Dr. Anthony Oettinger

Oral History by Atsushi Akera

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[Tape 1, Side A]

AKERA: I'm speaking today with Dr. Anthony Oettinger, Director of the Program on Information Resources Policy at Harvard University, and past president of the Association for Computing Machinery (ACM). First of all, is it correct that you served as the president of ACM between 1966 and 1968?

OETTINGER: Correct.

AKERA: The purpose to today's interview will be to focus on your involvement with ACM, since there are existing interviews that cover other aspects of your life and work, especially in machine translation.¹ However, Rick Snodgrass at ACM asked me to conduct these as free-standing interviews, so that we also have some broader sense of the overall career—of how your early work brought you to ACM, and how your involvement with the organization ultimately influenced your subsequent career. Throughout this interview, I'd like to try to make some interesting connections.

During the first session, I would like to divide the interview into three segments consisting of your early life and career, then your tenure at ACM, and then your subsequent career in educational research and ICP policy.

PART I: Early Life and Career

I believe the best biography of your early life can be found in a piece you wrote, "Machine Translation at Harvard," which appears in a compilation by W. John Hutchins (*Early Years in Machine Translation* [Amsterdam: John Benjamins, 2000]). Can you repeat for us some of the early details of your life, beginning with your birth in Germany in 1929 and through your graduation from the Bronx High School of Science in 1947?

OETTINGER: As you say, I was born in Germany in 1929, and more particularly, in the city of Nuremberg, which was the home of the early Nazi party. Some of my earliest memories were of storm trooper torch light parades. But in an odd way, this probably saved my life, because my parents had the wit to notice what was going on. So in 1933, when I was four years old—it was

¹ Anthony Oettinger, "Machine Translation at Harvard," in W.J. Hutchins, ed., *Early Years in Machine Translation: Memoirs and Biographies of Pioneers* (Amsterdam: John Benjamins, 2000), 73-86; Oettinger, "Reminiscences of the Boss," in I. Bernard Cohen and Gregory Welch, eds., *Makin' Numbers: Howard Aiken and the Computer* (Cambridge, MA: MIT Press, 1999), 203-214; W. John Hutchings, "Machine Translation over Fifty Years," *Historie, Epistemologies, Langage*, **22** (2001): 7-31.

shortly after Hitler came to power—they packed up a couple of suitcases and left for France. My father was German, but my mother was French. So we moved to France to my grandparents. My early schooling, my elementary schooling, therefore was in France. I became fluent in French, so by the age of five or six I was bilingual, which is part of what explains some of my later excursions into machine translation.

AKERA: When did you move to the United States?

OETTINGER: Unfortunately, we were caught up in World War II, and left France through Spain and Portugal in 1941. I arrived at Hoboken in New York Harbor in August of 1941, and that's when I learned English. It was my third language. In elementary school in Manhattan and at the Bronx High School of Science, I studied not only Spanish, which seemed like a good thing to do in the environment of New York City, but also extracurricularly one of the teachers offered a Russian course. So I had a smattering of Russian by the time I graduated from Bronx Science and came to Harvard.

AKERA: I'd like to stay in the high school period for the moment. In particular, I'm interested in finding out how you became interested in computers. You mentioned here how you arrived with many different languages, and that this in a sense steered you towards machine translation. However, you entered Harvard to study electrical engineering. Leaving aside the Westinghouse competition, can you tell me something about your upbringing, about the kind of technical enthusiasms in radio electronics, and what first brought you to take engineering seriously?

OETTINGER: Well, there were a couple of factors. Bronx Science itself was an environment in which all sorts of things were encouraged, and I had courses in biology and then physics and so on. A couple of the instructors, both of them physics instructors, introduced me into what became the Westinghouse Project that I did. But also, even toward the tail end of elementary school, I got a part-time job in the neighborhood with a radio repairman. And here, my duties were mostly to go to people's houses and pick up their sets and carry them back to the shop. But I couldn't help but pick up some knowledge (about electronics) from a man named Jacob Berlinger himself a refugee from Europe, who ran this radio repair shop... Those were in the days when you still repaired radios, replaced blown vacuum tubes and condensers that shorted out, and so on.

AKERA: Of course, this was before the day of television, and wasn't radio very popular?

OETTINGER: Yes, radio was very important. So I got very good with the soldering iron and learned about circuits and stuff. And Berlinger was one of those nice people who encouraged me and put me in touch with a man who ran a shop downtown on Cortland Street. The shop was Adson Radio (the owner was Sam Adler), and it stood where the World Trade Center once stood. That whole area of Cortland Street, Church Street and Vesey Street, and so on was full of little radio parts shops, hobby shops, and so on. So I spent a couple of summers working down there, to the point that by the time I was in high school—it was during World War II—the gym teacher commissioned me to build him a couple of portable radios. These were unobtainable in stores. So by the time I was in high school, I had a pretty good working knowledge of how to build and fix AM radios (FM wasn't out there yet).

AKERA: Did you have friends in high school that also shared similar interests?

OETTINGER: Yes. I mean, everybody at one Bronx High played with these things. And as I said, two of the physics teachers in particular encouraged me. But now that you've forced me to reflect on this: I picked up my knowledge about electronics in the neighborhood, with the jobs and the radio shops.

AKERA: Yes. That's fascinating.

OETTINGER: In fact, I resented when the World Trade Center was built in the first place, because they knocked down a lot of that whole area.

AKERA: So now, how and when did you become aware of computers?

OETTINGER: That was really when I was connected with the Westinghouse Project. One of the physics teachers, Loring Tyson had gotten hold of an old World War II K-8 gun sight, that had in it the makings of...—I realized that I could make an adder and a multiplier. So I built this analog device, which could add and multiply. But it grew out of the analog computing world of WWII gun sights. And then this was the period (I was in high school from 1944 to 1947) when *Time* magazine had the cover of Howard Aiken and his computer at Harvard University. So I realized there was this connection between digital and what I was doing for the Westinghouse and analog computing, and I said, "Hey!"

AKERA: I've seen that cover. I'm familiar with the cover. I couldn't place whether the Westinghouse competition would have taken place before or after it was published...

OETTINGER: Before. ... Well, I would say unrelated.

AKERA: Because yours was really an analog computing project? But this then brought you to develop an interest in computers, so that when you saw Aiken...

OETTINGER: But I couldn't act on it back then, you see. It just got stored somewhere in the back of my mind.

AKERA: Right. And of course, the scale of Aiken's computer was not something a high school student could take on.

OETTINGER: A high school student couldn't do it.

AKERA: Now if I understand it correctly, it was the Westinghouse talent search that paved your way for your entry into Harvard. You mentioned this in one of your...

OETTINGER: No it didn't actually, because I only got an honorable mention. It's so interesting, because it may be a matter of judgment, but it was so true for many decades thereafter that computer work was not understood or appreciated. They certainly didn't know what the hell to make of it in the Westinghouse competition. No, I applied to a variety of schools. I didn't know much about American universities. I followed the advice of my guidance counselor. I applied to

Rensselaer Polytechnic, which did not admit me. Then I thought of applying to the Webb Institute of Naval Architecture to enter the Naval Architect program there, but...

AKERA: But you got into MIT and Harvard!

OETTINGER: Well, I got into MIT, but they didn't give me a scholarship. Harvard did, so I went to Harvard. There was no playing against it. I got good advice. I got good advice. But also, what paid for my Harvard tuition was a Harvard scholarship.

AKERA: Now, did you come to Harvard with a specific interest in computers and Aiken's laboratory, or was that something that developed over time?

OETTINGER: Partly because of my poly-lingual background, in my Junior year at Harvard I was elected to Phi Beta Kappa, and was elected to be First Marshal of the chapter—an administrative post. Had I known it, I would never have stood for election. It made me responsible for organizing dinners and sending out mail, and so on. But it turned out that one of the dinners was for honorary members from the faculty, and one of those newly elected honorary members was one Howard Aiken.

AKERA: Yes. So that's how you got to know Dr. Aiken?

OETTINGER: That's how I got to know Aiken. But I came to Harvard because I thought I wanted to do engineering of some kind. And I had some sense of digital computers, but I remember Harry Mimno, who was a good friend of Aiken, advising me to take a course in rotating electrical machinery. I remember arguing with him that I was interested in other things and didn't think I needed it.

AKERA: Was it more that you were interested in electrical as opposed to mechanical things?

OETTINGER: I was interested more in electrical devices. I mean I played with circuits of various kinds. While in high school, I once jolted myself out of my chair by picking up the high voltage end of a power transformer from a radio. I knew about various aspects of electricity.

But I also had other interests, going back to the bilingual stuff. I took courses in French literature and Spanish literature. You know, we're talking 1944, 1945, and the end of World War II—the beginning of the Cold War. And, you know, forward-looking students took courses in Russian. That's what I did. I took a course in Russian, not because of computers or machine translation, but because it was the Cold War and I figured it would be a useful thing to know, the same way that students today study Chinese.

AKERA: Coming from Germany and the particular background that you had, I imagine your interest may have been a bit broader than the typical engineering student.

OETTINGER: Yes, oh absolutely. In my first-year Russian course, I met Marshall Goldman, who later became the head of the Russian Research Center here. So the interest in the Soviet Union was part and parcel to my education.

But I didn't do much about it until that Phi Beta Kappa dinner episode, where the memory of the *Time* magazine cover, my interest in analog devices, and computation converged. Since I was in charge of the seating arrangements, I arranged for Aiken and me to sit next to each other at that dinner. Aiken had had a couple of Martinis, which was one of his favorite things, and so he was in an exceedingly good mood. And that's how the connection began. He invited me to come over to his complex, and we talked about things. He learned that I knew Russian. So he handed me a copy of Warren Weaver's famous memo, where Weaver, who was by that time the head of the Rockefeller Foundation, wrote that the military had used computers during the war to do cryptography, and wasn't a foreign language just a code which anyone that wanted to be able to read it could use computers to translate/decipher. Aiken just sort of flipped that at me, and said, "See what you can do."

AKERA: See what you can do with your Russian?

OETTINGER: Yes! And he essentially left with me, both figuratively and literally, as a Junior in college, a key to the Computation Laboratory. So I had a desk and I had an office. And I started thinking about machine translation. And I was also put to other work. I helped with some of the wiring, and, you know, did the "dog work" in the lab. But it was a fascinating experience, I was involved in. There was a period also where many of the people in the Comp Lab as well as in my classes were WWII veterans on the GI bill, so that it was a very interesting period of mingling with people my own age and with these returning veterans in the complex. So this just became my home.

AKERA: I'd love to follow up on that. What was the social dynamic like within the Computation Laboratory?

OETTINGER: It was fantastic. It was like one big family. Aiken had this well-deserved reputation as a taskmaster, but he created a magnificent dynamic and welcoming environment. I mean people worshipped him to the point where, later on, when he had gotten into a battle with McGeorge Bundy, who was the Dean of the Faculty, when Mac called me in to offer me tenure, he went into all this crap about Aiken's cult of personality and so forth and so on, and I felt like giving a Nazi salute to Bundy, because he was behaving much more authoritarian than Aiken ever had been. No, it was a wonderful place to be.

AKERA: Focusing then on the intellectual milieu, what are some of the research programs that unfolded at the Computation Laboratory?

OETTINGER: Well, you know, the early days there were the mathematical tables. And Aiken was a fanatic for quality—he insisted on quality. Then, by the time I was a graduate student, he had introduced not only me but several of my contemporaries to the notion of commercial data processing—the use of computers in business. We did some projects with the Hood Milk Company; we had some money from the American Gas Association and the Edison Electric Institute; Ken Iverson developed a prototype meter-reading device. There were all sorts of things that were way ahead of their time. It was an interesting lesson, because it taught me that for something to be adopted, not only would the technology have to be right, but the cost would have to be right, and the environment would have to be right. And we tried this in a number of areas. In the summer of 1955, after I had gotten my Ph.D., Aiken sold me for the summer to the

Philadelphia National Bank. There was a vice president there (Lew Nungesser) who was interested in the use of computers in the banking industry. Elementary things like numbering schemes. I wrote a paper on account numbering. I mean, it was the new thing that they had at the time—everything was new back then.

AKERA: I was going to say about Howard Aiken that, despite being wedded to older technology, Aiken was quite influential a whole host of computing circles. And my impression is indeed that it was because of his more conservative technical choices and designs that Aiken was able to assemble a sizeable academic computing center well before other universities, who were focusing on electronic computers. In a sense, was Aiken able to take a leadership role, and for everybody else in the laboratory to take the lead in the study of the computer applications, as a result of this early prioritization?

OETTINGER: Oh, absolutely, absolutely. And we *were* encouraged to develop an interest in applications. So besides my work on language translation, I delved into the needs of the milk industry and the banking industry. We had research contracts with Bell Labs, so we also did development work on switches.

AKERA: So you actually had some influence on the digital switching?

OETTINGER: Oh, yeah. And John Harr, who was one of the designers of the Mark IV, then went to work for AT&T, and much of the earlier electronic switching work was done under Harr's direction, out in Lyle, Illinois. So yeah, Aiken's people were quite influential in many unsung ways. He's gotten a bum rap.

AKERA: In the history of computing, there is a lot less attention to computer application as opposed to the history of the computers themselves. I think part of this reflects our own historiography. It's something that is important to correct.

OETTINGER: Mm-hmm [yes]. Aiken's attention was to the practical. He knew a computer wasn't a toy. He wanted to do something with it! And he did a lot of work with the National Security Agency, and cryptography and so on. He's gotten a bum rap historically.

AKERA: I think Dr. [I. Bernard] Cohen² did a lot work in trying to correct that, fortunately.

OETTINGER: Yes.

AKERA: Let's see. Harvard is course a prestigious institution with individuals like I. A. Richards and Roman Jakobson on the faculty. In your later work as ACM President, you became acutely aware of how disciplinary boundaries...

OETTINGER: Oh and by the way, it was Aiken who introduced me to both of these individuals.

² I. Bernard Cohen, a former faculty member in the History of Science program at Harvard, has published *Howard Aiken: Portrait of a Computer Pioneer* (MIT Press, 1999)

AKERA: ...Yes, that's what I thought. ... but in any case, you became acutely aware of how disciplinary boundaries between traditional disciplines can constrain the development of new interdisciplinary fields. Reflecting back on this earlier period, do you think that Harvard's intellectual environment influenced the course of the computer-related research on campus, especially as compared to other institutions and universities?

