tell you about what he did because he was off up in Connecticut doing it. He was a very good engineer in the mechanical sense.

HAIGH: Now I know you also want to talk about programming tools. You have the story you want to tell about the compiler, but why don't we start at the beginning with that. What came with the machine? Did you get anything? Did you get an assembler?

CARLSON: What came with the machine was a Univac language which was built in the Minus Three coding system. Every number that you see on paper is stored in the machine three numbers less.<sup>2</sup> That's the way it got coded in, and then the machine operated, and then when it printed out it simply added three numbers and printed it. It was a very tricky deal. It helped them solve the zero problem among others. So we had that language as the foundation stone, and that's what got taught in my first class.

HAIGH: So that was the new language of the machine itself?

CARLSON: The language of the machine itself.

HAIGH: I remember reading, this would have been slightly earlier, that the General Electric payroll system at Louisville for their Univac I was written in octal absolute, so they were just writing directly into the machine language there.

CARLSON: Yes, I'm sure they were. We had people doing that, but then as Grace Hopper and other people came up with an assembler, put that to work to take this machine language and put it into an operating system that wasn't too difficult to operate. Because we didn't have big jobs; all those jobs were really quite small efforts. Then when the A-2 compiler showed up in 1955, we very quickly moved to that and trained everybody on how to do Grace's compiler as well as testing it for her and letting her do that. Which then led to B-0 in '56 that was the real business programming language that we needed and used.

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<sup>2</sup> This system is known as "Excess-3 Binary Coded Decimal."

I was going to tell you, one way we used it was that here we were running this payroll for the Wilmington shops, 300 people, and I got a call one night at 10:30pm. The people down in the computer room said, "We can't use this program. They tell us that the law has changed and is affecting the way calculations are being made. We don't have those new calculations. Where can we get them?" So I had a programmer called Ted Bomeister, who had been working with B-0 for me, call him on the phone and said, "Get down to the shop and take a look at those formulas and see what's needed." He says, "Well, all right." So he went. 2:30 or 3:00 in the morning he called me up and he said, "Walter, it's running. I used B-0. I rewrote all of those rules into B-0 and put them back into the program and it's now writing checks." So he'd done it. I've never since had a bit of trouble thinking about using compilers.

HAIGH: Do you know if A-2 and B-0 were widely used by every Univac site?

CARLSON: As far as I was concerned, A-2 was widely used. B-0 didn't because CODASYL came along a few years later and COBOL occurred. A certain amount of B-0 is in COBOL because of Grace Hopper.

HAIGH: You had mentioned that on the Treasury side that they had a continuing punch card installation.

CARLSON: Oh, a big one.

HAIGH: So do you know if many of the people who finished up being involved with computing there would have had punch card backgrounds?

CARLSON: Nearly all of them. Nearly all of them knew how to wire boards.

HAIGH: So that's where you looked for application programmers and so on?

CARLSON: There were two or three on that staff who had in fact been analysts and who then came in and were challenged with learning about programming to the point that they could really be useful. As I said, one of them was a real star. **No, it was the fact of having this additional capability picked up that handful of analysts.** Well, the Treasurer himself and the deputy that he put in charge of this thing didn't understand what computing was about. They never did until they finally were handed a project for the 705 two years down the road. When we finished the two-year period, I couldn't find a justification for upgrading to a Univac II, but the Treasury Department with all of that data processing had no problem going from the Univac to a 705, and did so.

HAIGH: So you kept the Univac I and they went away to their own machine?

CARLSON: Univac I, and we finally got a Univac II after grinding away.

HAIGH: So then after that they were two separate installations, business and technical, and they went their own ways?

CARLSON: Yes.

HAIGH: And on your side, did anyone have punch card experience?

CARLSON: Yes, I had three or four who were outstanding, and one of the people we hired from the Midwest had been experienced in punch cards and was therefore valuable to have to be able to see the change. The methodologies users were acquainted with on punch cards had to be

changed an awful lot when they went to computer programs, and making that shift was a big training task, not just for my people but for the users as well.

That was why I was giving lectures to general management groups. The Chief Engineer understood perfectly what we were doing. So here I was explaining the Minus Three language on charts to general executives.

HAIGH: Before you ordered the computer, you had gone through this process of trying to estimate costs and benefits and show how it would pay for itself. One of the things that struck me is I've looked at this period of history is how difficult it would be to do that accurately when pretty much no companies have got computer installations up and running successfully. A lot of the numbers were just guesses. So as you later ordered the machine and put it in and got this experience of how things actually worked, how did the results measure up to the expectations?

CARLSON: Well, that goes back to the sense of the DuPont executive committee saying, "Here's a new technology. Let's try it." So it was an experiment and not a full out commitment.

HAIGH: So how did the costs and complexities and difficulty of getting jobs up and running in reality compare with what you assumed when you were doing the feasibility study?

CARLSON: About three times worse—on the order of three times worse.

HAIGH: Which dimensions shifted? Did you finish up with a bigger staff than you thought you had needed?

CARLSON: No, that's what I said. We had I think on the order of 12 of my people were in that first training thing that as I recall something like 54 on my total staff by the time I got out of there in '56.

HAIGH: Did it take a lot longer to get the job up and running than had been anticipated?

CARLSON: The answer is yes. With the Wilmington shops payroll experiment, the people who were running the show, who had the management responsibility in that department, didn't know in enough detail what their people were in fact doing or what the interactions among the people were. So we were discovering how people worked, and putting their procedures into good enough shape to keep them happy when we actually gave them some tool to automate them. That was very time consuming, but we did it.

HAIGH: So you held that job of heading operations analysis from 1954 to 1957?

CARLSON: No. The operations analysis group I was responsible for for two years.

HAIGH: So what did you do in 1956 and '57 then?

CARLSON: We finished the two-year project around December of 1956. So I was still there in early '57, but being turned down on going to a larger computer for the Engineering Department.

HAIGH: All right. So you put in a proposal to get a Univac II and that wasn't funded.

CARLSON: Not then. We did later, but not then. So there I was hanging in midair, and ended up taking a reassignment to the design division of the Engineering Department and took on the task of helping 1,000-1,100 person organization to start learning to use computers. Use them as users,

not as programmers, although we ended up with an LGP-30<sup>3</sup> at my office and got some others like it out. We actually we had design engineers out on little personal computers way back then.

HAIGH: So at that point, did you have a sense that computing was what you wanted to do with the rest of your career?

CARLSON: No. I didn't know. All I knew was that I could have a useful effect of doing what I was doing, and there would be others who could determine if they wanted me to do something else. I wasn't pushing.

HAIGH: So as far as you were concerned, at that point you might finish up going into planning, rising further in industrial engineering, that kind of thing?

CARLSON: Might be higher in the Engineering Department. I'd been out in one of the operating departments and helped run a plant, so I had that kind of background experience could be used. I wasn't worried, though I can recall my wife might have been.

HAIGH: Had you come into a lot of contact with people at other Univac installations? Did you feel a part of a community of people who were working these machines?

CARLSON: Yes, because I took the initiative to work through Univac people to creating a Univac users group, which I chaired for a couple of years. Brought in people from railroads, from steel. I can't remember what were the different companies involved. There were about five

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<sup>3</sup> A small electronic drum-based computer, intended for desk use.

or six different Univac users that I drew on hard enough to come to Wilmington for user group meetings.

HAIGH: Did it have a name?

CARLSON: We called ourselves the Univac user's group, which the name has disappeared I think into the mists somewhere.<sup>4</sup> But our real purpose then was to beat Univac over the head to get things done. Again, this experience we've been through of a salesman who couldn't handle it. John Parker and Luther Harr finally understood that and got skilled enough salespeople and system engineer types out on the installations that they could deal with the kinds of problems that arose. Here we were in DuPont experimenting with all these different new ways of using computers, and here were the railroad people struggling to get on top of that, GE on top of their efforts, and so on. So each of us could sit and talk about how well we got along with Univac. And then sometimes we could arrange to have a Univac person there to listen [chuckles]. That became the key purpose of our operation among the users was to get things organized and operating out of Univac that we wanted. As a matter of fact, a couple of years later, even though I'd stepped out of the Univac business, the guy that got appointed as their salesman was chatting with me one day, and he says, "You know, I've got to reflect back on what I was told when I got sent down here to Wilmington." I said, "What were you told?" He said, "Luther Harr called me

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<sup>4</sup> Carlson is probably referring to the Univac User's Association, a group representing users in the Northeast and formed during 1955.

in and he said go down and meet Walter Carlson, and whatever he says you do it. No argument.”

So he goes, “That was my instruction from my boss.”

HAIGH: Do you know what year this group would have first started meeting?

CARLSON: I would judge 1955, '56. We started right away. Here we were with Univac I, and there were another, what, ten or twelve of them scattered about? As fast as they went out, I think we got in touch with somebody to say, “Come join us and help us get things out of Univac we need,” which was the basic argument. And that’s when they came.

HAIGH: I know the IBM user group SHARE had had a similar impetus.

CARLSON: Yes. SHARE had something else going for it. SHARE had program exchange.

HAIGH: So did that never get going for Univac?

CARLSON: We never had that in Univac, except another thing happened. I don’t have these documents now, but we got the publications people in AICHE, American Institute of Chemical Engineers, to take an interest in publishing computer program manuals. By the time we did that there were a lot of FORTRAN programs around. I don't know how many actually, but here comes this thing back about this thick, almost an inch thick, with the basic mathematics, arithmetic, and what have you that worked with the problem. The code was derived from that problem, and test data result in using problems and results printed were in this manual. So I don't know how many of those books actually got printed by American Institute of Chemical Engineers, but I know I kept two of them around just to satisfy myself that that’s what we did. I have no recollection of how long that lasted. It didn’t last too long, but it occurred. It was not

only Univac programs then but IBM and CDC computers went into a lot of technical engineering and scientific areas which were chemically oriented.

HAIGH: Actually it says in your resume that you founded something called the Machine Computation Committee at the American Institute of Chemical Engineers in 1958.

CARLSON: That's right.

HAIGH: So what was that?

CARLSON: Here we are now. I've done my road at Univac. I had run a 100-yard dash with that two-year experiment, and now they wanted me to run the two mile or something like that, so I was looking about as to how best to use what I'd learned to benefit of the profession. Because I had joined ACM by then, but I was also very active in the American Institute of Chemical Engineers and convinced the top people there that there was enough computing now going on in chemical plants and chemical engineering operations that there ought to be a committee organized to make sure that all the benefits got properly organized and distributed. And that then led to the formation of a Machine Computation Committee, which I chaired and ran for a couple of years, bringing in people from each of the different companies, and I think a government agency or two. I can't remember exactly how that committee got formed, but it's somewhere in AICHE files. It was almost a SHARE type operation Our task for the committee then was to ensure that any new knowledge that came out of using computers could be broadly disseminated and used by the various members' companies.

HAIGH: How effective do you think it was in doing that?

CARLSON: I thought it was tremendously effective because these people worked so hard at it. Everybody really pitched in. That's what lead I think that these books that I was telling you about, the publishing of the programs. That was later on in its life. It's the kind of thing that that kind of committee was able to urge upon the institute and get something done on.

HAIGH: Well, let me ask then about your early involvement with ACM. Can you remember when you first heard of the organization?

CARLSON: In 1954 I joined the Operations Research Society of America, ORSA, because of my operations analysis title. I started going to some of their conferences. Then as the computer started appearing on the horizon, I asked around about the professional organizations available for people involving computing and heard about an ACM chapter in Philadelphia. I went to a couple of their meetings. Most of it was academic. Most of it was way over my head technically. So I kept looking around. I joined ACM just to get their publication, which I couldn't read because it was the Journal.

HAIGH: You couldn't read in the sense that it was too technical?

CARLSON: The technical detail and mathematics were well beyond me.

HAIGH: I think they had a lot of numerical analysis in those days.

CARLSON: Oh, it was loaded, let me tell you. It was quite some later that the Communications got put together, parts of which I still read. In any event, going to these meetings in Philadelphia I ran into a fellow who I thought was very wise and practical, Eric Weiss, who was working for Sun Oil Company I think at the time, running their computer programs. So Eric and I stayed in

touch all these years, but he was one of the guys that helped me understand that an organization like ACM had some potential. He thought so, too.

HAIGH: What did he think the potential was?

CARLSON: Well, here were two of us from an industry group, as opposed to being academics, and therefore maybe we could grow that thing to a useful structure. I think we did, because when I became President in 1970 I was the first non-Ph.D. to be President of ACM. But in any event, we did not do much in DuPont as a result of my ACM interests because there wasn't much that I could pick up to use, other than just listening to people's experiences. Most of it was from sidebar chats at the meetings instead of the meetings themselves. I got more out of the hallways than I did in conference rooms.

HAIGH: Did you start going along to national meetings?

CARLSON: I went to national meetings.

HAIGH: So how big would a national meeting have been in those days?

CARLSON: A national meeting of ACM would be 1,000-1,200 people, something along that order. I know I went to one in Louisville, where GE made a big presentation on what they were doing. That had at least 1,000 people there.

HAIGH: That would be the mid to late 1950s?

CARLSON: Mid to late '50s.

HAIGH: How big was the Philadelphia chapter?

CARLSON: Not very many people. My recollection is if more than half a dozen or a dozen people showed up it was big.

HAIGH: So it was quite small?

CARLSON: Yes, quite small and quite academic. Again, because people at the University of Pennsylvania had had a great deal to do with bring Univac into operation, and we stayed with it.

HAIGH: My impression is that most of the people within ACM in the late '50s and early '60s who had an interest in business applications of computing were on the West Coast around Los Angeles.

CARLSON: There were two ACMs those days: there was the ACM West and the ACM East, or almost literally ACM New York. The people out west had this dissatisfied tendency to look down their noses at those of us on the East Coast because we weren't doing enough of the good things, because they were just marching along bang, bang, bang, and look at you guys. You're just sitting there.

HAIGH: What did they think the good things were?

CARLSON: Well, handling scientific projects. Handling business data processing projects. They had all kinds of plusses to point to what their skills were leading them to. Most of it was "leading to" rather than "doing." They could sound off something wonderfully, but it hadn't happened yet. Mine was my judgment from the East Coast, and I usually said so.

So here are the two ACMs, and I can't remember when I felt that something could be done about it. But it was really well into the '60s that I felt that that rubbing of the two sides of the country was calming down. The AFIPS thing had caused this, because you had to work together to get it settled. It was Paul Armer, a guy I could work with, who was certainly one of the leading characters on the West Coast. He and I did a lot of things in common. Dick Canning even more so in the San Diego area. So I became personally involved in working with the people who were leading a lot of that West Coast activity. Walter Bauer another one. His story is quite something. I learned about that one through the Department of Defense.

[Tape 2, Side B]

HAIGH: I'm looking at the short article you published in *Database* in 1994 called "ACM and Special Interest Groups". You talk there about the origins of the Special Interest Group in Business Data Processing. And here as well about the Los Angeles chapter of the ACM, John Postley, and so on. So how did you first become aware of these people? Did you meet them at the ACM national meetings?

CARLSON: Well, there were two driving forces. One was Isaac Auerbach, who had his firm in Philadelphia and on whom I drew personally as well.

HAIGH: Did you meet him through the local ACM chapter in Philadelphia?

CARLSON: No. I've completely forgotten how we first met, but I certainly was using him as a consultant to DuPont through my group.

HAIGH: How would you describe your impressions of Auerbach?

CARLSON: He's a very bright guy. He knew exactly what he wanted to do in terms of technologies and the use of technologies for consulting purposes, which is what he did, and configuring the staff, create staff to take on that kind of project. How he got involved with computing I have no knowledge, except that he was very knowledgeable about uses of computers and organizations needed to make good use of computers, which is why I drew on him from the DuPont point of view. It didn't surprise me a bit in 1959 he goes off to Paris and ends up creating something called IFIP and becoming head of that, which added to his prestige as far as I was concerned. He also hired Postley, as I recall. Brought him over from England because of John's brilliance and wisdom in dealing with business problems. He was especially good at that.

HAIGH: So Postley was working for Auerbach?