OETTINGER: Well, Harvard, by virtue of its disciplinary diversity was very much attuned to the emphasis on applications. We had a fellow from Divinity School who did the first concordance of the Bible on the Mark IV. Ellison was his name.

AKERA: That's right. In fact, there was also some fundamental work in Economics done, using the Aiken's computers.

OETTINGER: Wassily Leontief got a Nobel Prize for his input-output analysis, which was first done on the machine. Ken Iverson worked some of the differential equations for Leontief. So there was work done in Economics, Divinity, and Languages.

AKERA: Yes, that's pretty diverse.

OETTINGER: I collaborated with—there's an accounting professor in the Business School, Robert Anthony, who had a student named Chuck Christensen. And Christensen and I got harnessed, and Anthony and Aiken cut a deal where Christensen and I developed what was the first table of present values. So much of the later financial world's use of high tech was in there. Of course, later on, nobody would make a table of present values; they would build it into the chip, whether as software or firmware, or hardware.

But again, Aiken got us going in all of these areas. And Christensen and I meet occasionally and reminisce! And then later on, one generation later, one of my own students, Fischer Black, did the math for the Chicago Options Exchange and this produced the whole derivatives business. [Robert C.] Merton and Myron Scholes got the Nobel prize, because Fischer Black was dead by that time. But one can ascribe the derivatives markets to Aiken two generations down!

AKERA: In fact, I am very interested in the interdisciplinary identity of computing as a field, from very early on. In reading your own articles, and focusing specifically on machine translation, there seems to be some very intriguing entanglements between linguistics, literature, machine translation and international diplomacy. For instance, Warren Plath, the Russian linguist, was the brother of the poet Sylvia Plath.

OETTINGER: Yes, Warren was my student.

AKERA: Oh, I didn't know that.

OETTINGER: Yes. He did his thesis with me, and then went to work for IBM on machine translation. But he was my student, and several times went to England to try to help his sister. And of course, her relationship with her husband was not the greatest. But yes, I was well aware of that.

AKERA: But that kind of cultural diversity—the interest in different aspects of culture—was that part of the entire machine translation culture at the time?

OETTINGER: Well, you know, it was by nature a cosmopolitan bunch of people.

AKERA: I think that's what I'm trying to get at...

OETTINGER: Yes. I mean they, Leon Dostert, who was the fellow at Georgetown, had been Eisenhower's interpreter in World War II, and there were all sorts of folks.

AKERA: What I am curious about is making another connection—because eventually you got into the world of policy, and especially science and technology policy.

OETTINGER: Yes, but again, if you think about it, and go back in history, my work in language translation was supported by the National Science Foundation. In those days they were spending the CIA's money.

AKERA: Yes. And there was also some direct military support. Was it the Air Force?

OETTINGER: Air Force, yes. So between the National Science Foundation and the Air Force—it was the Rome Air Development Center, and also what is now the Air Technical University in Dayton [Ohio]. You know, so there was considerable military intelligence interest, and that then influenced, among other things, my later interest in intelligence affairs. But it was experiences like the summer there, at the Philadelphia National Bank, which also influenced some of the other aspects of all this. You know, what's so marvelous about this period is that, because of the novelty of computer applications, we could get into the ground floor of damned near everything.

AKERA: And being at Harvard really did allow you to connect to all kinds of different computer-related activities.

OETTINGER: Yes, yes. And also, I started in 1955, or '56 I guess, I did a lot of part-time consulting for the now defunct Arthur D. Little firm. And so doing casework there got me into an even broader range of industries. It was a wonderful period.

AKERA: Now your own working with machine translation was based on compiling an automatic Russian dictionary designed particularly to cope with the morphological complexities of the language. This has been characterized as an incrementalist approach. First of all, is that fair?

OETTINGER: That's stupid! [Chuckles]. It's a dumb notion and an anachronistic one. Incremental, you know, when you start from zero, any increment is an infinite percentage increment. And it's sort of hard to visualize how one would translate if a dictionary doesn't integrate morphology. Now in retrospect, that sounds really elementary. But at the time, this work stretched beyond the current imagination, storage capacity, processing time, and everything else, so that the study of the morphology as the ability to get down to roots and so on was vital, not only for linguistic reasons, but for, as of the time, practical reasons.

AKERA: Am I correct that this work actually followed some of the developments in the field of linguistics in the United States at the time? That there was a period when there was a great deal of emphasis on morphology?

OETTINGER: I can't comment on that. I don't know. I always stayed away from fads in linguistics.

AKERA: Actually, I should probably move on, because I want to get on to the ACM. Now I'm also curious, did the production oriented nature of the work within Aiken's Laboratory, especially the work on mathematics tables, have any direct or indirect influence on your choice of approach in machine translation? Or is this a stretch?

OETTINGER: Well, I mean, it would be incremental to begin with the beginning. So many of the so-called experiments at that time were, if not fraudulent, at least minimalist, in having bogus dictionaries, bogus syntax, bogus samples. And our thought, being motivated by practical considerations, was that a dictionary look-up would have some practical applications. By putting something in front of a technically competent person, that they could then smooth it out.

AKERA: Yes. This actually hasn't been pointed out about the so-called 'incremental approach,' but my sense of all this it is that your group at Harvard, and those at a lot of other places, was really trying to break down the problem and to try to understand, and to work on specific parts of the machine translation problem. Whereas a lot of the contemporary observers from the outside, people with false expectations about the technology, really wanted to see the whole thing done all at once, and in this sense...

OETTINGER: Well, there was a great deal of hype. Some of it was optimistic and some of it sheer bogus. I mean, IBM ran, to my mind, what were completely bogus experiments.

AKERA: Yes. That's right. There were highly constructed demonstrations, based on a very careful selection of texts.

OETTINGER: Yes.

AKERA: Now, by the early 1960s, you described yourself as already having become an observer on the sidelines in this field of machine translation. I think you also stated that your real interest, in any case, was with computer applications. I believe, besides your background in engineering, or applied science as they called it at Harvard, this was the reason for the breadth of your interests. Can you tell us more about some of the other work that you may have turned to after stepping away from machine translation? I think you've already spoken to some of this, but were there any other directions you took on after your work in machine translation?

OETTINGER: Well, keep in mind, my earliest, my first published paper in 1952 was called "Programming a Digital Computer to Learn" (*Philosophical Magazine*, Vol. 7, No. 43, 1952, pp. 1243-63) and that's kind of an early artificial intelligence thing.

AKERA: Yes. That's when you worked in Cambridge, England?

OETTINGER: At Cambridge. And Maurice Wilkes encouraged me to do that, and helped me get it published in *Philosophical Magazine*, which earlier had published one of Claude Shannon's papers. I also mentioned the paper on account numbering, for the banking industry.

AKERA: Now, did you turn to other areas, such as educational technology?

OETTINGER: Well, that came a little bit later. Remember, I taught numerical analysis. Remember that was the period in which realizing algorithms for stable differentiation was important.

AKERA: So numerical analysis was itself a serious academic field?

OETTINGER: Yes! I mean, this stuff had been done with respect to hand calculators, but the large-scale computer algorithms presented new problems, you know...

AKERA: Yes. And in fact, your Ph.D. was in applied mathematics?

OETTINGER: Yes. Well, then no-- it really was on language translation. There wasn't an applied mathematics degree per se. But another early published paper of mine was on using Iverson's language as a formalism to prove that the stack and pushdown store was accurately parsing formulas "Automatic Syntactic Analysis and the Pushdown Store" (*Structure of Language and Its Mathematical Aspects*, Proceedings of Symposia in Applied mathematics, Vol. XII, American Mathematical Society, 1961, pp. 104-129).

AKERA: That's right. So this was in the spirit of pursuing a more theoretical approach to machine translation?

OETTINGER: It was a theoretical paper. And then by the early 1960s, when I got out of the machine translation business, Manny [Emmanuel] Mesthene had started, with some IBM money, the Harvard Program on Technology and Society, and invited me to join in there. That's how I got involved in the educational technology business. That was essentially under the sponsorship of IBM...

AKERA: That's good. I think I have some of the connections here backwards, so some of my questions later on might be a little bit off. Now if I understand it correctly, you were also consultant to the Office of Science and Technology, under the Kennedy and Johnson White Houses from 1961 until 1973.

OETTINGER: Yes.

AKERA: How did this come about?

OETTINGER: Language translation—one of the people who was active in that area at MIT, at the research laboratory for electronics, there was a fellow named William Locke who was the MIT Librarian. But then the other one was one Jerome Wiesner. And so Wiesner and I were colleagues, and we became friends. And he had another friend who was much more influential, a

young Massachusetts congressman named Jack Kennedy. When Kennedy became President, Wiesner became the President's Science Advisor. So then subsequently, Wiesner invited me to join in on some activities in the Office of the Science Advisor to the President, having to do with the supervision of the Intelligence community. Someone who knew computers and who knew Russian was a rare commodity at the time! So it was Jerry Wiesner who brought me into that world.

AKERA: I didn't realize that. I was actually an undergraduate in the Science, Technology and Society Program at MIT, and I met Dr. Wiesner several times. By that point, he was one of the regular attendees at the departmental colloquium they held in Building E-51.

OETTINGER: Yes. Yes.

AKERA: Back to the questions... Can you tell me a little bit about the Automatic Language Processing Advisory Committee of the National Academy of Sciences, and the historical significance of this committee?

OETTINGER: Well, I was a member of it. John Pierce from Bell Labs was the Chair, and I don't remember exactly who all the other members were. It reflected concern within the government as to whether the money that was being spent [on machine translation] was getting anywhere.

And it was a mixed group. I probably represented the more skeptical side. By that time, I had become rather skeptical.

AKERA: ...hit up against enough walls...

OETTINGER: Well, yes. You bang your head against the wall often enough... And with the processing capacity and capabilities of the time, the exponential growth of ambiguity and its syntactical analysis seemed insuperable. But as time went on...

AKERA: ...you could take a more brute force approach.

OETTINGER: Well, the way I put that is that as hammers and tongs get cheaper and faster, you can do more things with hammers and tongs.

AKERA: That's right. In fact, the report itself didn't say that machine translation was impossible.

OETTINGER: No.

AKERA: It said that, in the short term, the kind of investment that was being made didn't seem warranted.

OETTINGER: Well, yes. And to this day, I feel it is still about machine *aided* translation.

AKERA: Yes, you still need both pre and post processing in most cases.

OETTINGER: Especially post.

AKERA: Especially post, yes.

OETTINGER: And at the time, keep in mind, this was before word processors, etcetera, so if you look at the overall cost of taking something from language A into language B, most of the cost was in operations like typing, etcetera, etcetera.

AKERA: Entering data was part and parcel to it.

OETTINGER: Entering data. And the actual translation part was a small portion of it. Today it's different. You have a production line where much of the routine stuff is now done commercially, with efficient...

AKERA: Or the source document is even electronic to begin with.

OETTINGER: Yes. Well, it's all electronic now... [Chuckles] When I think of how painstaking everything was. I entered Russian text into the Mark I computer. You know, there's a book that came out in the 1940's by Don Marquis called *The Life and Times of Archie and Mehitabel*. Did you ever come across that?

AKERA: No.

OETTINGER: Archie is a cockroach and Mehitabel is a cat. And they are friends. They live in a newspaper office. The book begins by Archie saying, "Expression is the need of my soul." And so at night, he comes out and he works the typewriters. But being a cockroach, the only way that he can do it is he has to jump head first onto the keys. That's what it was like to do input! Okay? And so the economics were all wrong.

PART II: Involvement with ACM

AKERA: Okay, now this brings us to the ACM. How did you first become involved with the organization? Was it because of your involvement with Howard Aiken's laboratory?

OETTINGER: Well, I believe that the ACM was involved with one of the symposia that Aiken had in that complex.³ So he was involved, at least as a host, in the early formation of the ACM. And I had been a member of the IEEE, or what was then the Institute of Radio Engineers (IRE), since I was in high school. I joined the IRE/IEEE in 1946 or 1947, just as I graduated from high school. It was the only technical society that had any relevance to the things that I was interested in, which at that time was radio engineering. I gravitated toward ACM and became a member, probably around the time I got my undergraduate degree. It seemed like a welcome opening to have a professional society that dealt with computers and not just with radios.

³ ACM 'co-sponsored' the Harvard Computation Laboratory's second computing symposium, held in September of 1949.

AKERA: Was that in 1952?

OETTINGER: It was in the early 1950s. I lost track. I mean, I graduated in 1951, so it would have been somewhere around in there. But I think ACM was created in 1947 or 1948.

AKERA: Yes, that's correct (1947). So your first direct involvement with ACM was a little bit after its founding.

OETTINGER: Yes. And I was a foot soldier.

AKERA: In fact, I think I have part of the information here. I believe your first professional presentation was at the ACM meeting in Toronto (1952) when you spoke about the work you did under Maurice Wilkes.

OETTINGER: Yes, that's right. I presented the paper on the programming a digital computer to learn. Yes.

AKERA: Now, if I recall the 1949 Harvard symposium was a co-sponsored event with ACM.

OETTINGER: Yes.

AKERA: Were you here at the time, or were you not yet involved with...

OETTINGER: Well, I was an undergraduate in 1949.

AKERA: Did you attend the symposium?

OETTINGER: I wouldn't have met Aiken yet. The episode that I told you about would have been 1950.

AKERA: Okay. Oh I see, because you were at junior, and having entered Harvard in 1947... That's right.

OETTINGER: Yes.

AKERA: Now, your early involvement with ACM must have occurred after the immediate postwar research efforts within the Harvard Computation Laboratory. There was the work on business applications as well as your own work in machine translation. Did this lead to your involvement with ACM? Could you comment on this relationship? The governing question is this: why was it of value for you to become involved with the ACM?

OETTINGER: Well, as I said a moment ago, there was no other home!

AKERA: Right. In fact, this was the home to go to for all computer people, right?

OETTINGER: Yes. That was the only place.

AKERA: That's where everybody who was interested in computers was talking at.

OTTINGER: Yes.

AKERA: There was some work within the Institute for Radio Engineers (IRE).

OETTINGER: Well, that came later. The IRE had a hard time adapting itself to the new world.

AKERA: So really, ACM was the faster-moving organization.

OETTINGER: Well, yes.

AKERA: It really embraced computing very quickly.

OETTINGER: Well, I mean computer folks embraced the organization. It was created by computer types who felt that they had no—... I, you know, felt reasonably at home in IRE, because that's what I'd grown up with. But then I welcomed the fact there was an organization that was focused on computers.

AKERA: That's right. Now did the work at the computation laboratory influence the early direction of the ACM?

OETTINGER: Well, really, no. You know, there were so many different contacts among various people.

AKERA: Everybody knew each other?

OETTINGER: Everybody knew each other.

AKERA: I guess Aiken was involved. Was Everybody else in the laboratory?

OETTINGER: Yes. And although I was only a graduate student, I could reasonably claim that I knew everybody in the world who knew anything about computers. That's such an insane statement! You know, John von Neuman would come by, and Norbert Wiener. I worked with Maurice Wilkes for a year, Heinz Rutishauser, from ETH in Zurich and Jose Santesmases from Spain. It was a small community. There was also Ed Berkeley.

AKERA: I'd love to hear more about Ed Berkeley later on.

OETTINGER: He was famous around here for picking up the wrong end of the soldering iron.
[Chuckles]

AKERA: Oh dear! I do want to hear more about him. But for right now, for the record, could you tell me other positions and offices you held within the ACM prior to becoming the President? I could rattle through the particulars.

OETTINGER: Yes, rattle through them, because I don't remember.

AKERA: What I have on record here that you were the Editor of *Computing Reviews* between 1960 and 1963; that between 1962 and 1964 you became the Eastern Regional Representative to the ACM Council; and then you became a member-at-large of the Council between 1964 and 1966. During the same years you served as the Chairman of ACM Committee on U.S. Government Relations. Were there any other ways in which you were involved with ACM?

OETTINGER: No, that is beyond my recollection.

AKERA: That's okay. We just wanted to get this for the record.

Now I want to focus first on the *Computing Reviews*. First of all, were you involved in getting it established?

OETTINGER: I have no recollection. My guess is that I played a relatively minor role in it.

AKERA: This was early on in the publication... I believe you were one of the early editors.

OETTINGER: Yes, but I think other people like Aaron Finerman were much more active in that thing. My recollection is that I played a supporting role; not a major one.

AKERA: Can you comment on what the nature of this publication was? Why did it get created?

OETTINGER: There were all sorts of other reviews published in other disciplines, and so the notion was that somebody should comment on our literature.

AKERA: I guess the overall concern, and rhetoric was with the expanding volume of literature. People couldn't possibly read everything.

OETTINGER: Yes. It was also a matter of respectability.

AKERA: That it helped established computing as a discipline?

OETTINGER: In those days, differentiating from electrical engineering and from mathematics was of some importance. And one of the ways you differentiate is by doing what is the academic thing, professionally...

AKERA: All of the things that a professional society or an academic society does?

OETTINGER: Yes. I mean that's what motivated it.

AKERA: Yes...

Now I will ask more about the ACM Council tomorrow. But in general terms, what was the tenor of the Council like during this period? Perhaps you can recall or tell us about some of your earliest experiences on the Council.

OETTINGER: Yes... You know, it's so far back. The general memory is that of a rather pleasant, congenial group, with occasional flare-ups, with the likes of Herb Grosch or Jean Sammet. So there were several notable cantankerous characters, but it was a pleasant group.

AKERA: But everybody was committed to the technical issues, and was excited about computers and all of that.

OETTINGER: Yes, yes, the Council was. I have very warm memories of it.

AKERA: I know it was a fascinating time. I've looked at some of the primary documents, earlier in my work on the history of computing. Perhaps your most important work prior to becoming ACM President is your role as a Chair of ACM's Committee on [US] Government Relations. Correct me if I'm wrong on this, but assuming it's true, can you tell us something about this committee and how it got started?

OETTINGER: Well, I have a vague recollection... that it was the notion that computing was of considerable importance—Yes, it's a little bit like today, the concerns over cloning and other biological things, where you have an incipient developing area where science has produced some results which get projected forward for consequences. So have a sense of responsibility to think about the consequences.

AKERA: Yes. So you really were aware of some of the social implications and the policy implications of the computer, quite early on?

OETTINGER: Yes.

AKERA: And that, of course, brought in the government and Washington and all of that.

OETTINGER: Yes. And years ahead of its actually mattering, in the same way that, except the current Korean fiasco,⁴ nobody is cloning people here. But people were worried.

AKERA: And when you are in the midst of it, you see things that the rest of the public doesn't yet see?

[Tape 1B Begins]

OETTINGER: Mesthene invited a whole bunch of other people, which was what made it so interesting. I would not have made Martin Lipsett, a sociologist, without that opportunity. Alan Weston at Columbia University, who was working on privacy, got involved a number of times. You know, other people. So it was remarkably stimulating, and I loved it.

AKERA: You mentioned that you became involved [with the Harvard Program on technology and society] as early as 1961? Or no?

⁴ This was the controversy surrounding cloning pioneer, Hwang Woo-suk (Seoul National University), who at the time was being accused of research ethics violations and publishing articles based on fabricated data.

OETTINGER: I can't give the date. Sorry.

AKERA: Do you feel that this involvement influenced your governmental work with ACM, either directly or indirectly?

OETTINGER: Well, yes, in the sense that it broadened my interest and reach, and opened to me ideas of disciplines that I had no earlier connection with. Yes, those weekly meetings were marvelous. Harvey Cox from the Divinity School. He's a theologian. We're still friends. And several others. It was a good period. Then that program funded my work on technology in education. Somehow—this was after the ALPAC thing—I had done some work funded by DARPA, because it was Glen Culler's work in Santa Barbara on developing a keyboard and display that would be mathematical that got me started. I had the ARPA (later DARPA) money for a project, which was called Project TACT (Technological Aids to Creative Thought) where the idea, rather prematurely, was to use some of the things that MATHLAB now does; software that can be loaded everywhere. It was essentially Culler's machine with ideas like MATHLAB that I worked on. Again, I ran into all sorts of difficulties, which have been bypassed now 30 years later. But at that time, it seemed insurmountable.

AKERA: It gave you enough of a pause to stop that line of work...

OETTINGER: So once again, by accident, I got involved in writing a critique. Because just as language translation had been prematurely oversold, the use of the computer was oversold. So I wrote this diatribe, *Run, Computer, Run*.⁵

AKERA: I'm actually going to ask a little bit about that later on as well. Going back to the ACM for right now, ACM used to have a precedent for advancing its vice president to the position of president. I believe that by the time you ran for the presidency, ACM began instructing its nominating committee to advance two candidates for the top offices. Can you help us sort out this history?

OETTINGER: Do you know who was [running against me]...?

AKERA: Robert Rector, but that's the next question. But first, do you recall when two candidates began to appear regularly on the ballot, and perhaps the circumstances under which this occurred?

OETTINGER: No. It's funny because I had forgotten about that, and I can now visualize Bob Rector exactly. But all I remember about the election is that it was Paul Armer who came to me one day and said, "You should run for president." I said, "Why not?" It was not something that I had thought about...

⁵ Oettinger, Anthony G., with the collaboration of Sema Marks, *Run, Computer, Run: The Mythology of Education Innovation*, Cambridge, Mass., Harvard University Press, "Harvard Studies in Technology and Society," 1969; Japanese translation, Tokyo: Kodan Sha Ltd, 1974; paperback, New York, Collier Books, 1971; Italian translation, Firenze: La Nuova Italia Editrice, 1975.

AKERA: Do you know why Armer approached you?

OETTINGER: No. Have you ever talked to Armer about this?

AKERA: No, I haven't. What I know is that the vice president at the time (his name is escaping me for the moment), became a member-at-large. My sense is that he chose to do so. He chose not to run for president, and therefore, somewhat unusual for ACM, there were two fresh names on the ballot for the presidency. Is this any part of your own recollection?

OETTINGER: I have zero recollection. No, I have a vivid memory of Armer coming in sort of out of the blue.

AKERA: Now... was Armer a past president of ACM?

OETTINGER: No.

AKERA: That's right. He was very influential, but he was never in the top position, perhaps because he was involved with SHARE as well. He was very tied to the West Coast community, I believe.

OETTINGER: Yes, but I can't shed any light on that.

AKERA: He must have been on the nominating committee.⁶ That's what I would think. I can look that up, but I don't know about that.

Okay. So in 1966, you ran against Bob Rector, then the Vice President of Plans and Programs for the California-based firm, Informatics. In fact, perhaps it is more important that he was the Southern California representative to the ACM Council from 1962 to '64, whereas you represented, in a sense, the more traditional 'Eastern establishment.' Was there a real tension here? Not between you two personally, but in terms of representing different positions for the organization.

OETTINGER: I wasn't conscious of that. I mean, think about it. We're talking 1966. I was in my mid to late 30s. Still somewhat innocent.

AKERA: Quite young, actually.

OETTINGER: And not particularly politically motivated. Also by that time, I had tenure at Harvard. I was feeling secure and not in any particular need to [gain credentials]. My recollection is that I didn't lobby for the position with Armer. So, it was sort of a matter of saying, "Why not?" I was probably oblivious to any tensions there might have been. Certainly, no East-West tension that I was aware of. What I was aware of was—and I may be creating an anachronism—but somewhere in that period, the DPMA (Data Processing Management Association) came to be, and in the question of whether ACM could serve the workaday

⁶ (He was.)

programmer because an issue. There was a whole bunch of people who came out of the punch card tradition.

AKERA: The workaday programmers?

OETTINGER: Yes. The workaday IBM card punchers. Whether ACM would serve those people, or whether the DPMA would. That was something I was conscious of, and I think it led to an emphasis within the various special interest groups to try to accommodate some of that. But I can't think of any geographic thing, particularly.

AKERA: Just to focus on Bob Rector for a second, he worked for Informatics, which I guess was an independent consulting firm...

OETTINGER: ...worked for [Walter F.] Bauer...

AKERA: Yes, absolutely. Is there a chance that, Bob Rector represented more of the point of view of the folks who were interested in data processing and programming?

OETTINGER: Yes, that's possible, except that Informatics was a computer firm, not a card-punching firm. I don't recall in ACM at that time there being... DPMA and card punch people were *them*, not *us*. Bauer and Rector were very definitely *us*.

AKERA: May I ask a question, though? Can you tell us why you think you were elected president?

OETTINGER: I haven't the vaguest idea.

AKERA: [Chuckles] That's totally fine.

Moving on, I wanted to take a very different cut at the history of ACM, and this is where Ed Berkeley comes in. Maybe I should just open it up in very general terms. What are some of the stories you've heard about Ed Berkeley? He, in some senses, really helped to found the ACM, and yet there's a lot of people who speak with qualifications about Berkeley. I'm just interested in the story.

OETTINGER: To me, Berkeley was a pain in the ass. I suppose you could characterize it as being excessively conservative, but it's the "giant brains" thing. He wrote a book called *Giant Brains, or Machines that Think*, which was a plague because it overplayed the capacity of digital computers, and kept leading to absurd questions both from press and from students on expectations that couldn't be met. That always, and still does, rub me the wrong way, which is probably why I'm still an academic and not an entrepreneur.

AKERA: No, no, that's wonderful. On the other hand, Berkeley played a major role in setting up the basic policies—even the constitution and bylaws of the organization, early on.

OETTINGER: Well, you know, he was a very energetic guy. I guess in some realms, his energy was welcome and in others it wasn't!

AKERA: Was some of the work he did beneficial for ACM?

OETTINGER: I don't know. Keep in mind Berkeley--

AKERA: He resigned in '53.

OETTINGER: Yes. He was around here. He lived in the area. I think of him more as an occasional visitor to the Comp Lab. Of course, by the time I was involved seriously with ACM, he wasn't really part of the organization anymore.

AKERA: That's right. But because you became president and had to deal with ACM's constitution and bylaws (which had been modified by then—we'll get to that in a second), did you feel at any point that Berkeley had left certain imprints on the organization?

OETTINGER: No, I was not conscious of that in any way.

AKERA: The influence that I would point to, and perhaps you can comment on this, is that Berkeley did have a very expansive view of what ACM should be as an organization. In 1953, he resigned over this issue. He became "a member of the loyal opposition" because he didn't want the *ACM journal*. To introduce a journal meant that the cost of publication would raise the membership fee, and he really wanted ACM to encompass everybody, so this was similar to some of the later ideas about ACM including every programmer. I think there's something about ACM's charter, its sense of identity, which really had to do with being as inclusive as possible. Was that something, perhaps not necessarily fostered by Berkeley, a spirit to the organization that you felt you followed, or had to contend with during your administration?

OETTINGER: Again, although this might be anachronistic, it does seem like something we would have welcomed. I don't think in exclusionary terms normally, so certainly it's not something that would have grated on me.

AKERA: That's great. Now, ACM underwent some significant organizational changes in its early history. Although all this passed before you became actively involved with the organization, Berkeley resigned in 1953 to become, in his words, a member of the loyal opposition. It's was not long after that ACM raised its dues; established its first journal, the *Journal of the ACM*; and opened its first offices through an arrangement with the New York Academy of Sciences. Given that such organizational changes echo some of your own subsequent efforts as ACM president, could you comment on this early period? What do you think may have been the impetus between for these first set of changes for ACM?

OETTINGER: There are a couple of things that I can speak to, and this is why I asked you to help me recollect Walter Hoffman's name. When I came into office, Hoffman, as Treasurer, and/or his predecessors were essentially carrying the books of the association in their hip pockets. The accounting system was a cash accounting system, not an accrual system, so that the question of whether we were solvent or not solvent couldn't be answered.

AKERA: ... only at the end of the year! [Laughs]

OETTINGER: Yes. If you have a balance of, you know, did you screw the membership by not giving them the publications they've paid for? Walter, along with Don Madden, essentially developed an accrual accounting system and switched us over. This happened during my period. It was something I encouraged, but it was Hoffman and Madden who brought it about. Obviously, we then discovered that we were not solvent—we weren't bankrupt; we could pay cash. But in a workman-like way, we weren't solvent. And so we increased the dues and built up something of a reserve so that we could meet the commitments implied by selling subscriptions to journals and so on. So I think a lot of credit is due to Hoffman for having taken a seat-of-the-pants operation and putting it on a solid financial footing.

AKERA: They may have gotten it to work, but did you contribute the underlying accounting ideas? For instance, did your background in computer accounting contribute directly?

OETTINGER: Well, it made me conscious. I can see myself as being conscious of such issues in a way. When you ask me about East Coast/West Coast tensions, it's not the sort of thing that I paid attention to. But financial solvency would be something I would have been attuned to.