CARLSON: I think. That's my recollection.

HAIGH: I believe he worked for the Rand Corporation. I hadn't heard of him working for Auerbach.

CARLSON: Yes, I'm not sure. Well, if it wasn't Postley, it was somebody like him that Isaac brought over.

HAIGH: I know he worked for RAND and was involved in SHARE. He worked at some point at the Bureau of Standards in Northrop, Hughes Dynamics, and then he went to Infomatics.

CARLSON: Then it's somebody with that kind of experience that Isaac had whose first name was John, as I recall. John Gosden, probably.

But this note here was I invited to the RAND Corporation Symposia—yes, I went to one, and they were a delight. You could sit there with a group of people who wanted to know something about the subject matter and be told a lot about that subject matter. Fred Gruenberger was a fabulous organizer with presentation skills. That was his main role, as far as I could tell, and he did it just wonderfully. If you went to one of his meetings you learned something. That's where I met people like Armer and other guys who worked at RAND, and always took back something I could use back in DuPont.

HAIGH: So when you talk about the “West Coast” faction of the ACM, do you have in mind people like Postley, Armer, the RAND Corporation people?

CARLSON: Canning. Yes. Walter Bauer.

HAIGH: So based around the ACM Los Angeles chapter?

CARLSON: All based around Los Angeles.

HAIGH: Let me check back to your actual ACM special interest groups. What you say in that article<sup>5</sup> is that the impetus to form it was coming from the Los Angeles people.

CARLSON: Yes, when it started there was an earlier event. People within ACM became properly concerned about the fragmentation of the different interests. Here were people really solidly after some subject, and the general meetings, annual meetings weren't doing anything to

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<sup>5</sup> Walter M. Carlson: ACM and Special Interest Groups. DATA BASE 25(2): 9-12 (1994).

help them with their special subject areas. So the idea came up, let's create special interest groups. I think that a lot of organizations since have had special interest groups because of what ACM did. In any event, the concept of the Special Interest Group and its management are all set on paper within ACM and approved by the council as something to be done. Then the fuss started. "Well, what special interest groups?" A couple of them came up right away. Would you believe with numerical control and things of that sort? It was a heavy base for discussion and communication. There were some others of us that, "There needs to be something for business data processing, which is where we've grown up. How can we do something about that?" I guess it was my discussions with Armer and Gruenberger and Canning and people like that that helped them put a push on and special interest groups for business data processing got formed. I didn't have time under the circumstances to provide any leadership; I was just an idea guy floating around to help make something happen as best I could, which is what I did.

HAIGH: Now when you say in the article was that you went to Harry Huskey, then President, and told him there were groups in the computing field that were ready to form their own societies if ACM did not work with them.

CARLSON: That was one of the arguments.

HAIGH: And "Harry was concerned enough to appoint me as a committee of one to look into the problem further, and report back to the ACM Council my findings at the ACM Council Meeting in the Fall of 1960."

CARLSON: Yes. That was a weird meeting. I still hadn't made my presentation, and in the course of looking at faces around the room, I found myself talking to one guy whose name was

Herbert Bright. He seemed to be listening. He seemed to be agreeing with what I was saying. So when I finished, sure enough Herb spoke up, in a sense, "I think we ought to do this." The rest of the Council, most of them academic, "Huh?" [Chuckles] With Herb's help sitting there on council, it went through.

HAIGH: Now you also mentioned that Bob Bemer was also on the council.

CARLSON: Bemer was one of the people that I learned from. He was one of those Southern California types. I can't remember for sure what role he played in the professional societies, but I know I became very much interested in what he was doing for his company and spent quite a bit of time talking to him about the business data processing and other things that he was putting in place, and stayed with him off and on for years, even after he left there and went to Arizona.

HAIGH: Now this idea of a special interest group, didn't those already exist within the engineering societies?

CARLSON: No. There was no such thing, certainly nothing by that name. There were classes of groups within chemical engineering, electrical engineering, mechanical engineering, civil engineering who had specialties, and these people organized within their own specialties. But they were recognized for the specialty and not for the organizational context in which they existed or created.

But once we had the problem in ACM, it was necessary to get the idea of data processing into the title of this particular special interest group (after numerical analysis people and others had their

way) to make sure that everybody understood that's what we're talking about. I guess I did tell Harry that [chuckles].

HAIGH: So to the best of your knowledge then, this idea of the special interest group as it was formed in ACM was quite innovative—you weren't just taking from another association?

CARLSON: No. It was invented as such within ACM was my recollection. Others might have had some broader view of it, but I didn't.

HAIGH: And that meeting with the ACM Council, was that the first time that you met with the ACM leadership in its official capability?

CARLSON: The answer is probably not, because that meeting occurred, in what, 1960? Yes, I guess I have to say it could have been, because I made my case to Harry, and Harry was kind enough to say, "Let's go at it." I had it in hand when I talked to Harry what the numerical analysis people were doing to create their own society at the time. I had physical evidence that what I was saying was true.

HAIGH: What was Husky like? Do you think he had a personal sense of the importance of data processing?

CARLSON: Husky knew an awful lot about the design of machines. He knew exactly what made them work and what made them not work. He also had a good sense of the organization needed to bring forward the technology because of where he had worked and what he had done in his own career. So I found him a good listener. What I wanted to see him about was mainly get ACM organized.

HAIGH: I'll ask you about some of the other people that you mentioned there. You mentioned them already, but I'll just ask you to describe in general your impression of their personalities, contributions, skills—that kind of thing. So you mentioned Paul Armer.

CARLSON: Paul Armer indeed. He was (I think he's now died), but he was one of my best friends over the years. He did me a large number of favors through the years. One ACM meeting I went to in Boston where I did some things or said some things which got me in deep trouble with the leadership, and Paul pulled me out of that one because he was acquainted with them well enough to be able to explain what I was really trying to do. Then on the West Coast Paul was always the guy that helped me become acquainted with and work with those people, with his RAND experiences and contacts with Willis Ware and others there. So I know it was his willingness to spend time with me that I thought was one of the most helpful parts of my life, because he also saw to it that I did useful things and good things, even though I didn't know I was doing them. So that was why his name would show up.

HAIGH: And Walter Bauer?

CARLSON: Walter Bauer was another case. I got involved in that one when I was working for the Department of Defense in the early 1960s, and a project showed up on the West Coast for...oh, dear. What was that one? The Air Force, or whoever it was, had this special facility there in Los Angeles writing large programs for aircraft carriers and other Air Force operations. Walter Bauer was the leader of that programming technology group. They did so well and the Air Force understood it so well that Walter finally got a promotion to one of the big consulting

firms there and didn't quite get to the top, didn't quite make it. So I've always had a feel for the job he did and the fact that he tried so hard.<sup>6</sup>

HAIGH: You also mentioned Dick Canning.

CARLSON: Dick Canning, San Diego area. He lived in Vista, California. For example, when I became President of ACM, I could just turn to Dick and say, "Here's a set of problems. Go look at it and tell me what I can do about them." It was that kind of relationship. He'd been around since year one, as far as I was concerned. He knew all the people. He had a particular sense of what to do to make an organization work. So he in one sense was my management consultant and did so over a long time, and as a matter of fact, last fall or last summer, I don't know how many months ago he was up here in California visiting his daughter who lives over near Sacramento and on his way back to San Diego stopped by here to see me here at the Lodge. It's been that kind of relationship through the years.

HAIGH: He was best known for publishing *EDP Analyzer*.

CARLSON: I'm sorry. He had his little magazine, and I thought it was one of the best things around because it told the facts. It stated what had done and what worked and what didn't work, and was brilliantly done. He got bought out and had to change the name of the thing, but he did and kept right on going. It was that kind of background that I drew upon when I came into being.

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<sup>6</sup> Walter Bauer is best known as co-founder of Informatics, one of the most successful software and services companies of the 1960s and 1970s. Prior to founding Informatics in 1962 he worked at Ramo-Wooldridge.

HAIGH: Did you know how he came to get involved with ACM?

CARLSON: No. He certainly was one of the West Coast group, as far as I was concerned, because nearly every time I had something to talk about in the West Coast I could call Paul Armer or call him.

HAIGH: You'd also mentioned George Glasser.

CARLSON: Well, Glasser is a very important case. He ran against me for President in the 1970 election. So did another guy, a professor at Cal Berkeley.

HAIGH: Had you known Glasser for a long time? Did you meet him in the 1950s?

CARLSON: No. I had met him of course, worked with him, and we knew each other quite well. In that sense it was a very positive election—each of us went forward into with full knowledge that whoever won was going to be all right. I was convinced that he could handle it, and he was convinced I could handle it as best I could tell. Didn't know what to do with this character at Berkeley. He didn't do much.

That was another element. One of the other things that I did as President was to reinstate the computer science conferences. Because of the effort to go so far into the business side of the technology, annual meetings became more and more business oriented and provider oriented. A bunch of professors got a hold of me one day, sat me down, and said, "Look. You're letting us down. We have other things to say. We're doing computer science. We want to talk computer science, and we'd like to do it under ACM's sponsorship instead of having to go out and create

something to do it properly.” So I said, “Okay. We’ll set up meetings on computer science,” which we did. They then became one of the big parts of ACM conferences through the years.

HAIGH: Let’s move back from that slightly then just to continue in your earlier involvement in ACM. So you had said that you had been active within the Philadelphia chapter.

CARLSON: Attendance. Primarily attendance.

HAIGH: But you had met Eric Weiss there and he seemed like a kindred spirit. Then you had been going to the national meetings and you became aware of all these people in the West Coast who were interested in data processing, and then you were the person who presented ACM council with the idea that there should be a special interest group. So how did things develop afterwards? Did you stay active within ACM through the early ‘60s? Were you elected to ACM Council or any offices like that?

CARLSON: I was elected to Council. I’m trying to remember. At some point I think I was, but I can’t remember.

HAIGH: It’s not listed on your resume.

CARLSON: It was not.

HAIGH: But in a way it would be surprising you hadn’t been, because I think generally the President and Vice President were chosen from there.

CARLSON: That got me on council of course, under Bernie Galler. Bernie was the President and I was his Vice President.

HAIGH: After you made this presentation to the ACM Council, did you stay involved with the politics of the organization, or did you go away for some time and not do too much?

CARLSON: Well, the answer is probably some. Not much, because early '63 I got this job at the Department of Defense as Director of Technical Information. Man oh man, that was really quite something that occupied my time for four years—really occupied it.

HAIGH: So we'll hold off on the discussion of ACM until we deal with some other things in your career that took place earlier. Now I'm also seeing in this period apparently in the Engineers' Joint Council you were chairman of something call the Information Systems Committee from 1960 to 1964.

CARLSON: Right. That was another piece of interaction. The Engineer's Joint Council (which is now the American Engineering Societies Organization, as I remember the name) was the place that the various engineering societies came together to do something in common, such as working on people coming into this country. There was a lot of this talk about engineering and science students now from other countries, and the early 1960s and '50s, right back after World War II, it was a big problem. The Engineer's Joint Council got formed by the various societies so that there was always one basic action that the engineering profession could bring forward if it had to. That's what it was there for. Well, from the AICHE point of view, because I was on their Machine Computation Committee. I got involved with the Engineer's Joint Council and created this committee of theirs, Information Systems Committee. I did that because what we learned in DuPont was that data processing is not information processing. Data processing and document handling are two different physical things, and the information is something else. That's

knowledge. So having that in background and with evidence that I could bring to it, I got the EJC leadership to agree that there could be a committee set up for the purpose of handling information as information, whether it was done with computers, with documents, with punch cards, with whatever. It was the information that counted. That was the nature of that activity.

HAIGH: When you say information in that context, are you think particularly of scientific information?

CARLSON: In my case with EJC, it was engineering information. It was engineering data, drawings, and anything that represented engineering knowledge, whether it was typed, run, or what have you. That's what we spent time working on. I wrote a report along the way that said, "Here is what's going on. Here's what needs to be done. And here's what the engineering profession ought to do to get it done." Well, the management and engineering people took a look at that and said, "Where do we get the money for that?" And the other people said, "You know, the government is spending a lot of money on information systems. Maybe I'll go down and talk to Washington to see if we can get some money to run these projects that you're talking about." So I did. I went down to the Department of Commerce, which is where the National Bureau of Standards was, and found that the Assistant Secretary of Commerce was interested in the subject but not in providing money. He said, "The people around here with money are in the Department of Defense. Why don't you go talk to them?"

HAIGH: And that's what led to your change of job is it?

CARLSON: Exactly because I went back to DuPont and said, "How do I find somebody in the Department of Defense to talk to?" One of the research directors I talked to about it said, "One of

our Vice Presidents is on a committee that's helping them find people. Why don't you call him and ask?" So I called a guy named Sam Lehner and said, "It's been suggested I go down and talk to the Defense Department about a big project that I think ought to be run and the engineering profession wants to run." He said, "What's it about?" I told him, and he said, "Well, the person you need to talk to is..." the number-three guy then in the Pentagon called Harold Brown. But in any event, I called his office and got his staff head and told him that I wanted to come down and present a proposal for carrying on a big study of engineering information, which I was sure would be useful to the Defense Department as well as to the rest of the country. He said, "Well, come on down." And he set November 8<sup>th</sup> if I recall as the time, which happened to be Election Day. Brown wasn't there, but the Vice Admiral named Charles Martell, who was the head of the staffing of DDR&E in the Pentagon then.

It turns out that what Sam Lehner had been aware of and had even called to my attention was that a piece showed up in *Chemical Engineering News* magazine to the effect that the Defense Department had been challenged by Senator Humphrey to do something about its information systems. So he says, "It's timely, Walter, for you to go down and talk to these people if you've got something they can use." I said, "All right." And got in, and Martell was not at the meeting that the Deputy Secretary had been at, but had been told by the Deputy Secretary, "Get this thing fixed." Wasn't told how to fix it, just fix it. Here I walked in, and I said, "When can I be there?" They said, "8:00." I said, "8:00 in Washington? I'm in Wilmington, Delaware." They said, "Well, you be here." So I was. I went down the night before and walked over the Pentagon from the Marriott to meet my 8:00 meeting. And here was Martell. I told him what I was there for and what I wanted to do and what I'd seen in the press. He had said, "We can't do it after 9:00. You

have to be down here by 9:00.” This was the time of the Cuban Missile Crisis. He had to go to a Navy meeting to be told what was going on there, so he had his responsibility, even though it wasn’t directly under him. So we talked for an hour, and he says, “All right. I’ll accept you here for lunch.” So we went into the Secretary’s dining room for lunch at the end of which Martell was saying, “How soon can you be here?” [Chuckles] So I told him that I had to tell DuPont I was going to do something like this, and he said, “Well, you go tell them tomorrow.” That was early November. I think it was the 10<sup>th</sup> of December, something like that that I’d made all the arrangements in DuPont and went down and checked in a contract with the Department of Defense.

HAIGH: I’ll stop you there on the story of that job, now you’ve finished describing how you were recruited. We still couldn’t talk about what you did at DuPont from ’57 to ’62. So chronologically we should finish with DuPont before we get too far into the next job.

CARLSON: I’m sure you’re right.

HAIGH: As you mentioned, while we’re dealing with these associations, in this period the other thing we should talk about is AFIPS.

CARLSON: I understand that. That’s a fairly long story.

HAIGH: I see that you’re involved with that for a long time. So that was happening in parallel with the work the Engineering Joint Council.

CARLSON: That was going on in parallel, right. That’s right. There were three basic... the Engineering Council Committee; the AIChE Committee, which continued even though I think I

stepped aside somewhere in this period; then there was the defense job, which is where my salary came from.

HAIGH: And AFIPS.

CARLSON: And staying with ACM's various activities, especially after I got to Washington.

HAIGH: So according to your resume, you were one of the founders of AFIPS in 1961 and service as Director from 1961 to '64.

CARLSON: Correct.