The journal was a strange experience because, if I could open a parenthesis here, one of the consequences of the Comp Lab relationship with Bell Labs was that one of the Bell Labs vice presidents, a man named Deming Lewis, went to work in the early '60s for NASA's Office of Manned Space Flight (OMSF). BellComm was a Bell Labs subsidiary supporting OMSF. He invited me to dinner. I took a sabbatical and worked for BellComm for a year in Washington on the Apollo man-on-the-moon project. Those were the heroic days when we built the Mission Control Center. The work statement for the subcontractors IBM hired to develop the Mission Control Center said, essentially, "You shall develop the software for Mission Control Center." That was the extent of the work statement.

AKERA: And it was the Moonwalk project that you specifically worked on?

OETTINGER: Yes, it was the Moonwalk project. I became conscious of some of the things that were being done with the Program Evaluation and Review Technique, PERT, which the Navy had adopted, which is alleged to be the basis for the success of the Polaris missile program. Again, this seems to be a thread in my life. I detected a certain amount of hocus pocus with this and wrote a paper entitled, "A Bull's-Eye View of Management and Engineering Information Systems."⁷ By "bull" here, I meant a pun on bullshit, borrowing from one of my Harvard colleagues who had written a paper on Examsmanship and the Liberal Arts. Deming Lewis, because I had written this on BellComm time, had to approve it, and he was leery because it was rather unflattering to some aspects of NASA's work. But then he was offered the presidency of Lehigh University, and a day or two before he left BellComm he signed it out and said I was to do it.

So at about this time, ACM invited me to present this paper at the Philadelphia national meeting. I forget exactly what year that was. When they saw what the title was and what the content was,

⁷ ACM, *Proceedings of the 19th National Conference, Philadelphia, Pennsylvania, August 25-27, 1964*. (New York: ACM, 1964), B.1-1 to B.1-14.

they tried to disinvite me, but we negotiated. In the proceedings of that ACM national meeting, you'll find my paper, "A Bull's-Eye View of Management and Engineering Information Systems."⁸ That's about as obscure a venue as it gets.

So when they created the *Communications of the ACM*, which happened just before I became president, they also put out a call for worthy papers that had appeared in the ACM national meetings proceedings, and which they were reserving to prime the pump for the *Communications*. I thought this was a worthy paper and submitted it. Between submission and anything happening, I became president. A shame-faced deputation from the Publications Committee came to visit me and presented me with the notion that it was too undignified a paper for the president of the association. [Laughter] So it never saw the light in ACM publications. If I hadn't been president, I could have fought it, but you don't take on your Publications Committee on this. Anyway, that's a sideline on the creation of the *Communications*.

AKERA: This may sort of repeat a bit of the story, but Franz Alt, in a later recollection, says that by 1959, he felt that the growth of ACM and the computing field as a whole made a large number of changes necessary. He suggests that ACM adopted an entirely new constitution and a new set of bylaws between 1960 and '61. First of all, do you recall any of this? Second, do you think that this launched ACM in a particular direction that you then continued to proceed in?

OETTINGER: Oblivious.

AKERA: Do you mean that you don't recall the events, or that, at the time, you weren't aware of this history?

OETTINGER: I may have been subliminally. But again, there are some things I'm attuned to and some things that I'm not. I have a vague recollection. Franz Alt was a good friend. I've probably heard discussions of this, but it's--

AKERA: ...but by the time you became president, it was already a part of the organization's history. You were simply acting on what ACM immediately required.

OETTINGER: Yes. The past organizational changes was not something that affected me vitally, anyway.

AKERA: Okay. Now, let me just follow by asking about some of the specific changes that you introduced during your administration. It was during this period that the council agreed to raise the annual dues to \$25. Your president's letter in the *Communications of ACM* (June of 1967), suggests that you did this perhaps with some trepidation. I forget what the title was, but it was about the increase in the fees.

OETTINGER: We were scared, obviously, that people would leave.

AKERA: So was there real trepidation? Or did you just think that you needed that letter to explain the Council's actions?

⁸ Ibid.

OETTINGER: No, think about it. You were in a period—this was not the dot-com revolution. This is not everybody getting rich quick. I mean, this is a fledgling professional field and so on.

AKERA: But there was a great deal of excitement, just like in the dot-com era.

OETTINGER: Yes, but a good deal of insecurity.

AKERA: And \$25 is a lot of money, also.

OETTINGER: It was a lot of money. While some people were beginning to make a pile running newsletters or founding software firms, etcetera, there wasn't the go-go sense like the dot-com revolution.

AKERA: Like you could just pour money into it, and it was okay because something would come of it...

OETTINGER: Yes. The professional field was still searching for a place in the sun.

AKERA: There were also a lot of programmers who were not tremendously well paid, for whom the dues might have seemed like a lot.

OETTINGER: No, [you're right.] This wasn't the '90s.

AKERA: So you were genuinely concerned that the dues might be too high?

OETTINGER: Yes. We didn't want to kill the organization.

AKERA: So now what were some of the more specific changes that you introduced during this period?

OETTINGER: The accounting thing and the dues increases are what are particular. Because of my interest in the government relations, etcetera, I called on Donn Parker to take that over because I couldn't do it any more. Donn, to this day, is sort of still involved with that. There, and then in the AFIPS realm, we started courting members of Congress. I remember Howard Baker, when he was senator, came to one of our annual meetings. He was a very bright man, really. I noticed somewhere later in your notes you discovered my testimony with Don Madden at a congressional hearing, a copyright revision bill. I still am a little bit ashamed. Invoked the [metaphor of a] blind man reading. You do what you got to do to get a point across. So we were fairly active in the political arena because of a feeling that the traditional print and punch card people didn't understand the potential of computers, and thought there was a danger that the technology would get throttled by ill-advised protective legislation.

AKERA: Was this a fairly new direction for ACM, this kind of political involvement?

OETTINGER: I don't think so. But it was not something which was... there was no tradition. The physicists, because of the bomb, had a very active political thing.

AKERA: And you don't mean lobbying, but a political organization.

OETTINGER: Yes... with a concern partly for the public, but with also a concern for the profession and the field.

AKERA: And of course it's sometimes difficult to tease these interests apart, I imagine?

OETTINGER: Yes. By that time, my relation with the government through the Wiesner connection had been developed for several years. My mentor and boss here in the University, Harvey Brooks, had been for a number of years a member of the President's Science Advisory Committee. Again, this was something I was aware of for a variety of reasons, my contacts and my experiences, I would have been highly sensitive to it...

AKERA: ...to the significance of computing related issues at the time?

Was Harvey Brooks the dean of the engineering school?

OETTINGER: He was the Dean of Division of Engineering and Applied Sciences. He was an associated guru behind Mesthene in the Program on Technology and Society. And another mentor of mine, Bill Baker of Bell Labs, who was a leading figure in the intelligence world, sensitize me to the policy issues in that realm long after Wiesner had left government.

AKERA: One of the other changes you made with regards to this 'policy connection' was that you decided to hire James Titus, a former columnist for *EDP Weekly*, who served as a political commentator and a Washington correspondent for the ACM.

OETTINGER: I'm a little bit confused here on whether we have the wrong guy. I don't think it was Jim Titus. There was another fellow named Jim.⁹ I've been scratching my head. Blond guy. Left ACM only about five to ten years ago. Retired. Still, when I ran into him, referred to me as having changed his career and so on by bringing him on board at ACM. For the life of me, I don't think his name is Titus.

AKERA: I actually looked at the Washington commentary section from this period. Here it is. This is, in fact, the article on copyright. It is signed "Jim Titus."

OETTINGER: That's very likely, but I don't think I knew Jim Titus very well. The person I'm thinking of was a headquarters guy.

AKERA: So Titus is somebody that somehow became involved with ACM, but you weren't personally familiar with.

OETTINGER: At least I don't think I was the person who hired him. I wish I could remember. Could you do me a favor? As with Hoffman, look up... see, it's James *something*, but he would

⁹ This was Jim (James M.) Adams, Jr., who entered ACM as the first Director of Education in conjunction with the National Lectureship Series and the ACM professional development workshops.

have been there for a couple of years, and would have been there as meeting organizer, sort of a general deputy to Madden. Maybe he became the executive director when Madden retired. And that's not Titus.

AKERA: Okay. I'll note this as something to do.¹⁰ I might be able to actually find it tonight because I have some of the documents.

OETTINGER: If you can, that would be good, and then we could proceed. I recollect Jim Titus, but as incidental to, and not a part of the headquarters staff.

AKERA: No, he wasn't part of headquarters. He was located in Washington and continued to be an independent journalist.

OETTINGER: My guess is that either Madden or somebody else brought him in.

AKERA: I think in one of your early letters you actually mentioned Titus by name, saying, "We have engaged this person in Washington, D.C."

OETTINGER: Okay, that's entirely possible.

AKERA: It comes up right here, actually. "The executive committee, with the concurrence of Gerald Salton, editor-in-chief, has therefore engaged the Washington correspondent to write a monthly interpretive column for the paper for the *Communication*."

OETTINGER: But that would have been an incidental thing.

AKERA: So in a sense, you might have approved of that change, but it wasn't something that you yourself initiated.

OETTINGER: It was not something that I initiated, right.

AKERA: Thank you. During this period, there were a number of policy issues and legislation in Washington that you had to contend with. Current ACM members might be surprised to learn, for instance, that there was active discussion about computers and privacy during this period, and that there was a major revision of U.S. copyright laws that brought about the Fair Use provision of the Copyright Act, which concerns the academic use of copyrighted material. Can you comment a bit about the political climate, the biggest policy issues that ACM decided to grapple with at this time?

OETTINGER: We've discussed this a bit before. The copyright and fair use issues were very central because we wanted to preserve, in the computer realm, what was pretty well accepted in the print realm. Namely, taking a few words or paragraph for a scholarly or journalistic purpose was fair use. Somehow, the print industry folks wanted to restrict computer 'quotation,' if you will, out of [the notion of fair use], which is why I got into this blind man thing, that we would be deprived of something that a seeing person would get.

¹⁰ See previous note.

AKERA: And is accepted in the print domain?

OETTINGER: Yes. So that was certainly of considerable concern. What was the other area?

AKERA: The other issue I mentioned was privacy, but there was a whole series of other issues that came up. I don't know—which issues did you feel were most important at the time?

OETTINGER: What we would call databases today, or in fact was being called-- It's the period in which I also became acquainted with Alan Westin, who wrote a book called *Databanks in a Free Society*. His book was a somewhat premature, but a prescient concern over...

AKERA: ...what we now call “data mosaics.”

OETTINGER: If you read the headlines over the last couple of weeks, these issues are alive and well. But people were only beginning to be concerned about protection.

AKERA: I was impressed at how early people knew about such issues. I wasn't aware that they were, as an historian. These really are the same issues as the ones we're talking about today.

OETTINGER: You might want to pick up a couple of Alan Westin's books, because they're a product of that period.

AKERA: Yes. I will also follow this thread later when I ask about how your work at ACM influenced your subsequent decision to enter the realm of technology policy. However, for the moment, I'd like to follow the larger issues you and ACM faced during your tenure as president.

One of the other major initiatives that you launched during this period was on continuing education and professional development. I believe that it was the eclectically named Committee of Thoughtful Persons that recommended that the ACM adopt as its masthead the slogan, “Educate yourself or perish.” Again, another early prescient issue that we deal with today. Can you describe for us the scope of ACM's new professional development activities at the time?

OETTINGER: My guess is again that this has to do with the DPMA and the notion that if the card punchers were to become... It was kind of a colonial thing, you know—got to bring the heathen to the level of the...

AKERA: And educate them in the basic skills of the field, and remain current, given the way the computing field was always changing. This is actually some of the language that you yourself used at the time. As far as the specific changes you made, one was over the National Lectureship Program. I think the program had already started, but you augmented it significantly at the time.

OETTINGER: I think that could have been under the pressure of the academics who wanted to have impressive people come to their campuses to help them differentiate from the electrical engineering and math departments!

AKERA: So you think that they were sort of taking advantage of the situation. It may really not have been the needs of the day-to-day programmers?

OETTINGER: That one strikes me as a concession to the academics.

AKERA: I understand... because that way, you can get a free colloquium speaker by having the ACM national pay for it.

OETTINGER: But it's more than the fact that it's free. It's the prestige. I mean, think about it. During that period, there were relatively few, if any, computer science departments. Depending on the university, computer science was still something that was kind of an orphan or a stepchild in EE or in the math department.

AKERA: So if you were in a math department, you had to convince your colleagues to bring someone in computing as part of the department's colloquium series, whereas if the ACM national was paying for it, then you wouldn't have to try too hard at all.

OETTINGER: And [it also] put some prestige behind [the talk].

AKERA: Yes. The lectureship series had some of the biggest names in the field, who in turn volunteered themselves for this work, if I'm correct.

OETTINGER: Yes. So I think that this was part of the boot-strapping of the field.

AKERA: Yes. Now, were you yourself one of the lecturers? I'm sorry I've forgotten, but one of the three past presidents that I am interviewing was a national lecturer. In any event, individuals such as Alan Perlis and others were very much active in this lecture circuit.

This was also a time when there was a tremendous demand for technical manpower, not too long after Sputnik and all that. It was also when computer science departments were struggling to establish themselves separate from traditional discipline bound departments. In speaking about this, and with the full benefit of hindsight, what do you think were the root causes of ACM's need to engage so much in professional development activities? Wasn't it unusual, at least for the time, for a professional society to adopt, in effect, a training program independent of the universities? First of all, was this characterization correct?

OETTINGER: Yes, of course [it was] independent of the universities, because universities didn't, and don't today, consider themselves vocational.

AKERA: That's right. You had fledgling computer science departments, but you didn't train systems programmers. You trained computer scientists in their junior form, even as undergraduates. But that didn't really meet the exact set of requirements out in the field.

OETTINGER: Yes. It didn't meet the needs of industry for troops.

AKERA: And that represents the concerns about the DPMA?

OETTINGER: I think the background here was a certain combination of rivalry with DPMA and ecumenical spirit that would want to attract them by offering an upgrade. Again, some of the things I remained oblivious about. But the relationship with DPMA was never far from the Council's mind.

AKERA: I imagined you learned a lot once you became president!

OETTINGER: Oh, yes.

AKERA: Now, I'd like to still try to understand something more about the breadth of the ACM, and why it chose to be so diverse and all-encompassing. The root question that I have here is whether the changes in ACM that you oversaw, and of ACM's subsequent development in general was entirely representative of how professional societies gradually mature over time, or whether was there something unique about the ACM or computing in general during the '60s? Was the stance that you took in any way unusual?

OETTINGER: I think [if you're looking for an explanation here,] it has more to do with something we talked about earlier in the context of my own professional development, mainly that computers deal with so many areas that you have to accommodate breadth. There was a search for, "is there specialization?" Does the same thing cover everything? We had to cover all sorts of industries.

AKERA: So it really follows from the fact that computing itself is an interdisciplinary field, especially once you include its applications.

OETTINGER: It maybe was... Let me give you an example. This has happened in other industries, and it's kind of a familiar path. There was a time in my Program here where we were tracking want ads for certain types of occupations. I forget whether it was late '70s or early '80s. We started to have a peaking of a call for people that knew how to handle word processors. Then there was a period when that became a specialty and there were people who were capable of working with it. And then the ads disappeared. I bet you to take any newspaper today, and in the want ads, you will not find such ads. Why? Because it ceased being a specialty. It ceased being a special skill. It is something that everybody has incidental to whatever their occupation is. So we were dealing with a period when these skills were specialized, and the industry or occupation in which they were applied was secondary. As the knowledge and the facility and the availability became more prominent and the price went down, the primary occupation became the governing thing, and the computer essentially, like electricity before it, literally disappeared into the woodwork.

AKERA: At a larger scale, it's sort of the current move away from computer science and towards information technology. This is a version of what you describe, isn't it?

OETTINGER: Yes. So I think that at that time, and in that period, it was a self-conscious need to accommodate computer skills to a variety of applications.

AKERA: And enough interest to foster computing as a body of skill?

OETTINGER: Yes. Also, if you think about that period, the notion of chief information officer or information technology executive was still way in the future.

AKERA: So everybody else was just staff—they were technicians.

OETTINGER: Yes.

AKERA: But in need of greater recognition.

OETTINGER: They were in strange places. They reported to people who didn't know or understand what they were managing.

AKERA: There was a need to give better definition to the profession.

OETTINGER: Yes.

AKERA: This is sort of tangential to our conversation, then, but let me quote a letter to the editor that was published in the January 1967 issue of the *Communications of the ACM*. This was when Louis Fine, a member of Synoetic Systems, suggested that ACM seems to be having an identity crisis, and that, "It is not clear to me that an organization can play simultaneously the role of a profession, of an industry, and of a science." In your published response to that letter,¹¹ you noted in effect that the ACM *has* to play all of these different roles, and that this, regardless, was the will of the membership. With hindsight, do you feel that this was the right decision for ACM? Were there other options?

OETTINGER: Clearly at the time, being ecumenical and all-encompassing sort of made sense. It's not clear today that it does. Somebody who is using Microsoft software for dental billing and somebody who's using it for scheduling airplanes is going to be much more concerned with the airline business than dentistry.

AKERA: That's right, and they don't need to be ACM members.

OETTINGER: They don't need to be. That's right. More likely they belong to a dental or an airline association.

AKERA: This is sort of separate, but in reading through some of your materials, I felt that there was still a tension, even within your own mind at the time, about whether to develop computing as a science, or whether to develop computing as a profession. Do you recall any of this? Was there potentially a tension along this line?

OETTINGER: I recall discussions of it. I don't think I ever came to any particular conclusion. These, I think, were more individual kinds of decisions. Science is committed to sharing and openness and so on. The professions have a loyalty to their clients and to proprietary things. But when you're trying to hold an organization together and keep the revenues coming from dues and so on, those fine points don't matter...

¹¹ Oettinger, "President Oettinger's reply," *Communications of the ACM* **10/1** (January 1967), 1.

AKERA: ...so these were tensions that were, in effect, built into the organization itself. In a sense, if both views existed, it was really to say that ACM had to serve both of those different preferences. Then what you had was the question of balance—of choosing when to emphasize one or the other.

OETTINGER: Yes. And there were questions about codes of ethics and so on, which are appropriate for a professional organization as opposed to an academic one. Although...

AKERA: ...well, that's true. [laughter] But with what's going on with the controversy in Korea right now...

OETTINGER: We've got Hwang in Korea, and others elsewhere. So I'm not so sure there is a vast difference. But yes, certainly, there was a lot of soul-searching about 'who are we?' where we were. The whole thing was, as I recall it and still feel in my bones, dominated by this sense of second-class citizenship; that both in industry, and in fact, everywhere, computer folks were subordinated to older disciplines or professions who didn't understand who they were.

AKERA: It was really necessary to develop the field, develop its sensibility, and to develop its identity.

OETTINGER: Yes. Again, if you look on my personal chronology, I was president from '66 to '68. Then for the next few years, became the founding chair of the Computer Science and Engineering Board of the National Academy of Sciences, which was the first time that the National Academy of Sciences recognized that there was a field that it ought to, in some way, begin to embrace.

AKERA: This translates into funding decisions, too.

OETTINGER: Yes, that, too. I think you have to be careful in what you do, not to commit an anachronism here. The period that we're talking about, computer science itself was not yet established. And that many of the things we were doing had to do with a struggle for recognition.

AKERA: Thank you. Now, let me check my notes a little bit.

So, I was struck by the number of committees that were created within ACM. I'm not a scholar of professional societies per se, so first of all, this may actually be typical of a professional organization. But it struck me how, for instance, at or around the time of your tenure, ACM had a Committee on Thoughtful Persons, Committee on National Meetings, Committee on ACM's Aims and Objectives, a Committee in Computer Science. There was also the Committee on Professional Standards and Practices, which was headed by Donn Parker at the time. There was a New Chapters Committee headed by Bill Lyons. Then the Temporary Advisory Committee on Business Data processing, as separate from the Special Interest Group on Business Data Processing. Then on the social side, the Committee on the Professional Activities for the Blind; the Special Interest Committee on Social Implications of Computing, or SIC²; and then of course the Committee on Special Interest Committees and Groups. This was in addition to the 11 SICs and 12 other SIGs. This is dated from September '68, so right after your tenure. Was this typical

of professional societies of this period? Or was there something about ACM that led to this proliferation?

OETTINGER: My current explanation for it is that the special interest groups and committees were substantive activities. There were people who increasingly began to see themselves as specialists, where they did their substantive shtick. The ones you rattled off earlier were management tools of the Council and President to figure out what to do with the association. They were looking at structural issues and, in contemporary terms, governance issues, not substantive issues.

AKERA: But if I look at it from the perspective of organizational sociology (which I'm not a specialist in, but I've read a little bit of this literature), this strikes me as an organization that is experiencing some kind of identity issues. There's a lot that had to be sorted out. There's a lot of different interests and contingencies.

OETTINGER: If you're in the chair of the presidency, what you do is when somebody complains to you, you create a committee and say, "Look, hey, buddy, look at it. Come back and tell me what to do."

AKERA: Yes, that's a reasonable position to take.

OETTINGER: In some ways, it's a copout. What do you tell the guy? Say, "Oh, yes, this is an important area. Would you get a group of like-minded people, and let me know what you think we should do." But it is also a way of thinking through difficult issues. I can't now recollect which motives dominated, but it's something that I wouldn't want to disown.

AKERA: No, no, I think it was a very good choice for the organization. Just trying to get that dynamic down for the record. I did have a question, though. Actually, I can tell this by way of my own anecdote.

[Tape 2A Begins]

AKERA: I'm a member of the Society for the History of Technology, and within our own field there is a division between historians of science and historians of technology where historians of technology are often former engineers, and historians in science former scientists. As a consequence, the Society for the History Science tends to be the more 'polite' organization, whereas SHOT tends to be more of a rambunctious organization. In being involved with SHOT, I know that there is a kind of governing, 'engineering' mentality that says, "We can solve anything." Given a problem, we can just create a committee, find a way to figure things out, create the right incentives, etc... That kind of reasoning. Given that ACM involved a very large number of computer people who I think also had this kind of problem solving mentality, do you think that the proliferation of committees within ACM itself might have been a kind of spillover from an engineering mindset, and their practices for coping with complex problems?

OETTINGER: ... No. As I indicated above, to the extent that... you know, it's hard to recover a state of mind. But knowing myself now, I'm imagining that I wasn't all that different then, it was

more likely that I used that kind of instrumentality to defuse a problem, or to get people to think about a problem seriously, rather than with the notion that somehow it would solve the problem.

You know, I'm conscious of a much different streak and tendency in my own mind, one conditioned by my history with language translation and educational technology, namely the problems which would appear on the surface to be engineering problems, but when you really get down to the nitty-gritty, they have organizational, political, ethical, components, etcetera, and that many failures—so-called engineering failures—are failures to engage with the broader context of where the device or gadget or system is embedded. I mean, systems do not exist in a vacuum. They exist in organizational, social, and political milieus, and if you don't take that into account, you're shooting craps at random.

AKERA: Yes, you're absolutely right. But I was thinking not so much about your own actions, but more about ACM's grassroots character in general. I think these committees were as much a product of the will of the membership. People had issues they wanted to bring to the fore. They also understood that the organization's committee structure could be used...

OETTINGER: I'm sure [that's right]. I mean, ACM was and still is a mixture of people with scientific and engineering backgrounds—you know, very different backgrounds.

AKERA: That's good. Thank you.

Tomorrow, we'll speak a bit more about several of the specific committees. But by way of preparation, were there other standing and/or ad-hoc committees from this period that were especially important to the changes you wanted to bring about?

OETTINGER: I can't recreate this in my mind.

AKERA: Sure. I actually have a list, so maybe at the end of the interview you can take a quick look at it and say, "Hey! We have to talk about that group tomorrow."

OETTINGER: Yes. I'll be glad to. See if it jogs my memory.

AKERA: Yes, okay. So, both through your policy work as well as your past involvement with the Program on Technology and Society, I know that you're familiar with the complex interplay between institutions, esoteric knowledge and both the implicit and explicit frameworks of the regulatory contexts that have fostered both. In putting on your analyst's hat—I think that could even be broadened to include social issues in general, which I think is what we were just talking about—what do you feel are the real issues and challenges that ACM faced during this period? We've been speaking about some of this.

OETTINGER: Yes, I think we have. I think the central one is the search for recognition, for a place in the sun, for self-definition, for autonomy of computer science departments in academe, and of the line of work that eventually became the CIO, CTO, IT Chief, etcetera, in the corporate world.

AKERA: A position whose work required substantial recognition within the corporate world, but that it did not then receive yet.

OETTINGER: At that time, no. That's right.

AKERA: What was the image of computing people in US industry? Leaving aside disciplinary and academic side of the problem, what was the image these folks had to contend with?

OETTINGER: They were back room service people, somewhat like the air conditioning and the buildings and grounds people.

AKERA: But with a PhD. Or, that's exaggerating a little bit. But, right?

OETTINGER: [Laughs] Well, that only added to the complication, and the mystery. I mentioned to you earlier that Aiken sold me to the Philadelphia National Bank for the summer of '55, and that led to considerable soul searching on the part of the management there. The champion was a vice president named. Lew Nungesser. And he and Aiken really prevailed. I mean, this was an old bank in Philadelphia: the president was a Potts from Pottstown, PA. It was decided that because I was a PhD, I could eat and pee with the officers! . But that was a unique thing. You know, somewhat like the first Black to play baseball. And it was many years later before a computing executive would be part of the management team.

AKERA: Invited into those circles.

OETTINGER: Yes, invited into those circles.

AKERA: It's sort of easy to trivialize it, but from the banks' and professions' point of view, these officers are people that were dealing with million-dollar bank accounts and loans and policy issues and so on.

OETTINGER: Yes. Well, see, the loan officers were the kings..

AKERA: Yes. I can imagine. Just like, at IBM, it would have been the sales professionals—although scientists and engineers did get into the upper ranks of that organization very quickly after World War II. But it seems to me that there too there was a barrier to break. You know, that people with technical backgrounds really deserved to be within these highest levels of management.

OETTINGER: It's not so much deserved to be, but as the technology and its applications became the central resource, a central component, it was necessary for the well being of the enterprise. And that eventuated. It took quite a while. From 1966 to '68, it wasn't there.

AKERA: Yes. Can you spell out some of the similar dynamics that existed in the academic context? What was going on in the universities in the '66 to '68 timeframe where computer science faculty felt sort of second-class to the traditional disciplinary departments?

OETTINGER: Well, in this university at that time, and we were behind many of the other universities, partly because the early successes provided a certain *de facto* recognition, even though there was no *de jure* recognition. But we had a series of committees that made recommendations. I remember one of my colleagues saying, “Well, that committee recommendation—which urged a lot of things to be done for computer science—it’s like a license to hunt moose in Boston Common.” [Laughter] And that’s what actually happened, and it took years [for change to happen. Years] later the students demanded computer science courses and then eventually arrived with their laptops and saved the faculty. It took the influx of students to provide the computer science business with more recognition [here].

AKERA: And when you speak of laptops, are you speaking of the 1990s, or earlier?

OETTINGER: No, I’m talking ’90s. At Harvard, computers... it was essentially with this current dean, less than a decade ago when computer science emerged from the backwoods and we gained some recognition. At other universities, it was more rapid.

AKERA: Indeed by the late ’60s, there were quite a few computer science departments in this country.

OETTINGER: Yes.

AKERA: Now, is that partly because of the strength of the traditional disciplines at Harvard? That’s what I think I was trying to get at earlier. In a way, computing perhaps got absorbed as an application into linguistics and communications, and into business, etcetera, so that this made it difficult to create a new computer science faculty at Harvard.

OETTINGER: Well, I was partly responsible for that, because I happen to believe that it really belongs in [the departments]. You know, now there is no pencil and paper department in any university. If you read Petroski’s book about the pencil,¹² you realize that there were periods where pencil technology was where computer technology is today. And so I’m still of a divided mind as to whether computer science departments need to exist. So I may have been in part responsible for not pushing it hard enough at Harvard.

AKERA: That’s good. Did that at all influence your actions within ACM? These attitudes would have had some significance for ACM’s direction...

OETTINGER: Well, no. Again, where you stand depends on where you sit. And as President, I feel a little bit like Alito¹³ in his testimony yesterday. As a lawyer, you have to do what the client wants. But as a judge, you don’t really have an agenda. You know what I mean? And I think that it became clear to me. I mean, it was an eye opener. There were these people out there who needed to have autonomy, etcetera, etcetera. And so some of my colleagues, like Perlis, did a yeoman’s job in getting recognition for the field. I didn’t do so much.

¹² Henry Petroski, *The Pencil: A History of Design and Circumstance* (New York: Knopf, 1992).