HAIGH: So do you want to tell the story of your involvement with the founding of AFIPS?<sup>7</sup>

CARLSON: Yes, let's go back to that. When I was working with the ACM people and again so well with the West Coast people, and my personal contacts with Isaac Auerbach, I became aware of the need for an agency within the United States that could deal with this new international organization (IFIP), and I think I volunteered to use whatever I could in background to help get such an organization going. I said, "I can tell you that ACM is not alone in having the kind of people who can deal with the environment that's now being created. I don't know enough about the IEEE computer group to do that, but let's see what can be done about creating an organization." So I think it was again Huskey was still there, and it was proposed that there be

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<sup>7</sup> Carlson has previously told the story of the founding of AFIPS in Walter M. Carlson, "The Wonderful World of AFIPS," *Communications of the ACM* 16:5 (May 1973), 273-274.

established a committee, or a council if you want to call it that, that would look at this question. Who's going to represent the United States, and how should it be formed? What will its responsibilities be as an organization? What if? So we began a series of meetings, and three guys would show up from IEEE. Might have had a couple of other people there from ACM.

HAIGH: So you became one of the official ACM representatives?

CARLSON: I became one of the official representatives in this group. There were others. I can't remember SIAM or any of these other people got into it or not, because the big fuss was between ACM and IEEE computer group. As I said, I'd be sitting there, something would come up. I'd look across the table, and I'd punch one of my ACM friends and say, "Well, you're about to get a little Hart speech." Frank Hart was the guy who was very rabid about wanting to be sure that the organization designated by the United States was going to be the IEEE.

HAIGH: So he was one of the IEEE representatives?

CARLSON: He was one of the IEEE representatives, and was very strong on it. So we could argue him down, and did many times. But in the final analysis, the decision was not made by this committee or council; it was made by the heads of the organizations. I got to know the President of IEEE directly in '64, I guess it was. Meanwhile I had worked with him in the early stages of his growing up through IEEE. So when AFIPS had to be created, a special group was set aside. None of us had been doing the arguing, but here are the things we needed: American representation, and merging of the different technical interests of these member societies that will be included in AFIPS. The fact that these conferences had been going on under the National Joint Computer Conference said here's where the money comes from. There wasn't any question

that by the early 1960s there was a large amount of money going into the societies from the NJCC conferences and if they picked up those conferences that was a part of it. NJCC was a representative in this council meeting as well; it was hitting them head-on. It was my recollection that it was essentially the NJCC people, who had the big hit financially, who were responsible for sitting down and making sure it happened, once they were told that this work for the computer conferences would exist only through this new organization. They had to design how that organization should exist, and what they came up with of course after the IFIP name was the American Federation of Information Processing Societies.

HAIGH: I'm seeing AFIPS was first chartered at the Western Joint Computer Conference in May 1961 as basically a new charter of the FJCC, which had been jointly organizing those conferences between ACM and IEEE.

CARLSON: Exactly the point.

HAIGH: And it also had the Simulation Councils and the American Documentation Institute as affiliate members in the early days.

CARLSON: Well, yes. That's why I said I don't remember whether the SIAM sat in the group or not, but anyway, we were all aware of their interests in the subject while this was going on.

HAIGH: How about the Data Processing Management Association?

CARLSON: That was easy. They were the punch card guys.

HAIGH: Well, I know that at least some of the people involved in founding AFIPS been talking about this idea of having an umbrella group for the computer profession as a whole, and had thought that DPMA should be part of it right from the beginning.

CARLSON: Well, there wasn't much. The ACM national people that I worked for in those early years didn't think much of DPMA. It wasn't until I became president that we even began talking about taking full effect of what the DPMA represented and had accomplished. But the general attitude was that's those punch card managers, and they don't know anything about what we're doing.

HAIGH: So do you know when you personally first became aware of DPMA?

CARLSON: I'm sure it was in the late '50s because you couldn't hold an ACM meeting without some punch card people around. It's my recollection that the Philadelphia chapter of DPMA was a very active bunch of people and made a lot of noise.

HAIGH: Well, I'll ask you more about DPMA later on. That was just a question in the context of AFIPS. From your point of view, then the primary and overriding reason for its formation was this need to have a joint American representative to IFIP?

CARLSON: Right.

HAIGH: I think Willis Ware was the first Chairman of the Board.

CARLSON: Yes. That was an interesting election. I guess it was at that Los Angeles meeting when AFIPS got formed. The question was, "Well, who are going to be the officers?" A group of

people were given an opportunity to make suggestions. In the course of those discussions, I said, "I don't know whether my DuPont management would be willing to take on something this far removed from chemical engineering and chemical technology." They said, "Well, could you find out?" I said, "Well, I'll give a call." This is now East Coast time. I called back and got a hold of a guy who was a special assistant to the Chief Engineer in DuPont and said, "Ray, I have this problem on my hands and they want me to run to the head of an organization that's being created today." "What's it about?" So I told him. "Well, that all ties to your computer work." I said, "Yes, but in a totally different context. It has to do with creating an American representative for foreign and international affairs." He says, "Well, let me find out. Where can I reach you?" So I said, "Here's my number." He went in and talked to the assistant Chief Engineer. Read had gone by then. Lunch had started, so I was sitting there in my room in the hotel waiting for this call and he came back and he said, "Well, Walter, doesn't look like it ought to go. It's not the right thing for somebody like you to get involved with, in our judgment now." So I walked down the head table and got a hold of the chairman of the nominating committee who was sitting there, did that, walked back out. And the first person I ran into as I walked out of the room was Willis Ware. He said, "How are you doing? You ready?" I said, "No, I just got told I can't do it." He said, "I've been working all morning for you!" That ended that opportunity, shall we say. But we went ahead and created AFIPS that day.

HAIGH: I know that some people particularly associated with the West Coast and the Rand Corporation Symposium had the idea that rather than just serve as a national representative to IFIP, that what was really needed was some kind of big computer society that would be large

enough and diverse enough to represent the profession as a whole. So when AFIPS came along, they were hoping that it would be more effective as a kind of super society domestically.

CARLSON: I don't doubt they felt that way at all. The task that literally existed was a much more narrow task, plus the shows. The shows were a really big financial support for these smaller societies, and giving away all that money to some new agency wasn't a very smart thing to be talking about from a society finance point of view.

HAIGH: So you think then the reliance on the JCC as a funding source would mitigate against broadening the AFIPS mission?

CARLSON: That was my recollection, yes.

HAIGH: When I read the transcripts from the 1959 Rand Corporation Symposium, which included Paul Armor, Herb Grosch, Walter Bauer, Willis Ware, it had a lot of discussion of this concept of the computer profession and the need for some kind of broader organization to represent it. One of the most outspoken people was Herb Grosch.

CARLSON: Herb Grosch was always outspoken.

HAIGH: Did you have much contact with him?

CARLSON: Well, I guess the answer is probably yes, because one of the things that I had to do later on was help him get a job and maintain contact with how he was doing, because he would tend to sound off wherever he was in ways that grated all kinds of people. He was not sensitive to personal relationships at all, although he seemed to have a number of women around that he

could deal with [chuckles]. Herb I guess I could classify as a friend. He once wrote an article. He said, "I have heard from my friend Carlson. Blast, blast, blast, blast."

HAIGH: So that was the founding. Then you were on the board. You were a director, presumably continuing as one of the ACM representatives from 1961 to 1964. Then immediately after that you were chair of the finance committee from 1965 to '67.

CARLSON: Right.

HAIGH: So do you remember any particular controversies or issues that you faced during that period?

CARLSON: The operation of the shows was exceptionally well done. A fellow named Charlie Asmus ran those shows and brought in these hundreds of thousands of dollars for distribution to the societies. When that effort began to be picked up commercially, he said it was just by AFIPS. The participation in the AFIPS shows started going down. So there was a real money problem foreseeable. We worked for those three years getting that done, and one of the key reasons I became chairman of the finance committee was that I kept insisting that there ought to be ways to supplement this one source, and we had to find them. So the bulk of the effort that created this committee was to offset the declining income from the shows as they were continuing to go down. They finally did and out, and ultimately that also took AFIPS out. But what we worked on for the period I was there was how best to finance or to gain financial support for things that AFIPS needed to do. Instead of just supporting its members, it even got to the question of supporting AFIPS itself.

HAIGH: What things did you believe AFIPS needed to do?

CARLSON: Well, there were a lot. Probably the most difficult and challenging was to help the computer profession. Here are all these different societies, and here's our level, and here's the level of the computer profession. How is AFIPS representing the United States in this way we do, do something about getting the profession more deeply involved, organized for its own benefit? Never did succeed in doing that. Peter Denning is still writing about it.

HAIGH: So by getting the profession more organized, do you mean having a greater proportion of the overall number of people working on computers be part of a professional organization?

CARLSON: Well, no. The Labor Department kept coming up with these five-year forecasts, looking down the road at these huge numbers of people who could professionally being gauged in computer technology whether hardware, software, systems, or whatever. These were very large numbers, and way beyond anything that was represented by the AFIPS Society membership. So is it education? Is it publication? What other ways in which people who are even now in or coming into this profession would be attracted to these societies? Couldn't get the kind of cooperation we needed from IEEE. I can't remember what ACM did if anything. It was a no-go for the most part. But the purpose was to help understand what the profession was going to turn into. And I went to some meetings at the Labor Department setup in Washington to talk to people there about how do they know these things are going to be this large. They said, "Look at the money being spent." I had to agree with them—look at the money being spent. That was the guide.

HAIGH: The impression I got from reading what had been written about AFIPS and looking at some of the papers was that the member societies were happy to have AFIPS there funneling money to them from the conferences.

CARLSON: Very much so.

HAIGH: They were less happy about the idea of letting AFIPS keep more of the money to do these kinds of more ambitious programs.

CARLSON: Exactly. Precisely right. Which again was what the finance committee had to get involved trying to help management sort that out. They never did.

HAIGH: You had mentioned problems with the IEEE relationship during the founding of AFIPS. Did the relationship improve as time went by?

CARLSON: In 1965 when I became Treasurer of Engineer's Joint Council, we had another big difficulty because IEEE wanted out of the Engineer's Joint Council and was using their large membership base as an argument for doing so. By a great good fortune, Hal Linder<sup>8</sup>, that I had known for several years, became president for IEEE and went to work with him to keep the old IRE types calmed down on their desire to be something different and special. He took the trouble of making sure that over into the IEEE computer society group, or whatever their name was, that we didn't go off the beam. He was concerned that IEEE as a total organization stay central and

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<sup>8</sup> Clarence Linder was IEEE President in 1964.

visible within these organizations and not trying to stir things up for the particular and sole benefit of IEEE. He was a remarkable man, because most of those presidents would have said, "Yes, let's go half them." [Chuckles]

HAIGH: Do you have anything else to say about AFIPS in the 1960s? You talked about Willis Ware. Now I think there's also someone called Goode involved.

CARLSON: Oh, Harry Goode. What happened is that it was all a cinch. The easy way to create AFIPS was to take a guy by the name of Harry Goode at the University of Michigan and put him in charge of a new organization, because he had contacts, consulting and technical, all over the United States because he was such a skilled guy. I was even using him as a consultant for DuPont and knew him well. So the idea came, let's turn Harry loose to create this new thing that meets Isaac Auerbach's need for a national organization. He can draw upon each of these organizations as needed to create this new entity. And actually a piece of paper appeared somewhere with Harry's name on it as to how it was going to be set up. Three weeks later he had this car accident and was killed, and that ended that thrust, bang, right there. It was the general feeling that Harry was good enough (if you'll pardon the pun) to make it happen.

HAIGH: So that was Plan A, and then rechartering JCC was Plan B?

CARLSON: Right, which made it succeed.

HAIGH: Okay. Well, I realized we haven't really talked about your work at DuPont from 1957 onward. So I think you mentioned briefly that from 1957 to 1960 you were involved with helping to arrange training for engineers to use computers.

CARLSON: Not only that, but when we got going with helping the design division understand how to use computers in DuPont, a bulk of my contributions had ended. I had a couple people on my staff who themselves were excellent computer specialists and could follow right on through and could help everybody. I spent some time, more than a little bit of time in fact, helping the Engineering Department management understand what information was being used to carry on the engineering work. If you're going to computerize something, you better make sure it was going to be useful. And I spent a lot of time going out to a number of guys in the design division and research division who were working across engineering and across DuPont to help design and build plants. We had one case where every piping drawing for a large facility had to be initialed and signed by one particular guy. We went to him and said, "Hey, you're the man in charge now. Do you sign these things off?" He goes, "Yes. I sometimes change them and sometimes I just let them go signed." I said, "What do you use? What's your information?" He reaches in his drawer and pulls out a large sheet of paper and says, "There it is." He had set down on one sheet of paper the key things that he was going to look for every time he saw a piping drawing. There was a woman here at the Lodge, for example, whose husband was the top man that I would go to on a distillation problem, to get the information needed to go ahead with the project. His wife is now here living right down the hall here at the Lodge, and at meals every time I see her.

HAIGH: So were you involved with helping them computerize those processes then, or was this totally separate?

CARLSON: My job was to work more on the information question rather than the use of computers to process it. That's what led me down the road to use the information more.

HAIGH: So on your resume, the only thing you wrote for 1957 to '60 was manage computer training for 1,100 design engineers. But actually you were doing these other things as well.

CARLSON: Yes. These special studies.

HAIGH: All right. So this is 1960 to 1962. This is what you did after your computer training.

CARLSON: After I stepped out of the design division, yes.

HAIGH: So this is what you describe in your resume as 1960 to 1962 "special studies for engineering and research division, including new products". So was that job a promotion?

CARLSON: In one sense it was because I was working with the two guys under the Chief Engineer. He had two assistants, two deputies, and most of these special things that I was working on came with their support and in some cases instigation. It was that comment about new products is that we had some people out at our research division who had redesigned all kinds of light measurement instruments. They measure light waves in all kinds of subtle ways, and over periods of time could actually build instruments to use that. Question: should we find somebody to build those things? Get some money out of new products that use that technology? Big question. Dug around and finally came back with the answer, "No, not now." It's too sophisticated for the marketplace. The demand doesn't exist in the marketplace for what these people have already designed and implemented to help build DuPont plants and run DuPont operations. So it was that kind of a question.

HAIGH: When you were doing that job, did you have a team assisting you, or was it more of an individual job?

CARLSON: Individual. Didn't need many people around. I was just out talking to people and pulling large amounts of data in to understand the marketplace if we were talking about a product, for example.

HAIGH: So that job was what led you into the interest you discussed earlier in technical information handling?

CARLSON: Correct. Now within the Engineering Department, at that time there was a group of half a dozen to a dozen people who worked on the question: how do you effectively transfer engineering information? Not just documents, not drawings, not sheets, but the information, the knowledge. How do you transfer the knowledge from the people who have to have it from research to design to manufacturing to construction? They had come up with a whole set of ways of doing that. We had helped them a lot of course with our computer activities, and we had some rather major computer projects that helped them build their information handling systems. At that point, I'd gotten into saying, "Documents aren't the thing. Information is the thing." Then this crazy thing from Defense hit, and the next thing I knew I was down at the Defense Department talking about setting up an information system, which I'll get back to one of these times.

HAIGH: Yes, I think tomorrow. So by that point were you ready to leave DuPont?

CARLSON: Yes. What this defense thing did was to jerk me right out of DuPont. I was gone within weeks.

HAIGH: Was that a surprise to you? Or did you have a sense that it was time to move on and find a different place to work?

CARLSON: I had done enough work on process improvement to know what the laboratories had done and how the information coming out of there got used to improve the plant operations. I was also aware of the fact that a fellow named George Holbrook, who had started in the laboratory, went out and used laboratory data to build processes out in the plant and had become a Vice President of DuPont because of that range of skills. Another handle on this question of using information is the key to growth. In his case, personal growth. I was dissatisfied with the kind of attention I was getting, so I called George one day and I said, "Look..."

HAIGH: In what sense dissatisfied?

CARLSON: Well, things weren't moving fast enough. I mean I could take proposals and couldn't get them acted on. That kind of thing. In DuPont's Engineering Department, either you had the boss up there pulling you or you had one hell of a fight getting up into decision levels. I was fussing with that a lot, because here I was off on new things that people didn't have any background or experience on. I was creating. So I called George one day. "Look, George, you've done it, and I need to do it." He said, "How old are you now?" I told him. He said, "Well, I can't do anything more than say keep at it." So there was his advice: Keep at it. It was in that time period that this defense thing hit. I kept at it in my own way.