¹³ The interview took place at a time when Samuel Alito was a nominee for the US Supreme Court.

AKERA: That's exactly my sense of your administration—that you were indeed very ecumenical, and that once you were in the office, you really tried to support all of the different interests inside ACM. I guess I'm offering that as commentary from outside. As a historian I can't help this sometimes.

Computer science has always been an interdisciplinary—actually, let me just pose this as a question, and maybe you will refute that it's an interdisciplinary field. As a consequence, ACM's jurisdiction has always overlapped with that of other professional societies.

We will probably discuss this more in-depth tomorrow, but can you tell us a bit about the other organizations that were active during this period?

OETTINGER: Well, yes, we mentioned DPMA. I think this was the main thing. The IEEE Computer Society and its special interest groups and so on happened later. As I recollect, I was very much conscious of the DPMA problem. IEEE at that time, the Computer Society and its various pieces, were not yet an object.

Now, what was a concern was the relationship between ACM and AFIPS.

AKERA: Yes, and IEEE was the other sponsoring member?

OETTINGER: But other folks like Armer and Rector and, oh, gosh, who were the other ones who were big AFIPS guys? They took care of [our relationship with AFIPS]. I dealt with ACM and had little to do, except to be delighted when there were revenues from AFIPS coming in.

AKERA: Yes, that's right. AFIPS was set up in such a way that the national meetings organized as the Joint Computer Conferences raised revenues for the three contributing societies—originally IRE, AIEE, and ACM.

OETTINGER: Yes, for the societies. And that was really nice, while it lasted.

AKERA: Yes. But I think it caused some trouble, too, if I remember. Although, I think this was what Bernie Galler [the next ACM President] had to deal.

OETTINGER: Yes.

AKERA: Indeed, as a consequence of the revenues, it was hard to change the charter of AFIPS to really keep embracing new organizations. AFIPS began as a general agreement of sorts to deal with revenue.

OETTINGER: Well, now because somebody knows all that voodoo, you know? [Laughter]

AKERA: Yes. That's right.

OETTINGER: I was in the happy position of having to come in. And Galler and [others later on] had to worry about the situation with AFIPS, but not on my watch. [Chuckles]

AKERA: Oh, yes. Bernie had to deal with the other concerns.

Now, were there other organizations that you... Or actually, maybe I can comment a bit here. It seems there were other societies with different interests [related to computing]. The American Mathematical Society was interested in numerical analysis. There was a very different sort of interest represented by SHARE, being a computer user's group, and then the Joint Users Group, which I guess came into existence at around this time. But at least with the most traditional societies, IEEE among them, it seems that there was a kind of gentleman's agreement among the various societies. And IEEE focused more on the electronics and hardware.

OETTINGER: Or software.

AKERA: Yes. ACM was more encompassing, but it really did have a more exclusive focus on software and programming.

OETTINGER: Yes. The hardware focus was almost non-existent [by this time within ACM].

AKERA: Yes. And the American Mathematical Society's focus was on mathematic algorithms and some of the more advanced [areas of mathematics related computing] research. Computer science and research still didn't have a very good home, although it was probably more in ACM than the other organizations, unless there was an obvious disciplinary-based [aspect to the problem, which might be represented by a] society like the Computational Linguistic Society.

OETTINGER: Yes. I knew this other person at the Computational Linguistic Society.

AKERA: So this tended to be the 'constellation' of organizations, and there was a fairly comfortable arrangement [between them]? My sense is that the DPMA presented a major problem, because if you looked at the ACM membership, roughly 50% of the members could potentially belong instead to DPMA.

OETTINGER: Well [yes], and especially as the technology migrated away from punch cards. And so little by little the operators in industry were computer types. And so DPMA became a higher tech thing simply because their old instrument got shot out from under them!

AKERA: So they used to be 'safe' because they were tabulating machine folks. But [then] they became computer folks.

OETTINGER: Yes. Well, they talked about wiring boards and stuff. But then little by little, the boards disappeared and they became programmers.

AKERA: Yes. And I think at a certain point, ACM became concerned that the rate of growth of its membership wasn't keeping up with the growth of the profession, where then you're looking at all of those programs over on the data processing side.

OETTINGER: Yes. But that peaked, I think, [later]; the deluge came later. [Laughs]

AKERA: Okay. Now, just in general though, did this kind of constellation of different academic societies, and divvying things up, or sort of each defining their own realm within the larger field of computing—did this have consequences for the development of computing as a profession? Did it tend to retard it, or did it accelerate it?

OETTINGER: My sense is that it was probably irrelevant. The driving forces during that period were the military and the space program, where ARPA dispensed money, where NSA paid for crypto, etcetera. These were far more influential [in the professional development of the field].

AKERA: In defining computer science as a discipline?

OETTINGER: In defining, yes. And today, it's the banking industry and entertainment and so forth—the customers, the large customers.

AKERA: Right. So in other words, back then it was the era of the Cold War. The military was the largest customer.

OETTINGER: Yes.

AKERA: When it came to computer science research, they too played a very active role in defining the major agenda. So it was about: time-sharing, I guess programming languages, formal systems, software engineering.

OETTINGER: Yes. So the internal battles within the profession were, yes, I think at most marginal.

AKERA: Right. And in fact, I guess in some sense, ACM nor any other society could not have been set up to really control the development of the field in the way that, for example, the American Medical Association had the ability to control their own profession. There, the professionals had a lot of power. But here, you had very powerful external sponsors.

OETTINGER: Yes. Well, partly because in that era, medicine was still an art controlled by occult means. If you look at it today, the medical profession is becoming subservient to the insurance industry and to regulators and so on. While at the same time it is becoming more scientific and therefore less occult. So the doctors had a good time, but it's changing.

AKERA: So these dynamics change. And that's part of the characteristic of professions. They don't always go onward and forward. But they experience these dynamics as a result of changes in the [historical/socioeconomic] context.

Partly as the result of some of the underlying tensions within ACM and outside of the organization, you chose to place greater emphasis on special interest groups and special interest committees. I believe that at this time you chose to budget greater resources for distributing newsletters, and expanded the program of National Lecturers to benefit local chapters, although, we corrected this in part, earlier. What were some of the other concrete changes, and what impact did they have on the future of ACM and its development?

OETTINGER: Well, you know, I think we also developed the headquarters staff. First, it was Irene Hollister, period. And then we brought Don Madden on board and this fellow Jim Adams and some additional staff. So it was the beginning of a substantial growth period for headquarters staff, and for membership services. I mean, if you look at the range of services being provided today, it's a far cry from minimalist.

AKERA: Now, actually, do you see yourself as having instigated a lot of these changes?

OETTINGER: I think we got it moving. There weren't the resources to [change things completely].

AKERA: Right. The financial setup wasn't correct. That's right.

OETTINGER: But again, I have a sense that my period marked the transition, sort of, from an amateur thing to a more professionalized organization-- And I'm talking about the operation, the management of the society.

AKERA: Right. Exactly. I think that's what I was going to say, because we've been talking about the development of computing as a profession. But that's sort of the intellectual side—relations outside of the organization. But I think what you're pointing to is that at the very least, you helped the professionalization of the organization. Internally, you really made a lot of effort to make the central office of ACM much more professional, like other professional societies, and that it started to offer the kind of services that other professional societies were already offering their members.

OETTINGER: Yes.

AKERA: Do you think you went as far as or further than other professional societies in this sense?

OETTINGER: No, we could have gone further. But we didn't have the resources.

AKERA: Sure. But compared to other societies, did ACM do more or less typically?

OETTINGER: Oh, well, as I recollect it, I mean, IEEE (or was it still IRE at that time?) had a much more extensive [set of member services]...

AKERA: Right. So you had other organizational models to go by.

OETTINGER: Yes.

AKERA: And of course, you were a member of IRE (or IEEE).

OETTINGER: Yes.

AKERA: Now, just for a more broader question. Were there other changes to ACM that you oversaw during this period that you felt had a lasting impression on the organization?

OETTINGER: I think we covered that.

AKERA: Yes, I think we did. Were there any initiatives that you launched during this period that fell by the wayside? You know, things that you felt should still be active today, or should have been active for a longer period?

OETTINGER: There probably would have been. [Laughs] Time heals old wounds.

AKERA: That's true. We might hit on some of these again tomorrow as we get to these things.

OETTINGER: Yes. You might have to jog my memory a bit, but I don't recollect any trauma.

AKERA: I believe that it is Dr. [Franz] Alt,¹⁴ in one of his later reflections, who suggests that if during the process of rewriting the bylaws-- in other words, ACM sort of chose to subsidize its SIGs and SICs. But if in the process of rewriting its bylaws, ACM made a provision for transferring some of the dues collected by the SIGs and the SICs back to the central organization, this might have helped improve the financial and technical standing of ACM's national organization. Is this true? Or do you think the move towards a greater emphasis on SIGs and SICs was an inevitable part of the development of ACM?

OETTINGER: Well, I don't think there's any clear-cut answer. My guess is that at the time, I wouldn't have thought terribly much about it and I would have relied on somebody's advice or whoever walked into the office last. Looking at it from the point of view of what I know in 2006, it's one of those unanswerable questions.

AKERA: Yes. It's kind of a counterfactual history.

OETTINGER: Yes, you know, you're juggling incentives, depending on who controls the money and who doles it out, and whether it's a payback or a flow. For instance, the crisis at the moment in the American Red Cross is a good example of this issue of, "Does the national collect the money and flow it back to the chapter? Do the chapters collect it and flow it to the national?" In every religious denomination, that's a big issue. It's an issue in this university. So whether we did the right thing or the wrong thing, it's gone on down.

AKERA: That's what happens, though. Yes. And my sense is, at least from a more rounded historical sense, that there was very much an interest in fostering the SIGs and the SICs at the time.

OETTINGER: Oh, there's no doubt about that. Now, whether the particular revenue sharing scheme that we had was contributive to that or hindered, I'm damned if I know.

AKERA: Yes. I don't know enough about the contemporary history of ACM, but I think the kind of historical answer you gave before might have been very relevant, which is to say: at that point it made sense to subsidize the SIGs and the SICs. But over time—there are other societies that

¹⁴ Third ACM president, who served from 1950-1952. See Alt transcript in this oral history series.

draw part of the revenue from the SIGs and SICs to support the central organization. And if the history of ACM is such that there is concern about weakening of the national organization, that could have been one of the possible means for strengthening the ACM nationally.

OETTINGER: Yes. But there's a lot to be said for autonomy!

AKERA: Yes. Actually, please comment. I'm just kind of repeating something I've heard.

OETTINGER: Yes. But I'll tell you, to the extent that over the years [in reflecting on the] intelligence field or in other organizational areas, I've become more and more conscious of the fact that things are described as pathologies, if they persist, must be functional.

AKERA: Is this to say, "on one level," or from a "different point of view?"

OETTINGER: And so the question is, "What are they functional to?" And usually the answer is that you're looking at a trade-off between incompatible goods—that if you want more of one, you have less of the other. And in a stable organization, things get kind of frozen. Nobody remembers why they got frozen in that particular way, until some extreme or disturbing factor comes in. And then you've got to reset all of these balancing acts, and you've got to relearn why you were balancing them. By the time you relearn enough, you're already past that crisis and on to the next one. And there's always, then, a sense of tension and imperfection. That's part of the human condition and part of the organizational condition, and part of the fact that the whole is unmanageable. Any time you cut it up, you have arbitrary decisions and balancing acts to do. You know, I don't worry about it anymore. [Chuckles]

AKERA: Sure. Let's see. Well, okay, so this is probably not the right question to ask, but the question I have here is: In hindsight, is there anything you would have done differently in managing ACM and its transition?

OETTINGER: I don't have enough memory to address that. [Chuckles]

AKERA: We'll continue this conversation tomorrow, mostly about ACM's organization. But is there anything else about ACM in general—an important issue or perhaps an anecdote that you would care to share at this point? This will be the end of this phase of the transcript, and therefore an opportunity to give the discussion about ACM some closure. And so you can reflect on this for a moment.

OETTINGER: Yes, well you know, while my participation lasted, it was a very congenial and pleasant period of my life. The people I dealt with, like Jean Sammet and like my successor Bernie Galler, were delightful people. And it was a sense of breaking new ground.

You know, one thing as I recollect (maybe it's coming up tomorrow, but you were asking me about it), one of the things that I was pleased with was that we moved the 1968 national meeting out of Chicago and to Las Vegas, which avoided our being in Chicago at the time of the head cracking during the Democratic National Convention. In fact, we moved it out because of the problems we might run into with space competing with the Democratic National Convention. But that turned out to be a good decision. I'm proud of it, but it was accidental!

AKERA: Actually, speaking about Bernie Galler['s administration], there was actually a national referendum the following year, of moving the meeting out of Chicago again for '71. And this vote was specifically politically motivated; it was not accidental. Of course, the ACM membership decided I believe to keep the meeting there. I forget the details, but that's sort of a separate '60s incident.

OETTINGER: No, [in 1968] we were just considering space problems in the move to Las Vegas.

AKERA: Let me shift, then, to the final stage of the interview about your subsequent career. As the final part of the interview for today, I would like to trace out some of the connections between your work at ACM and your subsequent career in ICT policy. First of all, am I right to assume that there is some kind of connection here? Did your role as ACM President, or your earlier work as the Chair of the ACM Committee on U.S. Government Relations give you new exposure to issues or policies that influenced your subsequent interests and activities?

OETTINGER: Well, yes, both in that sense of exposure (and we went over several of those connections earlier), but also in visibility. I think it was, in part, [my position as ACM President that was] responsible for Fred Seitz, who was then the President of the National Academy of Sciences, to ask me to form what became the Computer Science and Engineering Board of the National Academy. And that took place, then, in the late '60s through around 1972, '73. So I know I have no basis or record that could verify this, but I think without that exposure in the ACM, I would have been less visible. They might have thought of somebody else to do that.

AKERA: Right. And likewise that your work at the ACM made this a logical place/thing for you to become involved in?

OETTINGER: Yes. And so that, in a strange way, influenced my Harvard activities. Because one of my concerns during the period of the Computer Science and Engineering Board was that its activities were largely paid for by the government, and therefore, there was some pressure to reach the conclusions that the client wanted reached. Jerry Haddad [My Vice-Chairman and an IBM Vice President] had the brilliant idea, speaking from industry, that instead of relying on government money that we should tap industry—get money from a wide number of sources so that the Board would be less dependent on anybody and therefore be in a position to be more independent in its activity. We had raised some money from several companies—we had their checks in hand when the Academy realized what were up to. I had a letter (I wish I could find it someplace here) from Seitz -- Well, by that time, Seitz had left and there was a fellow named Philip Handler, and Handler sent me a letter ordering the Board to go into hibernation. Into “hibernation!” So Haddad and I and a couple of others took counsel as to what to do. And we said, “You know, if you’re going to get rid of us, bear the onus and fire us good and proper.” So we threatened to return the checks noisily unless they fired us good and proper, in which case we return the checks quietly. Well, they fired us, properly and we returned the checks quietly.

But I was at that time thinking of developing a research program that dealt with these controversial “technical political” issues. We were interested in tackling this problem of information resources policy’s controversial issues. . So I adopted Haddad’s idea and went to solicit, first of all, the several companies that had given money to the Computer Science and Engineering Board. So over the next 20 years, I’ve been running my research program based on this notion of being bought by everybody is being bought by nobody.

AKERA: Yes, that’s wonderful—checks and balances.

OETTINGER: Yes. And so it's sort of a chain, of how the ACM experience led to the National Academy experience, which then in its own strange way led to this notion of multiple funding as a way to get intellectual independence.

AKERA: So there really was a rather direct connection between these three activities.

OETTINGER: Oh, yes. And then, of course, throughout that period, the original connection through machine translation with Wiesner, and this led to this life-long avocation in dealing with the spread of computer technology, and the world of intelligence.

AKERA: Actually, could you speak more about that, because that doesn't show up in the other sort of historical records, your involvement with national security issues? And of course, only to the extent that can be disclosed to the public record.

OETTINGER: I mean, it's public record that I am the chair of the US Director of National Intelligence's Intelligence Science Board currently. But the root of that was in the language translation business. You know, there was a time when there were no computers in the NSA. [Laughs]

AKERA: Oh, dear. [Laughter] No, that's very good. I understand.

Let's see. What I want to do is to flag in the transcript that we spoke earlier about your work in educational technology. So I actually slated that for this part of the transcript. Would you mind repeating some of that information just so folks looking at the latter part of your career will notice this? What I have here is this question:

I believe it was during your tenure as ACM President that you began working on educational technologies. In 1966 you published an article in the *Communications of the ACM* entitled "A Vision of Technology in Education." (vol. 9 (July 1966), 487-490) What work were you doing at this stage? And could you also help spell out the connection here to the Harvard Program on Technology and Society?

OETTINGER: Well, as I mentioned earlier, this was a somewhat separate thread, which grew up out of my falling in love with the work that Glen Culler had done in Santa Barbara in developing software and using what was then a Tektronix monitor, which had a memory type phosphorescent [surface], so that it could retain an image until it was erased, which was of considerable importance in trying to get something that you could use for mathematical demonstrations.

AKERA: So interactive graphical media. Yes.

OETTINGER: Yes. That led me to send a proposal to DARPA (and Licklider was the Director of Information Processing Techniques) to try to develop it as a tool for education and as a mathematical working tool. Again, it was a little bit ahead of its time. And so it ended up seeming more about the difficulties than about the prospects. As I mentioned earlier, that was the sort of thing you buy now for less than a couple hundred dollars from MATHLAB.

AKERA: Do you recall roughly what year you received funding from ARPA IPTO and when you were actively doing this research?

OETTINGER: Yes. It would be in the late '60s, early '70s.

AKERA: So this article for the *Communications of the ACM* was part of that initiative. Were you still optimistic about this technology then?

OETTINGER: Well, no. It was either that or... I'm trying to-- Yes, that may have been a vision of how it was an optimistic thing. And then I got into the problems, and by the time I worked with Mesthene, it was more on the, "Oh, shit, that again!" you know, ahead of the technology, ahead of the declining cost curve, and so on.

AKERA: So once you became more involved—I guess you were involved, but once you thought about it in the framework of Harvard's Program on Technology and Society, that you quickly saw some of the limitations of the technology in this line of work.

OETTINGER: Yes. But, you know, you see the same things today with wired classrooms and distance learning and education?

AKERA: That's right, that's right, yes. Actually, so this question should be rather obvious from what we've said already, but by 1969, or perhaps even earlier, you became quite skeptical about the promising hype around the educational uses of the technology. It was in this year that you published *Run Computer, Run: The Mythology of Educational Innovation* (Cambridge, MA: Harvard University Press, 1969). Can you comment on how and whether you came to approach technology in a different way through your work on computers and education? Did this experience influence your decision to get involved with technology policy later on?

OETTINGER: I think it's more-- you see, the language translation problems, as I saw them then, had to do with the systems themselves and issues of cost and effectiveness and so on. But essentially, if you will, engineering issues--

AKERA: Yes, it was very much a straightforward cost calculation.

OETTINGER: Yes, I mean, cost and effectiveness. It was the sort of thing an engineer would do, maximize effectiveness. The educational stuff thing opened my eyes to the importance of the socio-political organizational context. You know, the refrain at that time—and occasionally, you'll still see it in education, sort of—is individualization.

AKERA: Customized education, yes.

OETTINGER: Customized, yes, etcetera, etcetera. I still remember visiting a neighboring high school here in Watertown, MA and they had a language lab, which, at that time a tape recorder, etcetera, was the cat's meow. Of course they were afraid of the kids breaking the recorders. And the banner was "individualized instruction". But the note to the students on how to behave in the lab began with, "No one is an individual in this laboratory."

AKERA: Oh, dear! “You must do exactly what you are told so you don’t break the equipment.”

OETTINGER: Yes. Allen Westin had a wonderful quip on that. He said, “Education frees the mind to run in accepted channels.” So those contradictions between the professed faith in technology and the actuality of the institutional framework is what seared itself in my mind, so I’ve ever since been much more conscious of the need to look at organizational, legal, and cultural environments in thinking about effective use of technology.

AKERA: Now, in fact, some of this literature does remind me of Mesthene’s work. Was there a direct influence?

OETTINGER: Oh, yes. Yes.

AKERA: Now, if you’ll permit me, I’d like to try two other connections. Moving backwards in time. Did your experience with machine translation help you—do you think it helped you approach educational technologies within a skeptical stance?

OETTINGER: Well, I don’t know whether I have a skeptical turn of mind, or whether it’s simply that I stumbled into areas full of enthusiasm, and then found that the enthusiasm got cold water poured on it by reality, whereas a number of contemporary colleagues would kind of continue to [be enthusiastic about the technology] and sometimes do it less than honestly, one might say.

AKERA: Oh, I see. Very good. Now, I would hazard a guess that you, along with others, were also frustrated by what little ACM could do to fill the gap in computer education and training. Just to broaden the question, was there any connection between the professional development and continuing education activities of the ACM and your work and/or outlook towards computer-assisted instruction or education as a whole?

OETTINGER: No, you know, and I think that this is true. Again, it was a period of experimentation, and ACM may have made some contributions to the upgrading of the backboard wires and so on. But every university was experimenting with curriculum and so on, and the notion of some kind of uniform ACM-developed curriculum, several people tried to do that, but it never got legs.

AKERA: So there weren’t a lot of direct connections in this sense?

OETTINGER: I don’t think so.

AKERA: Now, a sort of very different kind of question. All this occurred during the 1960s, admittedly somewhat on the early side. I think it is in one of your letters from 1967 that you wrote, “Social responsibility is a topic that ACM members, like much of the community, are fond of discussing these days.” Was this a position you yourself identified with during this period?

OETTINGER: Yes and no. I was pretty much middle-of-the-road. I think of myself as a middle-of-the-roader, both in ACM and trying to reconcile-- you know, I didn’t have much sympathy

either for the most leftist hippies nor for some of my stand-pat colleagues. So I found myself in a conciliating, mediating role more than anything else.

AKERA: Is that true with the rest of your activities at Harvard, outside of ACM?

OETTINGER: Yes. As a matter of fact, I can give you an anecdote, because it was the same period during which there was campus revolution, etcetera, and on one notable occasion, the president of the university called in the Cambridge police, and there was a fair amount [of discussion]. He was roundly criticized for this by various segments of the faculty, and we had a faculty meeting at which the extremes were very vehement. There was a resolution to censure the president for calling in the police; and then there was a resolution for praising him and saying, "More heads should have been cracked." And it was about to disintegrate into chaos, and I was looking at the text of these two resolutions, and it occurred to me that the front end of the left-wing one and the tail end of the right-wing one, if put together, would provide a reasonable compromise. I called this to the attention, got the floor, etcetera, and that's what passed.

So the administration asked the faculty to disperse to the various student houses and sit down with them at dinner to try to tamp things down. I went over to Dunster House and was at a table with a bunch of students, but also with one of the tutors in Dunster House, a woman named Doris Kearns, who since then became Doris Kearns-Goodwin and is a noted historian of the Presidency and so on. She made her reputation writing a book about Lyndon Johnson, and she's recently done some others. And so Doris introduced me to the students as the guy who had done the compromise this afternoon; she described me as "a great minor hero of the occasion." To this day, I can't quite figure out whether that was faint praise or faint damning [laughter]. My wife still kids me about it. She'll go, "Ah, you're being a great minor hero again." So that's been my position on such occasions, is try and be a great minor hero.

AKERA: Did any of this influence your decision to get involved with ICT policy? You'd already had this interest in getting involved with policy matters.

OETTINGER: Yes, that antedated the '60s revolution.

AKERA: Now, can you tell us a little bit more about the Program on Information Resources Policy at Harvard? This is the next to last question.

OETTINGER: Well, I told you a little bit about the origins, at least of the funding of it and the experience with National Academy of Sciences. But by that time, we're now around 1972--

[Tape 2B begins]

OETTINGER: Yes, there was a need for serious research in issues that had a combination of strong technological, and strong economic and political components. The techies left to themselves didn't look at [the political side]; economists didn't understand technology; the lawyers and politicians were oblivious of either. And well, I didn't know very much about this and maybe the contributions we could make if we'd develop research in this area.

But then came the question of how to pay for it; there were no established programs. The Markle Foundation helped us get started on the basis that we would as soon as possible get multiple sources of funding, so that they would cease to be not only a dominant but even any kind of a player. And after about two or three years, we managed to do that. If you look at our website, <http://www.pirp.harvard.edu>, you'll see a list of contributors, multinational and diverse, etcetera, etcetera.

The way we got started, to tell you an anecdote, AT&T was one of the earliest contributors and we went to see to the then president of AT&T, a guy named Bob Lilley (he died not long afterwards, but I don't think we were responsible for that!) But we weren't too sure about how to sell this, and he was falling asleep. I can't remember what it is that we said that suddenly jolted him up, but he said, "I'm beginning to see what you guys are up to." He says, "You must know that over the years we've had nearly every economist in the United States on our payroll." And we said, "Yes, we know that," because at that time, they had to report to the FCC on a Form M who their consultants were. He said, "As a consequence, even if they write gold-plated truth about us, nobody believed it because we paid for it." He says, "Now, you're proposing something different with this diversity." He says, "If you write something that's in our favor, it might even be believed because we didn't pay for it. And if you write something that's against us, we can deny it because we didn't pay for it." [Laughter] And he signed up.

So that was the position. We've gone on that basis for many years, initially concentrating on— And, you know, this was conditioned by all the prior stuff, including the ACM experience. The observation was one of convergence—convergence has been overrated. But what was clear even in 1968-'72 was that everything was going digital in technology. But convergence at the science and technology level is not the same as convergence at the industry level or the culture level and so on. And in particular, the telecommunications industry had this history of on-again/off-again regulation, deep intervention by government, whereas the computer industry had a history of sort of buccaneering, freewheeling, free enterprise, with occasional government subsidies, but not the same kind of hands-on control of a regulatory agency like the FCC.

AKERA: But then again, computers were advanced through more contract-based, and usually military related work.

OETTINGER: Yes. And the notion was that these two industries were going to be coming to loggerheads. And then along came the cable industry with its regime and history different from that of broadcasting, and it was clear that as the technology was going digital, it was going to collide. So that became the focus of our studies. And one of the central elements in it, which is extraordinarily sensitive politically, was cost allocation. Because all of these industries are characterized by a high proportion of joint and common costs, and therefore, the question of how best to allocate these costs?

And that's where the government... And the newspapers, by and large, whenever we reported this... Whenever it got interesting, they said, "It's technicalities." It came to a point where if anybody said, "technicalities," they dropped it. But that's where it begins to be interesting, where the nut cutting occurs. So we did a lot of work in that area, sorting it out. That's still playing itself out now in the battles between web-based IS... You know. And the clash is continuing between carriers and the cable people and the voice over IP, etcetera, etcetera.

AKERA: Yes, the Voice Over Internet Protocols (VIOP) and that kind of stuff. Yes. Now, when did you do those studies? When did you focus on this issue?

OETTINGER: We started in the early '70s and through the mid-'80s.

AKERA: So it was one of the major policy areas that you focused on early on.

OETTINGER: Yes. If you look at our website, you see that our publications are mostly in that area and in the national security area.

AKERA: Actually, for the record, can you name some of the principle areas that you became involved with?

OETTINGER: Telecommunications policy, military issues in command and control, interoperability (which are not unrelated, because in looking, especially during the Cold War era, at the relationships between U.S.-only military services and between U.S. and NATO allies on questions of whether their radio systems would interoperate). Well, you see [this kind of issue] in contemporary terms in terms of the relationship between the police and the firemen in New York at the time of 9/11.

AKERA: And this can occur within military units?

OETTINGER: Oh, it still occurs. But again, what became eye opening to us was that these are not necessarily stupid things. I go back to my statement earlier that when something keeps happening over and over again, it can't be stupidity. There must be some functionality. And then you've got to figure out what the functionality is and where the pathologies come from and how you can relate it. But you can't deal with those things without having access to information. That means you've got to have trust on the part of the various players. And if you're going to have trust, it means you can't be beholden to any one of them, and we're back again at the central importance there of having diversified funding so that you're not regarded as a tool of any one industry or government and can be either accepted or denied because you didn't pay for it.

AKERA: Now, are there any other areas that you've done studies in? Not necessarily the important ones, but novel ones that you'd care to report here? Just to get a sense of the character of the Center [for Information Policy Research].

OETTINGER: No, I think that we did a lot of work over the years on the sort of evolution of literacy from print literacy into computer or digital literacy. And that's still playing itself out, because the real novelty over the last few decades is interactivity.

AKERA: Now, how large is the Center at this point? You're still the Director?