*Session Three begins on the morning of Sunday November 27<sup>th</sup>, 2005, in Los Gatos, California.*

HAIGH: So in our session yesterday, we got as far as your being hired by the Department of Defense to be involved in the new Office of Technical Information.

CARLSON: As I recall, we stopped where I had gone down to interview them on what needed to be done relative to a project that they had to get started. The source of that project was that Senator Hubert Humphrey of Minnesota had called up his Senate committee, and had in that room the head of the Science Foundation, the head of the Atomic Energy Commission, the Deputy Secretary of Defense, the head of Science and Technology for the Department of Commerce, and head of the National Bureau of Standards. He had the entire collection there and beat them up because none of them, in his judgment of his staff's research, had found a place anywhere in the federal government that even came close to matching what the Soviets were doing in Moscow of collecting all of the scientific documents that they could get their hands on and storing them in one place, VINITI. Humphrey was saying, "You've got to get something done." So the Deputy Secretary of Defense said, "Well, sir, you've made a good point. We'll go forward with this." The Senator said, "When?" The defense guy said, "End of the year, sir." Well, there are two ends of the year; one was the national fiscal year and the other is the calendar year. So Humphrey immediately asked him, "Which one?" He said, "End of the calendar year." Well, I arrived in November for this session, and they said Admiral Martell wanted me to come in and take on the position that they were committed to Humphrey to create. DuPont let me go and I went in in early December on contract, and worked away for a while. Then Christmas week they brought a lawyer in to write a directive that was going to establish the position I was going

to take. We sat in his office and he dictated this directive, which the Secretary of Defense would sign by the end of the year. I listened carefully. Along the midst of the discussion, he used the word supervise. Well, I knew what a supervisor was. In my DuPont experience that was the guy well down into the operations. I said, "Are you sure that's high enough to accomplish what you want?" He said, "Oh, yes. We have a special meaning for that word. We'll leave it in and do that." By the way, the document carried December 31<sup>st</sup> on its cover. I won't tell you when in January it got signed. It was in fact the first start of the year. Then as I sat down and went to work, occasionally people would come in and say, "Where did you get that power?" I said, "What power?" They said, "Read this." It turned out I could speak for the Secretary in my area of responsibility of scientific and technical information handling, and in fact did so. A month after I was really officially there I took something that was known as ASTIA, Armed Services Technical Information Agency, and--

HAIGH: That agency was already in existence?

CARLSON: It had been there for years and was being operated by the Air Force, so that's part of the Defense Department. I changed its name to Defense Documentation Center, getting back to this question of what is information, where does it appear for use? Then I proceeded over the next few months to move it out of the Air Force into the Defense Supply Agency in a different location in the Washington area and left the Air Force Colonel behind in the Air Force and put a civilian in my staff in charge of it, Bob Stegmeier. It was in that set of developments that I discovered what power I really had. All I had to do was get something written in the way of a process or procedure required by the different agencies of the Defense Department, and its

contractors, by the way. So I had to be very, very careful as to what in fact I got my hands on and started messing around with. But I was able in the course of that to cancel one project that the Army was spending \$11 million on, but had no real support from the people in the Army who were supposed to be using it when it got finished.

But I also had to wonder how on Earth does information get used in the Department of Defense and its contractors? I would end up creating two projects, both of which cost around a million dollars, of going out and talking to people who were doing the actual work. What information did you acquire or did you already have, and how did it get used? And we ended up with something called work units. A project no matter how large could be broken down into individual work units, which had its own technical aspects to it, and then could tackle a question where did the information come from that solved that work unit. Whether it's design or research or doesn't make any difference, it could be defined in terms of the information required.

Well, those two studies, one inside the defense department and the other one inside contractors, developed rather well, but about a third of anything that a technical person needed working on a defense project was the information already in his head. It was pleasantly astounding to see how much was there and ready for use. Another 20-30% came from down the hall. It was people he talked to on a daily basis. Then close to another third came from organizations established to supply this kind of information. It was the organization, not its publication, that provided the information needed. Then something in the 5-10% range came from literature, it came from a document of some kind. It was an astonishing discovery, and I even influenced the guy who was in charge of defense research work to pay attention to that and take a good hard look at how

research is being done for all of the Department of Defense in terms of how they got the information and how they used it.

HAIGH: So are you saying it's astonishing because people would have assumed that higher proportions come from...?

CARLSON: Everybody, of course, was hammering documents. Everybody was talking about literature. Everybody was saying how important it was to get things published. Well, that wasn't the real driving force. That's never really been used, as far as I know, in terms of any policy.

HAIGH: So with these results you're talking about published?

CARLSON: We published an article in *Datamation* on the work unit concept that then went and repeated some of these numbers that I've just given you as to how people actually did work on getting problems solved in defense, and suggested that the work unit concept ought to be looked at and used everywhere because it did show up quickly what went on. You could really track and see how things came together within these technical activities of the Department of Defense. I had support for that, and I got the funding for those studies from a guy named Jack Licklider, who had been at MIT and was in charge of information systems research for the Department of Defense.

HAIGH: And ARPA?

CARLSON: And ARPA. It was his office which down the road then went ahead in using some of his initiatives that led to Roberts and others creating Internet. So he was an extremely useful guy to me because he gave me the money to get this work done!

Anyway, the question how did I make this happen? How did I get organized? It was an incredible situation. Admiral Martell and I could start a sentence and the other would finish it. We had this set of ideas which we could express and then follow through on. So I didn't have a bit of trouble with my boss getting agreement as to what needed to be done. I brought two or three people in as staff and went to work on different information systems scattered around the military. As I indicated a while ago, one of them that the Army was paying for was just a no-go, because all it did was provide salary for the people in the consulting firm that got the contract. They were not about to produce anything of great use for the Army that the Army people wanted. So I finally got more and more of the individual units of the Army's technical and the military technical organization saying in useful words what it was they wanted so we could go ahead and help them get it. And this work unit idea had a large effect on that, because they could then define in detail exactly what they needed in the way of information to get the job done.

So with about three or four years of that kind of effort, I'd finally gotten to the point where I thought, "Well, I've got this organized now," and start looking for something else. That was when by 1967 I'd been there for four years and was ready to leave. What then happened was because of what I'd done on the research side, the Deputy Secretary and some others said, "Why don't we do this for the engineering side, for the procurement side?" which was the installation logistics part of defense. I found myself being handed the task of organizing how best to use these concepts in these other areas of defense. I worked with the deputy, DDR&E guy Eugene Fubini, an Italian, to help installation logistics people understand what we had done and do something better, and they made some changes. They brought a guy in who was so good, in fact, that he became Secretary McNamara's morning advisor. They met at 8:30 every morning, and

the general would tell McNamara what intelligence people and others were doing about the war in Vietnam and help McNamara make his decisions on that. So it had kind of a side effect there. But I could tell that at least I was getting enough done when a meeting of Defense Science Board General Bill Ely, who was then my boss, took over for Martell, stood up and he said, "I'll give you a report now on what we're doing in my area. But let me just say thank God for Walter Carlson." [Chuckles] He says, "I don't need to say much more than that except it's going well." Then about a year later when the Secretary of Defense number two guy retired and left he held a press conference, somebody suggested perhaps I ought to attend it. Sure enough, he mentioned my name as one of the accomplishments of his tenure there, so I felt that well, all right something useful has been done. I would have a terrible time describing it in enough detail to justify those comments, but at least I satisfied my management in there.

I had told people, "All right, time to go." Fubini had left defense and gone to IBM as a group executive. He came back one night at a special meeting and came over to see me in my office before he went over to the meeting. He said, "How soon are you going to be out of here?" I said, "Well, I'm ready to leave." He said, "I'll find a job for you at IBM."

[Tape 3, Side B].

HAIGH: All right, so let's talk through the big picture of your tenure at the Department of Defense. Now I see in your resume you refer to the Office of Technical Information as being what you created and managed, but I believe you had spoken a minute ago about the Documentation Department.

CARLSON: Well, because of the way the job was setup in defense, even though it was down in the Air Force, at least my office was responsible for the ASTIA. It turned out that when I did some calculations I found out that the charter I had for my office, I could examine \$126 million a year worth of information and document activities of one kind or another. So it was the question then of sorting those things out and deciding what really needed to be improved or changed in those, and that was the nature of the task, which we worked on very vigorously.

I had one person I brought in from the Navy. Well, when the Navy came in to talk to me about my new assignment, the head of the Navy brought this gal along, Donna Spiegler, and she interviewed me, so I hired her! She had one way of getting information out of people. Go and sit down with them and they would say something, she'd say, "Why?" The only question she ever asked that I remember was "why." It really shook most of them up so that they finally had to explain exactly what it was they were talking about and why it was important. To me it was great having somebody like that who could sit there and in such an embarrassing way make these people communicate. No matter what it was they were trying to sell, we found out what it was they were doing.

HAIGH: So did the Documentation Department turn into the Office of Technical Information?

CARLSON: No, no. It was a unit of 150 people that had been in the Air Force, which I moved into the Defense Supply Agency at another physical location and turned it over to civilian leadership instead of military leadership to perform its function. I even got the Department of Commerce, which was then running another document operation in Washington, to coordinate and consolidate some of its activities with the defense unit, so that we in Defense could operate

more on classified documents and let them in Commerce deal with the unclassified technical documentation.

HAIGH: Which unit did the name Office of Technical Information apply to?

CARLSON: That was my office.

HAIGH: So that was the official name for the thing that you were heading?

CARLSON: That's right. And I had the title Director of Technical Information.

HAIGH: And you said that had about 150 people in it?

CARLSON: No. I had three people.

HAIGH: What was it that had 150 people in it?

CARLSON: That was the Defense Documentation Center, a big unit handling all these technical reports.

HAIGH: Okay, so the Documentation Center was the big thing, and the Office of Technical Information was the little thing?

CARLSON: In terms of size, yes.

HAIGH: That makes sense. I notice there's a period where a lot of people were talking about the idea of the information explosion and were enthusiastic about the potential of information science and new technologies like microfilm and information retrieval electronically to deal with this stuff.

CARLSON: Exactly.

HAIGH: Was that a new area that you were being exposed to during this period?

CARLSON: It goes all the way back into the 1950s, but inside DuPont when I was running the computer systems, I was a companion to an organization building up to handle the flow of information through research, design, construction, and operation of the plants that we were building. It was that management of flow that I had some help on in terms of getting them computer support, things of that sort. So I knew exactly how that worked. So when I got into places like Defense I could pose all kinds of questions as to whether they were doing it properly, because the so-called DuPont method became quite notorious in the early 1960s because of what we had accomplished in DuPont. So I could draw on that.

And going another direction that you stimulated in your question, I went to Stockholm to see one of their defense officials, because they had heard in Sweden what we were doing in my office, through their military liaison in the Pentagon. So this high level guy in Stockholm wanted to talk to me about how we did this and whether they should be doing what we were doing. So I went to Sweden and took my wife along on a trip and sat down in his office. He brought in his contractor, who then proceeded to give quite a bit of presentation on how they were attacking the "information systems questions". Well, most of it was stuff that I knew didn't work and wouldn't work because of the experience we'd had in DuPont, among others. So when the contractor left, the Defense guy said, "Well, what do you think?" I said, "I think you ought to get rid of that guy because he's spending your money and not going to give you anything. Three months later the Swedish military liaison in the Pentagon came by my office and said, "The Assistant Secretary

has agreed with you and has taken the action.” So it was interesting to have that kind of influence.

HAIGH: Did you build any ties with the community of academic information science researchers, or the ASIS, the American Society for Information Science?

CARLSON: The four years I was in the Pentagon, my primary contacts professionally were with the ACM group in Washington DC, and with the consultants in the business. When it became apparent to Defense that Humphrey was going to have this meeting they created a group of four guys to help the Secretary understand what the heck was about to hit him. So I had those four guys to draw on. None of them were employed by Defense that I could reach out to where they were around the country. So I spent a lot of time working with them and helping. In fact, one of them even got into the White House staff because of that experience. My contacts were ACM profession and the consultant thing, and to a modest extent with the computer industry. Among other things, I had caused one of the key guys in Defense, a fellow named Charlie Phillips, to become the chairman of the CODASYL Committee, which came up with COBOL and that sort of thing. So I had a lot to do. He was still there and helped me understand a lot of things that I needed to know to survive the kind of way that... If I wanted one of my things authorized, before I took it to the Secretary for authorization, I had to have 26 initials on a sheet. People like Phillips told me how to get some of this done. So I spent quite a bit of time working with the computer industry people who were getting things put in as well, because it was their equipment going to use the stuff I was interested in. So it was that kind of set of relationships that carried on.

HAIGH: You had implied that the initial idea was to create a gigantic central--

CARLSON: No. The idea that Senator Humphrey had was this VINITI thing in Moscow. I even got the *Saturday Evening Post* to get a writer busy debunking Humphrey's whole structure of that idea by showing what... For example, they had all the documents, but nobody could get them. It stored them nicely, but it didn't even have a system for bringing them out easily. We quickly took care of that, even to the point of this *Saturday Evening Post* article.

HAIGH: During years you were there, the Vietnam War was ramping up. Did that have any impact on what you were trying to do? Were people getting distracted by it?

CARLSON: No, but there were interesting things. One of these four guys that had been helping worked for Battelle Memorial Institute in Ohio, and he got involved with the intelligence community and went out to Southeast Asia, took a look around as to how intelligence was being handled in the Vietnam war. He showed up in my office one morning unannounced, and said, "You've got to get something done." I said, "What do you mean, *I've* got to get something done?" He said, "Well, here's what's really going on in Vietnam in terms of getting information here into Washington that Secretary McNamara can use in his conduct of the war. I said, "What can you tell me about it?" He said, "Well, I don't want to talk to you about it. I want to make sure to get your help to get me someplace where I can talk to people about it." So I did some digging around and got him into an office high enough that he spilled the beans, and that was when Secretary McNamara created the arrangement I mentioned earlier of having a general come in every morning and bring him up to date. So that was really the only specific contact I had with the Vietnam War was to be able to help sort this question out.

HAIGH: So is there anything else you want to say about your time at the Department of Defense?

CARLSON: No, I don't see anything. I think those are the important things, because it was that background and that confirmation of things I knew that I could use that gave me confidence in going ahead with what I then did in IBM and in ACM.

HAIGH: All right. Well, let's move back to ACM then. In 1968 you were elected as Vice President. How did that come about?

CARLSON: I'd had enough contacts around that as the nominating committee put their slate together of Bernie Galler for President and they needed a Vice President, they wanted somebody who was non-academic. The number of contacts I'd been having were enough that.... I think it was probably Paul Armer who after a meeting that we had somewhere in Southern California, or in San Francisco I guess, had told the nominating committee that my name be added on, which I then accepted. Maybe he was on it. I can't even remember. I know I had heard his recommendation. As far as I know there was no real battle. Bernie was of such stature, he carried the slate and away we went.

HAIGH: So the nominating committee was putting Galler forward with the idea that he was the person that they wanted to win?

CARLSON: Bernie Galler was an obvious choice for President. I kind of sneaked along!

HAIGH: So had any of the previous vice presidents been chosen in that way to balance the ticket with respect to non-academic representation?

CARLSON: That I don't know, but probably there was. Even though I think if you went back and looked carefully, you'd find that the academic or the Ph.D. guys were almost always there. There was funky guy without a Ph.D. coming in as an officer, and his name happened to be Carlson. [Chuckles]

HAIGH: So did you have the feeling that it was important that you didn't have a Ph.D.?

CARLSON: No. That had nothing to do with my sense of time. I was happy to be considered because of the things that I had learned over the years in working with the chapters and with the east/west battle during the AFIPS setup. There were things that the ACM could do differently, and that those of us in office might be able to help. So my objective was not to run it the way it had been run but to look at whether changes could be made. It was during that two years that ACM went broke, and because of the Council's orientation toward technology instead of finance, I had to go out. The people who were publishing the ACM publications, as I recall, loaned \$100,000 to ACM going into the 1970 timeframe in order to meet payrolls. Then at the end of that period that I suddenly became a candidate for President.

HAIGH: So let's just talk through your years as Vice President first. You were elected in 1968. I found an article published by you as letter from the ACM Vice President that there was a "Tide in the Affairs of Man" in *Communications of the ACM*, October 1969. At that point, one of the things you were proposing was that the number one goal at the association must be a broad base of membership, built upon all who were professionally involved in computing technologies and computer related activities, and you set forward the goal of 100,000 members by 1975, which would be about four times the size of the Association when you wrote that.

CARLSON: Correct, which was 25,000. Now what lay behind that was that the US Department of Labor was taking full note of the computer's entrance into the economy and into our national structure, and ran a survey which was presented at a meeting that said in 1975 there would be 500,000 people working in computer activities of one kind or another, everything from designing and building computers to using them. I was at that meeting, and quizzed the presenter afterward with how they got their information, and was satisfied that they knew what they were talking about. With that in mind, I sat down with my ACM friends and said, "Look, here's this opportunity. Here are people who professionally in some sense, at least technically, are going to be involved in working with computers or about computers. Do we have any ideas floating around in our special interest groups and what have you that can go out and capture more of those people, to the extent of reaching a reasonable fraction of that half a million people?" 100,000 seemed like a good fraction, so I used that in the article. But by that time I had been talking to people who understood how ACM operated and whether we could grow like, through its special interest groups, which is what would be attractive to this huge collection because there would be specialties. Well, there was some growth as a result, but nothing like I had predicted or proposed.

HAIGH: Then the next year in 1970 you had another article this time as ACM President's letter "Finding the Real Expert", *Communications of the ACM*, September 1970, where you called for a profession-wide effort that pulls together evaluating reports on the techniques used in teaching about computer and systems and designing them and building them and programming operating systems and applications for them, and operating them, and evaluating the benefits from their use

and then managing the people who perform these technical tasks. So my question there would be, when you say “a profession-wide effort” what did you think of the profession as being?

CARLSON: Well, there are two basic elements. There was the academic computer science-oriented profession, which was certainly a rigorous group of people. The other group were the people I’d helped put into work in DuPont and Defense and elsewhere who actually put the computers to work. The whole idea of FORTRAN, Basic, APL, hadn’t sunk in as far as giving end users the ability to create programs for their own professional interest. Mostly this was people turning to computer programmers and systems analysts and what have you in order to get something done effectively on a computer. So it was that latter group of analysts and programmers that I represented, and the other half as the other sense of the profession. And it was those people, of course, that I was most interested in having given the background I had.

HAIGH: So do you think your background gave you a different sense of what the profession should be from the people within the ACM who had Ph.D.s and academic jobs?

CARLSON: It certainly did at that time. That got changed later when the academic people came in and beat me up because we weren’t running computer science conferences. That made me realize that at least I had been overlooking a very important part of communication within the profession.

HAIGH: So that’s when you moved back somewhat more towards the academic side?

CARLSON: Right.

HAIGH: Did you have a sense as someone without a Ph.D., at least as Vice President who was there to balance the ticket with Bernie Galler, that it was your job to represent the people without Ph.D.s?

CARLSON: Well, I had Tony Ralston as my Vice President, who was an academic Ph.D. and professor. It was that combination of the two elements of the “profession” that were in my mind.

HAIGH: When you proposed that plan to massively expand the size of the society and broaden its coverage, do you remember getting any reactions to that?

CARLSON: Very little. There was one reaction. It was a delayed reaction because it took a while to come forward, but DPMA had to go through a whole series of difficulties, as I recall. At one point in time, its president was living in his car in an airport in Minneapolis or something like that.

HAIGH: Can you remember which president that would have been?

CARLSON: No. It was just that as I became more acquainted with the people involved, it was this guy who was in that kind of state, and the organization itself was in a bad state. Then as a part of their wanting to do something, a guy working for Boeing in Seattle stepped up and took over, and was much more helpful in taking a look at the question do you bring together all of these card area people who are doing data processing type work within this profession, as it were? So I think that article probably had as much to do in stimulating outside organizations than ACM itself, is my recollection.

HAIGH: Can you remember who the person who working Boeing was?

CARLSON: I was trying to remember.

HAIGH: Let me see if it is in my notes. Edward O. Lineback, would that be it? Let me see. He was elected Executive Vice President of the DPMA in 1970.

CARLSON: Yes.

HAIGH: So that would fit in terms of time. So did you have personal contact with the man?

CARLSON: Oh, yes.

HAIGH: How did you meet him?

CARLSON: There were actual meetings set up just for the two of us to talk at a conference, or I think on a couple of occasions I caught him when he was in the East Coast for some reason and we had a session. That was a very helpful set of discussions, because he knew exactly what DPMA could or couldn't do and was very straightforward in putting limits on what we talked about.

HAIGH: I found a comment that was published in an article. I'll obviously find the citation for that.<sup>9</sup> But in this you said that the odds on the Data Processing Management Association merging with the Association For Computer Machinery as zero for the next five years and 100% within the next ten. You were reported as saying that the ACM was under new management and would now reach strongly toward business for its members: "What we are saying to business

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<sup>9</sup> Poliski, I. "ACM Wedding Date Set," *Business Automation*, 17:3 (November 15<sup>th</sup> 1970), 6&27.

data processing people is we're going to work with you and your technology. There have been a lot of people responsible for ACM activity that decay business. Business is where I happen to have come from.... People who sang those songs are no longer in charge."

CARLSON: That was to switch away from the academic Ph.D. types.

HAIGH: So you're thinking this prediction that the associations would merge was based on the personal relationship that you were developing with Lineback?

CARLSON: He was one of the strongest. There were some others that were helpful, but I can't remember their names. There was enough interest, and Lineback had created enough interest within the DPMA, for me to make those comments. Because I wasn't just talking in thin air.

HAIGH: When you said that there was 100% chance that the associations would merge within five years, did you mean that literally?

CARLSON: I meant that literally. Because we could find ways, and in fact had defined ways which over that five-year period SIG BDP and other types of units in ACM would realign themselves with what DMA could bring forward. They would have to do some pretty strong things that they hadn't done before to make this work, but guys like Lineback was in a position where he could make it happen. Which he never did, but when I was making these comments I was looking at his participation.

HAIGH: On the ACM side, did you ever make any tangible steps to push forward this idea of merger?

CARLSON: No, none other than just getting people to talk about it.

HAIGH: And when people talked about it, what did they say?

CARLSON: “Don’t know how to make that happen, but if you know go right ahead.” It kept being handed right back to me to try and make something go.

HAIGH: As I’d looked at the documents for this period, it seems that both from the ACM side and on the DPMA side there were some negative stereotypes of the other side. The DPMA people would sometimes call the ACM people “longhairs” and “sneaker wearers”.

CARLSON: Oh, yes. There were people that got brought into these meetings from DPMA management holding office in DPMA who were very frosty at the idea of even talking to ACM, because we’re this academic crowd that didn’t have much realistic view of how life worked. They would make long speeches as to what a nutty thing it would be to try to join ACM. That’s what I expected, so it didn’t bother me too much because we just went ahead and did what we could do.

HAIGH: Then on the other side, it seems that some of the ACM people would just view the DPMA people as jumped-up punch card machine operators.

CARLSON: Yes. Here were these ACM specialists, or scientists if you want, who said, “what degrees do these people hold?” Questions like that would popup every time. It turns out that there were a large number of DPMA executives who might have had B.A. and B.S. degrees, but not all of them. An awful lot of them had not come through college.

HAIGH: Having looked at the internal DPMA documents, one of the things that becomes apparent in terms of attempts to build greater ties with ACM was that the Executive Director Calvin Elliot was very much opposed to that. Did you ever have any direct dealings with him?

CARLSON: Yes, I spent a lot of time Cal Elliot. He had a set of officers who were supporting his salary that had some strong objections to this ACM thing, and he under those circumstances could do nothing but offer his opposition to satisfy the people supporting him or paying him. I got Cal to agree on several occasions that there were worthwhile things to be done by bringing the two organizations together. Any effort he made to follow those ideas through would get him in trouble, as it turned out. So he backed off usually, but it was a political back off, not fundamental.

HAIGH: All right, so you would meet with him and discuss things and then he would come back to you and say, "I'm sorry, but I can't get people to agree to that."

CARLSON: Yes. I would keep finding that out. It was about that time that I gave up on the idea.

HAIGH: Then sometime in 1972 he seems to have been involuntarily removed from his position and replaced with a new Executive Director, Don W. Sanford. Did you ever meet with Sanford?

CARLSON: No. In one sense I'd gotten Cal in enough trouble with his people by giving him these thoughts to carry forward that in some sense I felt that I had helped him get fired, even though that was not my intention.

HAIGH: Another issue that was very much in play with respect to DPMA at that point was the question of whether it should be a member of AFIPS. Do you remember anything about those discussions?

CARLSON: I don't remember much of anything. I'm not sure I supported the idea of it. I think if the subject came up at all in my presence, I was probably more interested in getting the DPMA and ACM world together than to create just another entity for DPMA in AFIPS. I felt that the combination would be far more effective in helping offset the IEEE dominance in AFIPS. But I don't recall any serious discussion of DPMA and AFIPS.

HAIGH: I think the approval for its joining went through in 1973 and it finally joined in '74. But you don't recall much action towards that or active discussion in 1970 or '71 or '72?

CARLSON: No.

HAIGH: I expect that it makes sense. I think basically Elliot had been blocking that, and when they got rid of him it went through quite quickly. There was another thing DPMA was doing during this period that I know some people within the ACM were concerned about. Since the mid 1960s it had been running a "Certificate in Data Processing" and during the late '60s they were broadening up somewhat with a "Registered Business Programmer" qualification, with the idea that they might want to certify some other things as well. So do you recall anything about that program and people's reactions to it?

CARLSON: That's interesting. Now that you mention it, I remember there was some activity going on, but I don't know anything about it. I mean I don't have anything in my mind that gives me something to discuss.

HAIGH: Actually, again, a couple of years after you were ACM President there was something formed. Basically DPMA was realizing that it couldn't support that activity on its own, and something called the Institute for Certifying Computer Professionals was formed with a number of societies sponsoring it, among them the DPMA which transferred control to the new group, all of its certification programs, and also ACM. I think it's something that Anthony Ralston supported.

CARLSON: I'm sure he did.

HAIGH: And I believe someone called Fred H. Harris would have been active in ACM—Harris was the ACM representative to the new Institute for Certifying Computer Professionals. I think he actually ran it for a number of years.

CARLSON: Yea. Harris worked in Chicago, and when this whole idea came up, he dug into it enough. In discussion that I recall that he presented to us what it was about, and what would happen if ACM didn't participate. It was the threat of somebody else going without our participation is the reason it made me, as I recall now, give full support to Fred in carrying on in his work. Which he did beautifully. He was a real operator within that effort to create this whole certificate idea. But that was about the only thing that I got personally involved in was listening to Fred and helping make sure that ACM stayed involved. I'd completely forgotten about that.

HAIGH: Actually, in terms of expanding AFIPS, I've seen discussion in your 1972 presidential column in "Unfinished Business Three", *Communications of the ACM*, May 1972.

CARLSON: I wrote such an article.

HAIGH: You wrote that the willingness of AFIPS to admit new members was a crucial test of its legitimacy as being "fully represented to the computer field," and blamed its continuing reluctance to admit new member societies on "a desire of the three founder societies including ACM to control the proceeds of the joint computer conferences."

CARLSON: That was almost a fatal sore, because that attention in effect had blocked off participation in international events that IFIP wanted to carry forward.

HAIGH: In what way?

CARLSON: Well, it's just that as the profession and as the technology was growing and becoming more international, there needed to be a lot more effort placed on how standard ways of dealing with the technologies. We had done what we could in ACM to ensure that in the United States a lot of those things were taken care of. Sometimes over the IEEE objections. But the whole idea of language control and other things that were necessary had stayed effective. Then once the Germans came in with their programs, there wasn't a good American response. That was what one of the things I was getting to—there needed to be more of an international attack on these scholars, which AFIPS was not well-equipped to perform, owing to its other objectives.

HAIGH: Actually, I just pulled up the text of that article, so the specific context was to do with expanding AFIPS. Because a vote was coming up on whether to give SIAM and the Instrument Society of America full member status.

CARLSON: SIAM I remember. ISA I don't.

[Tape 4, Side A]

HAIGH: I also know what happened in that meeting, which was that over your objections the ACM Council imposed what was essentially a veto on giving full membership to SIAM. That prompted SIAM to threatened to withdraw and the whole thing got very messy, but eventually the rules were changed and SIAM came back.

CARLSON: Believe it or not, almost no recollection whatsoever of that event or that sequence. Others were running ACM vigorously with their own senses by that time; I was out of it.

HAIGH: Another society that was around at that time was the Association for Systems Management, which used to be the Systems and Procedures Association.

CARLSON: That's right. I was attracted to the idea and to some of the people who were running ASM, but best I can remember nothing really important came from any discussions I might have had with them. I know I had discussions with them, and I thought they were doing the right thing. I told them so. Best I can remember, I emphasized that they were talking about systems management. They ought to put their primary emphasis on what management needed, which was what the systems were going to do for them, and that they better sort out where the emphasis lay

in their efforts. I don't know if they did it or not, but that was sure the lecture I was giving them, considering what I was then going through as well as what I'd been through.

HAIGH: They seem to play out to the story going forward from that. I think they had been relatively active earlier on and gradually started to fade away. The systems and procedures people, it seems their heyday was really in the 1960s.

CARLSON: Oh, yes. They had their punch cards and tapes and stuff, and that's what they focused on. The big thing, as I recall, in discussions there was that the systems drove what the people were going to do instead of the people designing what the systems would accomplish. Then the procedures, once established, became essentially rigid and formidable.

HAIGH: So we've covered the ACM's relationship with other associations during that period. So let's return then inside the ACM itself. You were Vice President 1968-70 then President 1970-72. So we've talked on how you became Vice President and also your plan to expand the size of the society, at least your hope that it could be expanded.

CARLSON: That was an easy thing to arrive at after the labor prediction.

HAIGH: Another thing I know you were promoting was the idea of revitalizing the ACM's local chapters.

CARLSON: That had an interesting source. Owing to the way that ACM had been operating over the previous ten years when I took over, the people responsible for chapters—the chapter chairman or the head of the chapters committee—did not have any significant programs to help the chapters do more interesting things. I said earlier that when I go to an ACM chapter meeting,

the hallway discussions were far more helpful than what the chapter itself was doing in terms of presentations. So as I was becoming Vice President and President, my concern was that this collection of people who had been responsible for chapters really hadn't been all that active or innovative, and boy, did those chapters need innovation to get themselves back to work.

So I went around, I must have talked to a half a dozen people, saying, "Look, here's a big problem. The ACM needs you to get something done about it. Would you be willing to take on the task? You (whatever your name was) have shown a certain amount of effort to make things change. How about taking this one on?" It was a tough job, and Anita Cochran I think was the person who gladly said, "Yes, I'd be happy to do that, to give it a try." I think she was the one that I finally got interested in pushing Council and pushing herself and the various large chapters to think in terms of different ways of leading the chapter. However much of that got through I don't recall, but at least there was an effort to innovate with the chapter process.

HAIGH: You had spoken earlier in the interview about the East Coast/West Coast split. So it seems that the ACM chapter in Los Angeles had been the most active and innovative one nationally. I guess my first question on that would be whether you think that split had persisted through the '60s. Was that just an early '60s thing, or was that still the sense an East Coast/West Coast split by the end of the 1960s?

CARLSON: By the end of the 1960s when I took over President, that East/West argument had stopped. We'd resolved it essentially through the AFIPS agreement and things of that sort, so there wasn't this contention. And one of the things that I wanted out of innovation of the chapters was to get all the chapters to understand, for example, some of the things that Los Angeles had

done, because their mode of operation was far above Washington and other places like New York where I'd spent time had even thought of doing. I wanted to get somebody who could go in and make these things occur. So no, the argument had ended.

HAIGH: So you actually had the Los Angeles chapter in mind as a model?

CARLSON: Oh, absolutely.

HAIGH: Can you give some examples of the things that it was doing that you hoped other chapters would do?

CARLSON: Well, what they did was listen to SHARE, for example, on how to get better programs written and get people from outside ACM, such as the people working so vigorously on SHARE, to come in and describe the technologies like FORTRAN and other things that would make a difference. So what I was doing, I thought, was to get more of that type of external presentation available within the ACM chapters. There wasn't enough of it, as far as I was concerned. So that's one idea.

HAIGH: Well, I'm pleased that you say that, because I'd written in my dissertation that you seemed to have the ACM and Los Angeles chapter in mind as a model, so it's good to hear you say that! So it seemed that the growth of the association and the reform of the chapters were your two big ideas as Vice President. Then in 1970 you became President. Now was the tradition that the Vice President would usually become the next President by default, or what that not something that you'd been expecting?

CARLSON: I did something looking at that as I recall, and I think in 1959 something like that the Vice President did not become the President—there had been something like one in 23 years where that had not happened, as my recollection. That could be checked, but at the time I took on as Vice President and did some digging and said okay, well President is next.

HAIGH: How did that actually come about?

CARLSON: I don't recall much detail because I don't remember who the nominating committee was. I know that whoever it was came to me and said, "Well, if you'll say yes, you'll run for President, then you can name whoever you want as candidate for Vice President." I said, "No way am I going to get caught up in that kind of arrangement. It's up to you people to come up with the nomination and go ahead and do it." They didn't have much trouble finding George Glasser, who if I remember correctly was the one that they found to run against me. Ralston was kind of an easy choice, as I recall also for Vice President.

HAIGH: Had you known Ralston well prior to that?

CARLSON: Not well. I'd been quite well aware of his activity in his university on the committees he'd been serving on. He'd been quite active.

HAIGH: What was your opinion of Bernie Galler's work as President?

CARLSON: Bernie was an extremely smooth individual, and people could come to him with some of the roughest kinds of difficulties and Bernie would sit there, listen carefully, ask questions, and usually have an answer. He was extremely effective because he understood what the problems were, and in many cases knew what to do about it. He didn't spend a lot of time

thinking about what needed to be done because my sense was that he said, "I'm here to help solve problems when they arise," was his mode of dealing with the presidency, and he did. He just did that and quite effectively. So that was the impression I had. I knew that I could take almost anything I wanted to him and get an answer. Well, he had to draw others into the act.

HAIGH: You had mentioned that when you took over as ACM President that the association was in a state of serious financial trouble.

CARLSON: Yes. It had to go out and get a loan in order to meet payroll. We had gone to work to get better operation control within the headquarters and decided then that Don Madden, who was then the head of the staff, needed to be moved on, and Bernie Galler and Donn Parker and I came up with a way of doing that and handed Donn the task of convincing Don that he ought to leave. That was done just about a month before the election and I got in.

So one of the first things I had to do was then decide, well, who do we get in to make a replacement? I began by asking about to find suggestions for a new director. Then one of my UNIVAC friends told me about Gordon Smith. His legal name is Frederick Gordon Smith. But I don't recall him ever using that first name or anybody talking about him with it. He had been sales manager for Europe UNIVAC and was then serving as an executive director for a small association for manufacturing firms. I interviewed him twice at his palatial home in Greenwich. It was clear that he had the right background, skills, and interests to server as ACM staff head.

At least two consulting organizations provided us with the proper range of salaries for this position at ACM. Gordon accepted a level of salary in the mid-range of those surveys. Months

later, he confided that the salary was acceptable because it put a cap on his wife's wild shopping trips.

But then looking around at what had been going on, it didn't take very many fingers to count there were 42 people on the headquarters staff and start thinking about well, what do they do and what's the benefit to the ACM from what they do. It was difficult to find justification for that size.

HAIGH: So what kind of things were all those people doing?

CARLSON: Well, membership and then keeping records of all of these committees and staffing committees, that sort of thing. The things that I'd been through taught me that this didn't leave that many people for those services. With the Engineer's Joint Council we'd made a big reduction in staff there going through the same process of looking at what services there were and budgeting of zero to see if we could justify keeping the people. So I essentially handed the task to Gordon of taking that approach—look at who's doing what, see if it's justified, and then make a decision. As I recall, there were 42 people on the staff when I took office in the first of July, and by first of September there were 29.

A few months later I was at IBM headquarters in Armonk, New York, and one of my associates popped into the office and he said, "Walter, you have ruined my fun." I said, "What are you talking about?" He said, "Well, my organization has an office down there at 1515 Broadway where ACM headquarters are, and we'd finish a meeting, we'd go down to the third floor and look at the queers." Apparently Irene Hollister had not staffed the thing with enough sense of some of the interpersonal relationships and there was a lot of stuff going on that the staff was

enjoying each other. So I kept hearing about these people who had been fired who were terribly upset, but it was justified because of what they'd been doing as well as what they'd been not doing. So it was that kind of a situation that I walked into really without understanding what I was walking into, except we went at it.

HAIGH: So other than being overstaffed, what was your impression of how effectively the headquarters was operated?

CARLSON: Well, it needed better attention to whether it was meeting its goals. The officers and the council essentially laid on staff the task of carrying through a lot of projects. If they didn't do it well, it cost a lot of money or we didn't make enough money out of it. It didn't take long in looking at each of these different activities to whether they were paying for themselves to discover that hey, a lot has got to be changed. In many cases it was moving staff out; in many cases it was changing the guidance to the staff as to how best to operate the projects that they were handed. We consolidated a lot of the membership activities. There was one gal there who I thought was really quite competent, and Gordon would probably agree, and we gave her additional responsibilities to merge two or three of the different membership-related activities. The best I know she is still staff head all these years later. Or at least was for a very longtime. She did an excellent job. So it was that kind of thing that I thought was necessary, and in fact made a difference.

HAIGH: So I know that when you were elected as President, as well as that kind of cleaning out the headquarters office, one of the things that you did was try and launch an ambitious reform agenda appointing three panels, each of them charged with exploring a different challenges. So

basically do a strategic planning review: one panel of vice presidents, one of the losing opponents, and one of ACM members who weren't holding offices. You also have an informal ballet of ACM council members to try and set some goals and priorities.

CARLSON: I did? [Chuckles]

HAIGH: Apparently you did. You wrote that the association is going to have systems to define where we are going, how to measure how well we are doing, and to decide how much to spend in getting there to produce a set of ranked goals.

CARLSON: Well, that was easy. In DuPont I'd ended up helping management understand how to deal with such things as that new product effort as well as the strategic planning for what computer activity and things of that sort. Then in the Department of Defense, I was in a very strategic position and had to come up with a whole set of specific ways in which what we were assigned to do was in fact going to be accomplished. A lot of paperwork was generated in order to get strategic approaches clarified and agreed to. So it was that background of experience that I'd been through that didn't seem very difficult to say, "Let's do that with ACM." I'd been doing it at that point for about ten or 15 years in my job.

HAIGH: Right. At DuPont and then in the McNamara Defense Department, which liked that kind of systematic approach to things.

CARLSON: Yes.

HAIGH: How well did you find that that kind of approach translated to the culture of the ACM?

CARLSON: Not well. Again, once I got Tony Ralston to understand what I was thinking, the two of us could and did effectively go to an awful lot of the council members and people like that when we met with them to say, "Stop and think. Just don't keep doing what you've been doing. Think in terms of what you'd rather be doing." "Huh?!" In most of their minds that was a complete shocker. But that's how we got the point across that is going to be necessary for them in order for their future in ACM and the future of ACM to have that attitude. And that's what we tried to sell them, because I knew it worked.

HAIGH: I saw in your ACM President's letter "Unfinished Business I" in March 1972, you wrote that as a result of a "fundamental split" within the executive committee, and the refusal of the council to even to put strategic goals on its agenda, that no action would be taken on these things. Do you remember...?

CARLSON: I don't remember how exactly that happened, but it did happen. Again, we had support at Council meeting of two or three people, but not the whole 15-member Council.

HAIGH: Do you remember who supported it?

CARLSON: If I remember correctly, Bob Bemer, who was then sitting on the Council, was one of those, and I've worked gladly with him ever since. No, it was that kind of individual who understood what we were talking about, and sensed that ACM itself needed to have that kind of sense of looking out there. It wasn't enough looking forward far enough out to really control or guide ACM's activities, so that's what we were trying to get done.

HAIGH: Do you remember who the most vocal people were in opposing this agenda?

CARLSON: No. I guess my attitude in most of that was if they'd start talking I'd quit listening. These were not people that I felt were going to be very helpful, and therefore I wasn't going to spend much time with them. My attitude was quite negative in terms of the resistance that arose.

HAIGH: Then in April 1972 ACM President's Letter, "Unfinished Business II", you wrote that Council members have the flavor of a faculty senate rather than of a board of directors, and that the problem was that a "basic attitude that anyone elected to council should have the right to nitpick on any agenda topic, whether his experience in that particular subject matter or not and whether his facts are correct or not."

CARLSON: It was that sort of approach. There were many, many circumstances where Ralston and I would put something on the agenda, and we'd get the meeting and get to that point, and then bingo, here comes a speech. Presenting facts to argue either for or against, but the facts being presented were totally irrelevant or in fact false. How these people got away with their jobs, behaving like that, I would never understand. But the bulk of what appeared in most of those speeches was in fact not true.

HAIGH: And those are speeches being made by Council members?

CARLSON: Speeches made by Council members on an agenda item, and that's what I was referring to in my note. Because it was really disturbing that there could be that level of misadventure in something like the ACM Council.

HAIGH: One of the other things you wrote in one of those parting letters was, "It is simply beyond my comprehension that an organization of ACM's size and age should try to muddle

along with no formal statements of its goals. The consequences are all too obvious. The day-to-day priorities become merely a reflection of the personalities and interests of the officers and the headquarters staff. The budget becomes merely a scorecard of ad hoc political contests conducted within the ACM Council each May.” Then you concluded that, “An ACM member deserves more from his dues than a random walk through an unprogrammed forest of programs, projects, and activities.”

CARLSON: That’s wonderful language, isn’t it? But that’s how I felt.

HAIGH: So is it fair to say that by the end of your term as President you were feeling quite disillusioned about the response that you got through these initiatives?

CARLSON: I felt that I had not been nearly as effective in that job as I should have been, and what you are now reading was one way of expressing that. Although I’m impressed by the language I used, now that you read it. That’s the way I felt.

HAIGH: Then do you think that there would have been anything you could have done differently to push things through more effectively?

CARLSON: In retrospect, the answer’s probably no. All I can say is I tried, and I thought I’d tried pretty hard, as a matter of fact. But the evidence is there.

HAIGH: How involved with ACM did you stay after the end of your term as president? Would you have been automatically serving on the council as a past president? Did they have that position?

CARLSON: There was a two-year period that the past president had a spot on the Council after his presidency. So obviously I stayed on that.

HAIGH: Do you remember anything about the issues that were being dealt with during that period, or your participation?

CARLSON: Well, I guess the answer is that I'd become involved with so much of these other things that I really didn't spend much time with ACM matters at the council level for the reasons that you've just been reading. If it was disillusion, well, that might have been it. But I don't think I was disillusioned; I was just disappointed. That needs to be said in respect to what you've just read. So that was not something I was going to keep fighting for. I had other things to worry about—these government committees and things like that.

HAIGH: So really the end of your presidency was the end of your active involvement in the ACM council?

CARLSON: And in trying to get something important done.

With the exception of finding a new executive director in 1973. It turned out that Gordon had been as frustrated as I had. He either quit or was fired by new officers. I had just finished my time on ACM Council and was given the change to come up with another answer for the ACM executive director position. We hired Joe Cunningham with whom I'd worked in the Air Force and the Pentagon in the early 1960s. He was really an outstanding manager of computer systems within the Air Force at the top level. So I figured he can handle that.

HAIGH: Now I did want to ask you about Herb Grosch. His term as president was even more controversial than yours it appears, and I know he had an unusual kind of personality. So do you have any recollections of what he was up to during this period?

CARLSON: Not any particular details of his interests, except that his personality was clear from the beginning of his involvement in this computer activity. Here he was I guess working in Indiana, and he got a job to head up the computer organization there, and inside of a year was fired because of the way he behaved. It wasn't that he did anything wrong; he just did something wild—he was always doing things that people got upset by and doing it very loudly with his personality. He then went to the Bureau of Standards and made such a mess there that they had to replace him. They brought in Ruth Davis to run the shop. Again, because he would sound off in places where he shouldn't make noises, those kind of noises anyway. And so it went everywhere he arrived, his basic personality was giving him difficulty. When he got into ACM management again, that still with his basic difficulty and just saw more of it there.

HAIGH: Do you know how it was that he came to be elected president?

CARLSON: No. That occurred much without my observation, as it were, and I couldn't help him once I got there. I tried one thing, and I remember he wrote a letter or an article which he headed "My Former Friend" [chuckles].

HAIGH: And was that something that was published in *Communications of the ACM*?

CARLSON: It could have been. I don't recall where I saw it, but I know that's how he approached the problem for my participation.

HAIGH: I see he mentioned you in his May 1978 ACM President's Letter as being appointed chair of a search committee to find a new executive director, or whatever the job would be called, for AFIPS. It mentions you had this famous fireside chat.

CARLSON: What happened there was that Bob Rector, who had been Executive Director, retired. I don't think he was fired; I think it was his initiative to get out. But then as they were looking around, somebody asked me if I would set up a committee to pick somebody to fill that job, which by that time was over in New Jersey. For the life of me I can't figure out what we did or who we selected, but we did. It was the kind of thing that I would take on because I could do it, I guess.

HAIGH: I know Jean Sammet was also a vocal member of the ACM Council.

CARLSON: Oh, very much so.

HAIGH: She served as president, I think she would have been elected in 1974. So how were your relations with her?

CARLSON: Well, quite good, except that I had to go to her management and ask them to remove her from either an AFIPS or an ACM committee, I can't remember. But she was creating enough difficulty to make it impossible for the committee to operate. Since she worked for IBM, I worked for IBM, so they came to me and said, "Could you do something about this?" All I did was pick up the phone and call her boss and say, "Hey, Jean is very vigorous. So vigorous in fact that she's stirring up some difficulties for herself and for IBM. See if you can do something about it." So they removed her. Moved her from Boston down to Washington.

HAIGH: Can you remember what the committee was?

CARLSON: No. But I sure remember that Jean had done it.

HAIGH: Then after your term as President, I see from your resume that you were chair of the awards committee from 1979 to 1984. Anything stand out from that experience?

CARLSON: Well, I can tell you an anecdote. When I took over as President, I went to work with Grace Hopper to create the Grace Hopper award. Somebody wanted to put an award in her name, so I went and talked to her and said, "What do you want in the way of your name of an award?" She said, "I'd like to make sure this award is for somebody who does something unusual and different before the age of 30." I said, "That's the criterion?" She said, "Yes. Anybody who before the age of 30 makes themselves most useful to computer technology ought to get considered for an award." So we put it through. And as I later became chairman of the awards committee, each year I would ensure that there would be something brought up. One year, and I can't remember which one it was, someone came in with a name, and the rest of the committee turned it down. The name was Bill Gates. They wanted to give him one, and the reason for turning him down was what he had done was not technical.

HAIGH: I know the ACM is very proud of its Turing Award.

CARLSON: Yes, and it should be because the selection in my judgment has always been outstanding. Unusual sometimes, but outstanding. The effort to make sure that the person, or persons in some instances, being awarded and giving that prize have really qualified. So the committee of people responsible for making that recommendation have always done a thorough

job. It's not a light, top of the head sort of activity at all. So I've always been pleased by the Turing Award operation.

HAIGH: Then so finally on ACM, your resume also says you were chair of something called the Inter Society Liaison Committee from 1982 to '84.

CARLSON: What happened there was that we found enough going on in IEEE Computer Society thing that matched some of the SIG BDP and other ACM SIGs. So the question arose, do these things need to operate separately? Can they operate together? How would one get a decision? To answer that question, and among other things that got decided, was to put an IEEE member as a guest at the ACM Council table and an ACM member as a guest at the IEEE Computer Society table. I became that Computer Society's guest, and my name is still in their directory as a consequence. The idea being that as things came up that could be addressed effectively in terms of joint effort, that guest could bring them up at those meetings, and in fact on several occasions did. Nothing really came of it. It lasted its couple of years to settle things down. But I enjoyed doing that.

HAIGH: Well, that's probably a good point to breakup then. When we return we'll discuss your career at IBM.

[Tape 4, side B]

*Session Four begins on the afternoon of Sunday 27<sup>th</sup> of November 2005.*

HAIGH: I think we just concluded talking about your involvement with the ACM. What I suggest we do now is take some time to talk about your career with IBM from 1967 onwards.

Then we'll return to wrap-up talking about the other organizations and things you were involved with, and also your interest in distributed computing. I think you had mentioned the context in which you'd joined IBM, which was that your boss from the Department of Defense had come to IBM and asked you to follow along.

CARLSON: He was not my boss. His name was Eugene Fubini. He was the number two man in the DDR&E section of the Pentagon. While I didn't report to him, I at least began working with him when it was agreed to consolidate the scientific and technical information activities from research through procurement and installation areas. He had said when he left that he wanted to keep track of me. He did so, and came down one night to a meeting and told me that if I wanted to leave the Pentagon, well, he thought he could do something for me in IBM. I had already decided a few months before that 1966 was going to be the time I'd be out of there. So he went to work, and when I told him to get me some arrangement, he immediately lined up with a series of three interviews at IBM corporate headquarters for data processing division, and I went up and went through those. But then that was about June. Nothing really happened. And so in September I asked him if he knew anything more and he says, "Well, I guess we better do something else." So he immediately went to work and the next thing I knew I had an invitation from the Chief Scientist of IBM to come to Armonk for an interview.

HAIGH: And who was the chief scientist?

CARLSON: That was Manny Piore, who was not only Chief Scientist, he was also a member of the board. So I went up and we got along just fine. He said, "Well, I think I ought to hire you, but

I can't hold you. I can keep you here a few months and then find something for you." I said, "Okay." So that January of '67 I quit the Department of Defense and went to work for IBM.

HAIGH: Was the Chief Scientist responsible for running the Research and Development department?

CARLSON: No. He was the Chief Scientist in the sense that as a member of the board, he could deal with chairman, president, and board members on policy questions having to do with science and research.

HAIGH: So it was more like one of these "fellow" type positions that high tech companies offer distinguished scientists?

CARLSON: The way it worked was very interesting, because if I got into a problem area, which I did many times, I'd go to him and I'd say, "Here's what's going on and here's what needs to be done about it. What can you do?" He said, "Walter, I can't do anything," as he reached in order to pick up the phone and call somebody. And whenever he was on the phone making a suggestion, it usually went through. A member of the board, you don't ignore people like that in an organization like IBM.

So when I got there, he said, "Yes." But the title I had was Technical Consultant. What that meant was that I could go wherever I wanted or he could assign me to go someplace to look at a problem. And they weren't easy problems; there really some toughies that took a lot of attention. But I could get enough information to make up my mind as to what needed to be done, which I could then take to the management of the organization involved, and if I was having difficulty

convincing them of what I thought was appropriate, I could always go to Manny Piore and he'd say, "I can't do anything," but then reach around to the phone and make a suggestion to the top management involved.

HAIGH: So that was a new temporary job that had been created especially for you, was it?

CARLSON: It was indeed. So I asked him about that after the first one didn't work. He said, "Well, when you were up here interviews before, if any of us wanted to hire you, they had to go through the personnel staff to get approval for the hiring of somebody outside like that. When I wanted to hire you, I didn't have to do that; I just hired you. We bypassed the personnel organizations by getting you here."

HAIGH: What do you think the problem with the personnel organization might have been in your case?

CARLSON: Just a top-level outsider, which was not the usual thing that IBM did.

HAIGH: So they would prefer to promote internally?

CARLSON: Yes. When I went on the corporate staff, sometime later I went back and counted. There were eight of us on the entire corporate staff of IBM who had worked someplace else before we got to that position. The chief counsel was hired from Department of Justice, and a couple of technical hotshots were brought in on some research type planning efforts that got corporate attention. So it wasn't their usual thing to go in there, and I never got off the corporate staff the whole time I was there.

HAIGH: How big of a cultural shift was it from your previous experiences with DuPont to working at IBM?

CARLSON: Not very much at all, because in DuPont if I wanted to do something different and needed an authorization of some kind, whether personnel or financial, I had a layer or two or three above me that I could work my way systematically through to get approval to go ahead. In the Department of Defense, I was at that point speaking for the Secretary so I didn't need an awful lot of that except for these 26 initials on policy proposals. So that's what I took to IBM, and as I discovered how to best take full advantage of Piore's interests, as I just described, it didn't take much to get people to understand that if I was there and wanted to hear something, I could hear it. There wasn't much hiding of problems going on.

One of the key things I got involved in right away was that IBM way back in the 1950s had set up the Service Bureau Corporation in answer to some antitrust concerns that existed in the mid-'50s, and there it sat. It was kind of an almost literally a punch card level of computer operation because the services it provided were the things that various firms wanted done and it would charge for them. Well, now FORTRAN and similar languages were going to help create an online service instead of a batch service. So the question was should the service bureau corporation be brought internally into IBM to help make that happen? Almost instantly I ended up almost literally serving downtown with the service bureau people, trying to work that out. Never came up with an IBM answer to it, except that IBM sold the Service Bureau Corporation to Control Data Corporation as a consequence of all this effort, and the obvious need was portrayed which IBM couldn't handle but CDC felt they could.

But then it took 15 months of that kind of work as Technical Consultant and Chief Scientist before I ended up in the Corporate Marketing Department. I was making more noises like a salesman than I was a technical hero, and Piore sold me to the Vice President of Marketing to go on his staff. That then was where I stayed for the next ten or eleven years, both working out of Armonk and working with the Federal Systems Division in Washington on some special studies.

Then 1974 we got a new Vice President of Marketing and began to wonder out loud, “What the hell is that guy Carlson doing? I never see him. He’s out wandering around.” So he called me in and asked me, and I said, “Here’s some of the things I’m doing.” By that time I’d been working quite a bit with the General Products division out here in San Jose, helping them get disk drives of this huge cabinet size down to handheld size almost to deal with the kinds of problems that existed with desktop computers and things of that sort. He did some checking and found out yes, they’d paid attention to what I was doing, so he backed off. But he said, “What do you think I could do for you?” to me. I said, “Well, as I spend my time out in the West Coast, I find that there are other people here in Corporate Marketing wandering in and out of the West Coast operations. It might be worthwhile to have one person reporting to you out there. So he said, “Fine. You’re the guy.” The next think I knew, I was being transferred to the West Coast and arrived here in San Jose.

HAIGH: So was responsibility for marketing spread out widely among the different divisions?

CARLSON: There were three marketing units. There was the Data Processing Division, which was the US only; then there was the Europe and Africa; then there was the East Asia Pacific group. There were three different marketing sales organizations. Then the Corporate Marketing

staff had the task of consolidating helping them get the products out of the product divisions that they needed in order to get on with their business. So a lot of what I did was get the product divisions to understand what the market needs were, and get them to make offerings to the sales organizations for getting those things out and moving.

At one briefing to the corporate staff one year, a planner from San Jose General Products division who was presenting the new product line for the following year, got to a point where he said, "We now get to Walter Carlson's product," and pulled up a smaller disk that I'd convinced them that they had to produce if there was going to be any continuation with the smaller computer. So that's kind of the way it worked. I would press hard, but in the midst of it all, the question had come up of what does marketing tell the Research Division? The tradition had been for years that the Vice President of Marketing would produce a critique of the Research Division five-year plan, which would then be ignored because the Research Division hired the people who had skills that were attractive, and those people then proceeded to do whatever it was they knew how to do. As I started going up to research headquarters and talking to them, I sensed that something would have to be done about that if some obvious needs in the marketplace were to get into the hands of the research guys to come up with ways of solving them. Because the product divisions had their development staffs, who were carried as far as their technology and knowledge would permit; but if they needed new knowledge, they didn't have it.

So I finally convinced my head of marketing that his notes to the research strategy ought to change and set forth problems that the marketplace was discovering and get the research people in early enough so that the technology and science that existed down the road for products to be

created to solve them. It was a tremendous blow to Research to have that presented. For two or three years they just wouldn't respond. But finally we got a couple of particulars, especially when the personal computer came along, it opened up a lot of eyes as to what was needed in the way of new ways of approaching this whole question of computing.

So about a year before I retired, I finally got a letter out of the Vice President of Marketing to Research and their strategic plan, saying, "Over the next five years here are things you need to concentrate on because we don't have solutions today in sight to meet these demands," which we then specified. And I would take that paper up, and again with these guys I'd been arguing with for years and have another discussion of what that letter meant. It was very, very helpful to have his signature on it because the Vice President of Marketing in IBM was an important guy.

HAIGH: So it sounds like that's in some ways parallel to your experience with ACM that you were arguing with the culture of the academic people.

CARLSON: Exactly. In that case, very much so. Since it was so visible as to exactly how their hiring and firing and research was set in certain priorities, I knew that that's the kind of thing that had to be changed if we were going to succeed down the road, and finally managed to get that. If you listen now to the director of research for IBM all these 20 years later, you'll hear him talking about problems in the marketplace that we have done something about. To me that's very satisfying.

HAIGH: So you mentioned pushing for smaller disk drives. Can you give another example of something that you handled during this period from 1968 to '85?

CARLSON: There was always the question of programming languages, and something called APL emerged from the research division way back in the 1960s. When I joined Corporate Marketing I found that over in the manufacturing side of the business corporate level was a young Indian engineer who had his degree in India and then come to the United States for his masters degree, and he was on their staff trying to help them understand what to do with some of the computing and other systems relative to manufacturing. But he had discovered this language called APL. Did you ever hear of it?

HAIGH: Yes. Ken Iverson.

CARLSON: Ken Iverson's language. So I took an interest in that. Didn't learn enough APL to use it. But the question was what to do with something that efficient, because in this case the users could sit down with their problem statement in front of them and write the code in APL. So we began a campaign, which lasted about two and a half years, how to get APL broadly available in the marketplace instead of just in various scientific centers and places like that that saw what it was and enjoyed it. That was a head-on fight against the divisions producing the programming languages. They didn't want this thing to interrupt their selling the various data processing languages that we had out there—no way! So we would occasionally have a meeting where we'd have the head of programming and the corporate staff guy responsible for programming and a couple of other people like that in the room to get them to try to agree that more effort in APL was terribly important to IBM. That was quite a campaign. Never changed a thing, though APL changed to broaden its appeal. But it never really went out as a premier product from the IBM Corporation. So that was a worthwhile try, but didn't succeed.

HAIGH: Do you think there would have been a substantial market for it?

CARLSON: Oh, absolutely. As I thought back on it afterward, the thing that we emphasized that was damaging to our program proposal was that computing capability is in the hands of the user, and the programming staffs that we sold to in various companies weren't interested in having all those users messing around in their computer systems at all.

HAIGH: What year would this proposal have been produced then?

CARLSON: It was probably in the late 1970s that we had the APL effort on. Ken went to Canada, and his deputy stayed with the research division and continued with the project. The APL II came out with much greater power and has been sold ever since, but only through this narrow construction.

HAIGH: In taking this job that was product and marketing related, do you see that as a break with the things that you had worked on earlier, or do you think it was involved in the same kind of activities?

CARLSON: I had made so much noise on it as being a continuation that one of the associates in Corporate Marketing then produced a thing that pointed out that not only did IBM have a consumer advocate it had a customer advocate! A little statute and a piece of wood with "Customer" printed on it with me standing beside it to get the point across that this was something that people in IBM hadn't seen so much of before. So that was really what I was doing.

HAIGH: So then in a sense then you were providing the viewpoint of the user to them?

CARLSON: Exactly. And insisting that that be taken into consideration whenever a new project for the company was brought along.

HAIGH: Overall, how successful would you say you were in influencing the final products?

CARLSON: I would find that difficult, except that there was one incident that helped me understand it a bit. One of the guys that I first interviewed in that first run at IBM from Defense had now become a Senior Vice President. So one day he called me into his office and had his new assistant sitting there to introduce us. He said, "I want to especially introduce you to Walter Carlson, because around here when he speaks, somebody listens." That's the sort of thing you want to be paying attention to from this guy. So that was the best kind of confirmation I could get along the way of whether I was having an effect or not.

HAIGH: So then you feel in general you were successful in launching...?

CARLSON: Well, at least I helped cause things to happen when I thought they should.

HAIGH: So is there anything else you want to say about that period at IBM?

CARLSON: Well, when I came out here in 1974, my sole efforts were with the General Products Division with two of our technical laboratories, one up the way here and one down in Los Angeles, and with a programming laboratory that was set up in Menlo Park. Those were my territory, as it were. So my key concern was with languages; it always had been. So then when IBM came to the question, "Well, what do we do to expand our effort on programming languages?" I found people around here that were interested enough to actually create a project for just south of San Jose, and the Santa Teresa Laboratory was setup to do programming

production. So I had the opportunity seeing where I was to help them get the whole idea organized and sold as well as properly organized, because some things needed to be done if they were going to succeed in getting their stuff out into the marketplace. So I spent some time on that, and the Santa Teresa Laboratory I thought was a well-developed sort of thing. I think it's lost its power within IBM and within the industry, but in its time it was worthwhile doing.

HAIGH: Your resume shows that presumably the end of your time at IBM that you provided "supplemental assistance to corporate communications" on the Information Revolution exhibition at the Smithsonian's National Museum of American History.

CARLSON: That was interesting. I retired in January of '85, and then because of the work I'd been doing with government agencies, I found myself at least watching to see what the Smithsonian was doing about computers, and found out they hadn't done very much. They had a machine about 20 years older in a small area. Nothing significant.

HAIGH: Now actually if I can interrupt you, your resume also says that the AFIPS that you had been chairman of the Smithsonian project committee from 1968 to 1974. So presumably you had been involved in that as well. So why don't we talk about that one, and then we'll jump back to the later involvement.

CARLSON: The AFIPS project developed when the sort of thing I'd been doing on ACM history got me interested in making sure that a good history of computing actually got prepared.

HAIGH: Wait. So you also perhaps should talk about what you'd been doing on ACM history then?

CARLSON: Well, what I did on the ACM history was simply go back and write how ACM got formed in '47, and that was published, or presented I guess is the case, at the 1970 ACM conference in Boston. So if you want to look that one up that would be, as I said yesterday, we discovered there was one founder of ACM.

HAIGH: But that was the 1970 conference, then that would be after the 1968 Smithsonian project committee at AFIPS.

CARLSON: Yes, well, because the key reason I got involved with the ACM history thing was because I'd been doing the AFIPS project so vigorously.

HAIGH: So the AFIPS project, when that started in 1968 I think that was the first attempt to do anything with the history of computing.

CARLSON: It started in 1963 or '64, because I was then in the Pentagon and Isaac Auerbach, with whom I'd been working, had taken on the IFIP responsibility. As he and I discussed some of the things that were going on that he had done and others had done, he and I agreed that there needed to be a recorded history of where a lot of this stuff came from and how it got there. So I went to a couple of sources, American Physical Society or whatever who had a history activity going on and didn't get anywhere. I went around to my government friends. "Is there some way to get this written?" "No." Nobody had any money to put into that. It sounded too far out. I then went back to AFIPS and said, "Look, the most important thing that you can do now is spend a lot of the money coming out of these conferences and the shows to get a good history of computing." Two or three people like Paul Armer agreed, and we had a project set up, and I became chairman of the history committee.

The first task was to find a historian. I went to work and over time came across Hank Tropp up here in Northern California and got him to the Smithsonian to hire him and put him to work on oral histories. There was a big, big plan laid out of people that had been recommended. Something in the area of 25 names of people came up in this listing as to who could really contribute effectively to this history project, and Hank went out and did a masterful job of performing those interviews. We never had a chance to publish them that I can recall, because the Smithsonian changed personnel and put a gal in charge who stacked all those interviews off in a corner somewhere and said they're classified or private or something like that. Whether they've ever been released, I don't know. All I know is we fought hard and didn't succeed in getting them out in the public. Because the history of computing, as far as I was concerned, did in fact exist then in the 1960s, which then led me to interest in doing the ACM history when the opportunity came up. That came back later when enough had happened that we were beginning to have personal computers and the new technologies were having an effect.

HAIGH: So then to summarize that, the Smithsonian project committee which you chaired from 1968 to '73 was responsible for getting those oral histories done with the Smithsonian, and you weren't happy about how the results finished up just in terms of people not being able to get access to them.

CARLSON: Right. Exactly the point.

HAIGH: Then your resume has also shown that you were then chairman of the History of Computing Committee of AFIPS from 1984 to some date past 1985.

CARLSON: But let me take care of this IBM up to the Smithsonian. When I got the Smithsonian interested in doing something and got money for it but we'd give them money, then the question was where would real money come from? Well, I'd retired from IBM, but I got the Smithsonian people and the IBM PR types together and got IBM to commit the \$5 million support to the Smithsonian, and then rehired by IBM to go down to Washington and watch and see how that got spent.

HAIGH: So that would be overlapping with also you returning to chair the history of computing committee of AFIPS.

CARLSON: Yes.

HAIGH: So was AFIPS also involved with the exhibit?

CARLSON: No, not down there. We got that whole thing changed within the normal processes of the Smithsonian to expand and put a whole half floor together with something like a dozen interactive things to see and play with that would help anybody coming there to understand what computing was about.

HAIGH: Would that be the Information Age exhibit that was around in the 1990s, or was this earlier?

CARLSON: Yes, because I went in in the mid '80s and kept developing.

HAIGH: Who were you working with at the Smithsonian on this?

CARLSON: Whoever the head of the Museum of American History was, and that was at least two different people, because I had an office in the Museum of American History, even though I was an IBM employee, to help them understand what was needed. There was another guy who was Assistant to the Secretary of the Smithsonian. I got him interested in the project, and he spent an enormous amount of his personal time convincing the Secretary that what we were doing was the right thing to do. I didn't have to meet with the top of the Smithsonian to get these things done. If I had the head of the Museum of American History with me and then this staff guy, we managed to see to it that the thing moved, from my point of view at least, in the right direction.

HAIGH: Were you working with David Allison on this?

CARLSON: No. David Allison and I never worked directly together. He had been where, at NASA?

HAIGH: I'm not sure. I just know that he was chief curator of the Information Age exhibit when it opened in 1990.

CARLSON: Yes, he had come back. I was long gone by then, because I was only there about 25 months.

HAIGH: On the subject of history, we could also discuss the Charles Babbage Foundation. It says in your resume you were a Director and member of the Executive Committee from 1984. So did you stay involved with the Babbage Foundation for a long time?

CARLSON: Not very long. Again, because of some history work I'd been doing, I felt it absolutely essential that there be a broader history of computing than what AFIPS and ACM and other typical organizations could do. So I went to some people first in Philadelphia and later in New York, saying there needs to be a funded history project that does the job. I said, "I don't know exactly how to bring something like that about because I don't have the money. Where can we get money to get something like that to happen?" I've forgotten who it was, but I finally found somebody who said he thought it was important and he would see what he could do about fundraising. For the life of me now I can't tell you who that was, but he was the guy that found Arthur Norberg and set something up and they decided to give it a name, Charles Babbage Institute with the Charles Babbage Foundation as the funding organization. All of that happened in the early 1980s, as I recall.<sup>10</sup> But since I had been involved in arguing for it, I found myself working with Arthur enjoying very much doing that work with him and coming on their board or on their council in the early stages, which my participation only lasted a couple of years. Help it get started, help make sure it was really starting, and then I'll find something else I guess.

[Tape 5, Side A]

HAIGH: So we have finished with your involvement in the history of computing, unless you had anything else to say on that topic.

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<sup>10</sup> The Charles Babbage Institute was created in 1979 when the Charles Babbage Society was renamed. The Charles Babbage Foundation was created in 1980, when CBI moved to the University of Minnesota.

CARLSON: Except for one comment. The last item on there that says the chair of the AFIPS History Committee, 1984 onward. My best recollection on that is that somebody felt sorry for me and felt that if I was given something like that to do, that I would be satisfied. My best recollection is I didn't do much of anything. It was just something that was gratuitously operated as a reward for all of the previous efforts.

HAIGH: And AFIPS itself I think was running into problems by that point.

CARLSON: By that time it was really in difficulty.

HAIGH: There is one thing I do recall. AFIPS was the original publisher of the journal *Annals of the History of Computing*, and I think they would still have been publishing it at that point.

CARLSON: It was indeed. That was all part of much of this sort of thing. Again, Bernie Galler and Aaron Finerman were active in making it happen. Some people at ACM wanted it, and I said, "No, you'll get all bollixed up," and managed to get it into AFIPS hands. I tried to make sure it got in the right place. Then as it went along, AFIPS various difficulties both political and financial got into the road of making it succeed. Some of us then went to IEEE and said, "Hey, here's a really good publication, and we think it's going to last for a long time if it's properly done. Could you take it over?" "Well, okay. We'll give it a try." And they did down in Southern California with the right people on making it happen. Bernie was exceptionally pleased with the treatment they got in putting it into this new publishing environment. So I think it succeeded well.

HAIGH: I think you were at one point on the editorial board of the journal weren't you?

CARLSON: Yes. I still appear on their sheet of editorial board members, something like that. I guess if I went down and got another copy I could still find my name there, because a guy that had worked with me in IBM tried to find me, and he went to Google and they had that page from IEEE and he found me there, and then called IEEE to see what my phone number is. They called me to ask if they could hand out my phone number and I said, "Yes." That guy was a really great consort of mine in IBM.

HAIGH: Actually you had mentioned that you thought that ACM would have messed the journal up. That reminds me of something that we didn't talk about that I know was controversial in the '70s, that some ACM people looked at the accounting for publications and claimed that a fortune was being wasted on them and other people claimed that actually they were making a profit and the accounting was just being done wrong. What was your feeling? Were they too academic? Were they not academic enough?

CARLSON: Well, Myrtle Kellington, who was then the editor of the journal, was doing the best she could. She was not the smartest person around, but she was a good publisher. Again, because of all of these other accounting difficulties, the ACM was not keeping her well informed on what was being spent where. It was not a good system. That was one of the key things that I had to fuss with when I became President. One of the early things in addition to labor, the publisher was even telling me things that needed to be done as a part of their loaning us money. So there were arguments. That was all part of this whole computer science concern about conferences. There were enough people who wanted a lot more out of the journal than they were getting because the growth of computer science curricula was so great that there needed to be much more

representation in the press as to what computer science, if it existed, was doing. Of course I've never felt that there is a "computer science," Peter Denning notwithstanding. So the argument that there needed to be a lot more publishing effort in computer science matched thoroughly with the argument that there ought to be a lot more communication at conferences in computer science, because these were people who could understand each other and work with each other. I bought the thing on conferences and was able to do something about it as President, but I never did get productively involved in doing anything on the publication side. Again, the way ACM handled publications I never did understand enough to do anything about, which is why I made that comment earlier that I didn't think it would be a good place for the Annals.

HAIGH: Let's then just talk about these other things. I think you had mentioned that the activity that you considered most important was this one here with the National Science Foundation.

CARLSON: The Greenberger Committee. Now, the Committee On Scientific and Technical Information was COSATI. It had representatives from each of the agencies and the White House. The Science Foundation helped support it in its operations. I managed to get my Lieutenant General, Phil Ely at the Department of Defense as chairman of COSATI because I could show that between us we had 55% of the government money spent on information, science, and technology—Scientific and Technical Information. Therefore, having him as chairman was the way to ensure that the proper things got done and got done in a timely way, and even arranged to take an Army colonel that I had on my staff and put him over at the White House under the COSATI structure so he could serve as a kind of secretary to COSATI under my boss General Ely. So that all got arranged. In fact, Andrew Aines, the Colonel, stayed there at the White House

for years in charge of the government's programs in Scientific and Technical Information. Then the question came up who needs this? Mostly it started from the Science Foundation. They were spending a lot of money on this. Are we getting anything for it? So they went up to Baltimore and got Marty Greenberger to agree to chair a committee that could look at COSATI. Is it useful? Are there things to be done to improve its operation? And so on.

HAIGH: So this is a committee that is formed to review another committee?

CARLSON: That's right. It was really small, three or four people.

HAIGH: And you remember that from 1970 to 1972. So who else was on the committee?

CARLSON: I don't remember very well at all. There were never any serious arguments, any brouhahas that required deliberate attention, because Greenberger at the end could go back to the Science Foundation and say, "Hey, it's useful. It needs to be continued, so let's not stand in its way." Was the net result of the effort. So that's what that was about.

HAIGH: So basically, the Greenberger committee reviewed the COSATI findings and agreed with them?

CARLSON: As far as I'm concerned, yes.

HAIGH: Did you have anything to say about any of those other things?

CARLSON: Let's talk about this one. There was a book, a manual book called the *Annual Review of Information, Science, and Technology*. It comes out annually and is published by ASIS. I wrote the chapter for that book way back in late 1970s on privacy because I had done

some work with the federal government that ended up in the Privacy Act of 1974. As a matter of fact, I wrote the executive summary of the report that went out on the commission that was established by HEW to examine whether there ought to be a privacy law. So I took all that background a few years later and had a good friend, Martha Williams, who was editor of this annual review and get a job on the privacy question for her in a chapter in one of her books. So she put me on her editorial board as a result for a while. I don't think I'm in it still, but the book still comes out. I still look at it. That was that privacy chapter that led to that little item.

HAIGH: So that was your only involvement with ASIS?

CARLSON: I gave a couple of talks at ASIS conferences and tend to get people mad at me.

HAIGH: So what was your impression of that association, ASIS?

CARLSON: A bunch of librarians that didn't know what to do. Really, it was ineffective in terms of being able to carry the library profession forward in any kind of a systematic or productive way. I thought they were never very good.

HAIGH: Do you think that any of the associations were doing a good job in this area of technical information handling?

CARLSON: I guess I'll start by saying I tried to get ACM to do so. I don't think I succeeded. I know that IEEE put a lot of effort into it, but I've never seen anything really solid come out of that effort. Again, this failure on the part of the people involved to understand that there information, and documentation and other ways of presenting, are two different subjects. They always present the transmittal effort as information systems, and they're not. They're not

“information systems,” they’re “document systems,” which is what I corrected right away when I got into the Pentagon. The whole I don't think understood yet that significant difference.

HAIGH: So there's also something, the National Academy of Science member of the Evaluation Panel for the Institute for Computer Science and Technology of the National Bureau of Standards from 1970 to '76.

CARLSON: That's right. That was a long one. You had brought up Herb Grosch earlier, and when he got fired at the Bureau of Standards they brought in Ruth Davis to head up the computer research organization at the Bureau of Standards. Ruth had been right down the hall from me in the Pentagon in the early '60s working for ARPA and handling a number of information systems jobs, especially with the Intelligence Agency. So we knew each other. And when she came in, the Academy of Science panel was so concerned over what had happened there that they wanted somebody to watch over this. I can't remember, Ruth might very well have suggested my name to be on the panel. But anyway, somehow or other I got on that panel for five or six years.

What we did was examine each of the programs was at Ruth's organization. There were about five or six major efforts underway. One of them that I remember early on was this business of using fingerprints for personal identification, and the effort that went into following those little spirals on the finger or thumb or what have you and do it scientifically and realistically from a police identification point of view. We spent more than a little bit of time digging into as a panel to make sure that it was being done right, and concluded yes. It's got the right technologies that work, and one of these days it will succeed was our prediction. And I think we were right. There were other questions having to deal with information interchange where classification systems

were involved. We never could quite do anything useful on that except to get people more fully aware of the need for following classification rules. That kind of thing was helpful to the government, I think, because we could say, “This is it, and this is what you’ve got to do. Here’s the people there at the Bureau who can help you do it in this organization.”

I can vividly remember some of the meetings we had where another member of the panel happened to have been a professor at Cornell who had stimulated the antitrust suit against IBM. He then went down to the Department of Commerce and one day when I was calling an assistant secretary at Commerce, he picked up the phone and I found myself talking to him. Well, we got along very well together because we could agree in advance if necessary to disagree at the table, and anytime we did agree the whole table said, “Ah, they agree,” because we were being watched very closely.

HAIGH: After your retirement, were there any other activities that you continued with that you haven’t talked about?

CARLSON: If there were, I didn’t spend that much time or attention to them. I felt I had done what I could. I retired at age 68. This I find a little unusual. So did the other people.

HAIGH: Retiring at 68—was that thought of as unusually early or unusually late?

CARLSON: Unusually late, because all of the people that I had dealt with in IBM and in defense were all going out at anywhere from 62 to 65 at the latest. As a matter of fact, there were rules that forced that. I was working in IBM with one gal who was head of a group of people in another part of the corporate staff and working with her. The two of us decided, well, we really

ought to get something done about this. I went to work on it, and she called a meeting and said, “Walter and I have agreed he’s going to retire at a much later age than I will. I want to be as active when I reach his age as I need to be.” So that was the compliment I got on that one.

HAIGH: Is there anything you want to say about what you’ve been up to since retirement?

CARLSON: Well, not very much, at least in terms of being helpful here. My wife and I have done a lot of traveling. We bought a timeshare down in Southern California, where among other things we could use the week that we bought for getting another week someplace else around the world, and have done some of that. So our approach has been to retire in the way the word reads. So I guess I shouldn’t try to draw anything else into it. At least on a technical side, I’ve just let that go. I still have these opinions, as you well realize now, some of them, but not trying to do anything about it.

HAIGH: Well, let me wrap up with two broad questions then as you look back over your career. The first of those would be what do you think your biggest single regret would be, either in terms of something that you did that you wish you had done differently or just in terms of how something worked out?

CARLSON: I think my largest single regret, which I tried to express along the way, was that I couldn’t find a way to solve the ACM question of its pattern of academic leadership, bringing the data processing and business fields into a more active and productive role in helping ACM move along. It was a try, but I know I didn’t succeed.

HAIGH: By the way, what is your opinion on how ACM developed subsequently through the '70s and '80s after your Presidency?

CARLSON: Well, it's grown. It's gotten up to 70,000 members, something along that order, as I recall.

HAIGH: I think 80 something thousand, but fairly flat since the 1980s.

CARLSON: Is it? Yes, okay. I know I have followed that. So from the ability to attract this burgeoning field of people that I made my prediction on, I'm happy to see it go that way. It's found ways to get attention and membership. So that hasn't been a problem. That's not a disappointment at all.

If I have any other regret, it's probably a very personal one that I never did use all of this experience when I joined IBM to take on a broader and financially larger responsibility. Fubini got a hold of me one day and said, "Why aren't you head of this laboratory up there? You had the qualifications for it. Why didn't you get them to realize that?" Well, that reminds me that yes, I probably should have done something like that and become a much richer man, but I didn't. So if I have to regret, then I can regret that.

HAIGH: So to reverse that, again looking back over your career as a whole, what would you say is the single accomplishment of which you are most proud?

CARLSON: Probably helping the way I did working with Isaac Auerbach and others to bring AFIPS into being. I didn't really cause it all, but I caused enough of it to be able to look back and

say, "You know, I think I made a difference." At least I feel that way. It was needed, and it happened.

HAIGH: So that concludes the questions that I've prepared. Anything else that you would like to say, then now would be the time to say it.

CARLSON: I'll look at what the tapes say and help you in that respect. But at the moment, nothing is sitting in my mind as unspoken. What you have written in your document plus whatever we've said here might stimulate some additions that I can get in touch with you on.

HAIGH: Well in that case, thank you very much for taking part in this interview over the last two days.