OETTINGER: Yes, and my colleague next door, John C.B. LeGates, and you saw our administrator, Claire, walking in. The core is four or five people. The other recipe for working over all these years was to get our researchers from wherever we could—they're not necessarily academics.

AKERA: So you have a very large network of people you can draw on into your studies?

OETTINGER: We have a network of researchers who are either active people in the industry or the military or retired people who want a chance to do [this kind of work]. And then we use our friends as reviewers and critics, so that there's a quality control element built in. So essentially, the experience at ACM and then the experience at the National Academy led to the creation (and I operated it for many years) this research activity trying to take seat-of-the-pants ideas coming out of ACM and the National Academy and turn them into a solid understanding of the dynamics of technology diffusion through organizational and political entities with their strengths and their pathologies. It's been fun. It still is fun.

AKERA: That's great. I just have one closing question. Dr. Oettinger, you have had a very prestigious career. You served as a consultant to the President's Foreign Intelligence Advisory Board and the National Security Council. You also served on a study team that contributed to the Critical National Infrastructures Report issued under the Clinton Administration. You're also a fellow of the American Academy of Arts and Sciences and the American Association for the Advancement of Science, as well as being past President of the ACM. Reflecting back on your career, can you relate to us what you felt were your most important contributions to computing, to its policy framework, and to its professional and/or academic development?

OETTINGER: Well, it's my students who've gone on. Some of them are academics, but many of them are lawyers or military people. And it's a pleasure to watch them carry forward and use some of the ideas in various realms.

AKERA: And they've really gone into very different contexts.

OETTINGER: Yes. And that's something I'm very please with. Some would regard it as I've perverted several mathematicians into becoming lawyers! But there's nothing wrong with having a lawyer who understands some technology and some mathematics. They might even be less foolish about doing some things.

AKERA: Dr. Oettinger, thank you very much for a very wonderful interview.

OETTINGER: Pleasure.

Dr. Anthony Oettinger

Oral History by Atsushi Akera

Day Two, January 11, 2006

[Tape 2, Side B (continued.)]

PART IV: 'Offline' Conversation

Note: This segment was an interactive discussion based on looking through several key historical documents together. It was not carried out with an 'audience' in mind, but contains various conversations of historical interest, so they are reproduced here for this purpose.

AKERA: That's right. We just turned on the tape recorder. This is sort of an offline conversation, but we thought we would record some of it for the transcript, because it seemed interesting and potentially relevant.

So John Carr was on the nominating committee, and then Walter Bauer, and he was, of course, involved with Informatics, as you mentioned. The committee was chaired by [Paul] Armer [of RAND Corporation].

OETTINGER: That's why I recollect that he was the one who approached me. Yes. See, both Armer and Carr knew me. Carr when I was working with Maurice Wilkes in Cambridge. Carr visited Wilkes's lab. So both Armer and Carr would have known me fairly well, Bauer less so. So yes, somehow the connections are there.

AKERA: That makes sense.

OETTINGER: Galler. Bradshaw. See, we're talking 1968. My leave of absence working for the Office of Manned Space Flights was in 1962-'63. I was in Washington when Kennedy was assassinated. I met him, Bradshaw, in Huntsville [Alabama], and I knew him quite well. Then Donn Parker and I really came to know each other, only through ACM, but we shared this interest in governmental relations. Donn had carried that forward for many years. Yes, [R.L.] Ashenhurst and I were graduate students together at Harvard. He was a year ahead of me at Harvard as an undergraduate. So I knew Ashenhurst from way back. He was one of Aiken's students, as I was.

AKERA: Wonderful. What I'll do is ask specifically about some of these people later. I just wanted to flip to through this to get a couple of names on the record. Aaron Finerman, Saul Gorn,... Fred Brooks is listed there as well.

OETTINGER: Sure. Again, Fred was a graduate student of Aiken's. He and Iverson.

AKERA: That's good, then. And so these were the full list of candidates, and then there were elected officers. So it was Herb Bright, Fred Brooks, and Saul Gorn who became members at large to the Council [the year Oettinger was elected President]. I thought I'd ask about some of these individuals, plus Jean Sammet and anybody else that you thought was worthy of speaking about. This is the title page from the *Communications* just shortly before you took up your presidency. But I thought it was interesting because it lists the various topics that were current at the time.

OETTINGER: Oh yes, Myrtle Kellington, I'd forgotten about her. Of course, Salton was another Aiken graduate student.

AKERA: So there was quite a bit of connection to ACM from Harvard.

OETTINGER: Oh, yes, from Harvard, yes.

AKERA: Actually, what I found interesting was the name, Joseph Weizenbaum.

OETTINGER: Oh yes, Joe programmed ELIZA. That's interesting. Yes, in computational linguistics.

AKERA: Time-sharing was emerging as a topic, and real-time computing and business data processing, of course.

OETTINGER: Yes. And the National Lecturers.

AKERA: Here's One page of the roster of National Lecturers. There are some folks that stand out: Paul Baran was on the national circuit. Which I think gives a sense of how much these people volunteered to help advance the development of computer science as a discipline.

OETTINGER: Yes, this is another Harvard person...

AKERA: Yes, Martin Greenberger.

Now, this is the current list of special interest committees and groups from September '68, plus the Editorial Board. What I did was to flag some of the special interest committees that I'd be interested in asking you some questions about later. But if you see any others that you think we should speak about... Artificial Intelligence, criteria for student memberships—there are a bunch of them.

OETTINGER: Yes, the Editorial Board, yes.

AKERA: The Program Committee was new at the time.

OETTINGER: Bruce Gilchrist, I'd forgotten about Bruce as Chairman of the Finance Committee. He was with IBM, as was Jean [Sammet]. Carl Hammer, Paul Baran. My goodness.

AKERA: Actually what I noticed was that there was a tremendous change during your tenure, where quite a few—the ones marked SIC were still special interest committees—and there was a slate of them that became special interest groups right in '66, '67, I believe, so by the time of '68, these were special interest groups...

OETTINGER: Yes, as I recall, the committees were kind of tryouts, on the way to becoming...

AKERA: Yes. And there was formally a sort of two-stage system. That's right. These were some of the other officers, and then this page gets into the events calendar.

Now, this is actually from your tenure, January of '67. So back then these four were the SIGs; the rest were still SICs.

OETTINGER: Yes. Well, it's sort of interesting because yes, the SIGs are kind of old line. You can see the transition.

AKERA: Yes. Progressing into newer topics, yes. Yes, and I think that [this organizational scheme] was actually a very effective tool for the ACM at the time.

OETTINGER: Yes. Well, you can see the new world emerging there. It's fascinating.

AKERA: Yes. This is the budget from the period.

OETTINGER: My goodness, we put some money in reserve!

AKERA: Yes, you did. I think Bernie wound up eating it [all] up in the next term, but that's a different story!

Now, this is actually a letter [from you] that accompanies the budget sheet. Some of the things that I highlighted: a really explicit statement that says, "We need to increase the amount of services offered to our membership." Then you delve into a specific budget justification for the membership, starting with the claim that you're raising the dues to \$25. "Council agreed that this budget and the revenues supporting it are essential to the professional well-being and progress of the members of the association." Don Madden, Executive Director. I was just highlighting some individuals that were very active. [Then the National Lectureship Series.] It went from nine people—though it doesn't give a date—to 40 people. And more important, that the budget for this goes from \$5,000 to \$28,000. So that's a cost center.

OETTINGER: Yes, and there we had Jim Adams as the Director of Education.

AKERA: Exactly. Sam Matsa was the Chair of the Professional Development Committee. Jim Adams was then hired as new Director of Education, especially as you were placing greater emphasis on education and professional development. Then here, just a mention of Vice President Galler, but he headed a Committee on Information Dissemination, and a lot of different publications were proposed as a result. So that was something... there was a new biweekly news publication, and then the computing surveys and tutorials.

OETTINGER: Yes. When Walter Hoffman and Don Madden took over the Association accounts, so to speak, in its predecessor's back pocket.

AKERA: Yes, that's correct. Exactly. In addition, you hired an accountant and clerk into the central office at the time. And I thought this was a very clever comment you made: (You write very well, by the way.) You say, "The shoemaker's children are always the poorest shod, but we are making an effort to improve data processing facilities at headquarters, and an EDP supervisor doubling as a programmer is to be added to the staff." You had all these punch cards, and you had [inaudible; laughs]. But the budget also provides for a clerk.

OETTINGER: Yes, a conference coordinator of a lectureship series. Yes.

AKERA: Yes, a conference coordinator and a lectureship coordinator. And then what else?

OETTINGER: Yes, I have a feeling that Adams got into this conference coordinator/lectureship series thing as part of his responsibility for education.

AKERA: That would make sense. The last item, there was also a staff person and a clerk to operate at headquarters an information center using the ACM's collection of books and other information. In other words, a reference staff was hired into the central office.

OETTINGER: Yes. Interesting.

AKERA: And here's one more document. We don't have to go through this in detail, but this was the one ACM Council meeting minutes that I happened to have, from November of 1967, during your tenure. So just some of the things that happened: an ad-hoc committee was created on accreditation of data processing schools; there was concern about some of these fly-by-night operations.

OETTINGER: [Laughs] Reduction in the amount of US government funding for computer science—it's always the case, isn't it?

AKERA: Yes. Reduction in the amount of U.S. government funding for computer science research, which generated quite a bit of serious concern at the time. You also appointed Frederick Brooks as the chairman of a new Committee on Reorganization. Added 100 pages to the journal. Vice President Galler reported on the information dissemination issues—The proposal was for a new survey and tutorial journal, and also a news periodical, which then the Council itself endorses in principle, and then specifically approves the inauguration of a weekly news publication in January of '69.

OETTINGER: New groups. Yes, my goodness.

AKERA: And that's it. The rest go further backwards, and they're less relevant.

OETTINGER: Yes. Memory lane. You know, this is 40 years ago. But it's surprising how many of Aiken's students were involved in the ACM. Robert Ashenurst as far as I know, is still

active. Until very recently, he was still editing one of the journals. So he's probably one of the longest, continuous serving ACM members.

AKERA: Let me officially start the second segment of the interview. The purpose of the interview today will be to fill in and go more deeply into the details of the ACM organization. This is especially for the benefit of the ACM membership; I think they'd be very interested in this aspect of the history.

But I also have several questions that I'd like to follow up on from yesterday's interview. I think I'd like to begin with those.

The first question I had was just to establish your age at the time that you became ACM President. You became President in '66, and you were born in '29, so that would have made you 36 or 37.

OETTINGER: 37, yes.

AKERA: Also, you had received your PhD in 1954. So this was 12 years after you received your PhD. So that would have made you fairly young. Was this unusual? Or was this typical of ACM at the time?

OETTINGER: Well, I think it more reflected the times. I became a tenured professor in 1960, so I was 31 at the time. I was at that time the youngest tenured faculty member that Harvard had ever appointed.

AKERA: Really? I was going to ask about that, too. Yes.

OETTINGER: You know, I think it's a sign of the times. There weren't many people around in the computer world.

AKERA: The ACM crowd as a whole was fairly young, weren't they? At the time?

OETTINGER: Yes.

AKERA: I mean, there were people like Aiken, Mauchly, and others who were the previous generation. But just given the size of ACM already at the time, I imagine that most people in administrative positions were young—in their 30s.

OETTINGER: Oh, yes. So you had that first generation, the pioneers, the giants, and so on. And we were sort of their students, the next crowd.

AKERA: Now, I'd like to ask you about your tenure decision in 1960. I didn't realize the fact that you were in fact the youngest tenured professor at Harvard. If I understand Harvard's [tenure] clock, it seems to be a little early to get tenure.

OETTINGER: Yes.

AKERA: Was there a specific reason that you were tenured six years after your first appointment? Other than brilliance, of course.

OETTINGER: Well, yes, right! [Laughter] Yes, Harvard had an “up or out” policy. I suppose that from their point of view, they needed me as much as I needed them.

AKERA: So it’s really that computing was growing as a field.

OETTINGER: Yes. The first year after I got my PhD, I was on the faculty, but I paid for myself essentially with an NSF post-doctoral fellowship. There was no money for appointing me. And then in the following year, Aiken negotiated a deal with the Linguistics Department, so the Division of Engineering and Applied Science and Linguistics Department each picked up half of my salary.

AKERA: That’s right. So you served as an instructor for an additional year. So you really were tenure line faculty, officially, for a period of only four years.

OETTINGER: Four years, yes. And then I was an assistant professor for three or four years. At that time, associate professors were tenured, so I was tenured to associate professor in 1960. But three years as an assistant professor was sort of the norm. And it was an up or out question. And my guess is that the administration felt that...

AKERA: Now, did you have an unusually large number of publications for someone tenured at the time?

OETTINGER: Well, there was my *Philosophical Magazine* Artificial Intelligence paper from 1952. By 1960, I’d published my book on automatic language translation. And, you know, it was a hot topic. I mean, it was very sexy at the time.

AKERA: And you were also involved in Washington.

OETTINGER: Yes. So...

AKERA: Now, a separate possible tack. Is there a possibility that Bundy himself was interested in having you succeed Aiken in running the Computation Laboratory?

OETTINGER: ...That is entirely possible. I mean, there may have been an element of “bring in some new blood, get rid of the old.” I’ll tell you an interesting anecdote along that line. I hadn’t thought of it that way.

For a couple of years before I was tenured, Aiken wouldn’t speak to me. And I complained all over the place, you know, “What did I do?” And in retrospect, I think that he was distancing himself from me as a favor so that I was clearly not his boy. Had I been “his boy,” I think Bundy would have cut my throat—[This is] from the evidence of my interview with Bundy, when he called me in to announce that I had tenure, and his diatribe about [the cult of] personality and dictatorship, etcetera, etcetera. So it may well be that there was backstairs politics of that sort. Of course, later on I mended fences with Aiken, and until his death, we were good friends. So that’s

part of what lends credence to me of the notion that the two years where he distanced me was not of a disliking sort, but actually a kind of noble act of avoiding dragging me down with him.

AKERA: That's right. That's interesting and impressive. I noted that passage in the book—what you described in the piece you wrote for *Makin' Numbers* that Dr. Cohen put together.¹ You actually approached Aiken about this later on. And I think you noted that he simply smiled.

OETTINGER: Yes. [Laughter]

AKERA: Which is very wonderful. Can I ask, though, what happened to the computation laboratory at Harvard after Aiken's retirement? Did you step up as director? Or did it continue?

OETTINGER: Well, yes and no. It was a period of transformation, you see, because there's a period there where I chaired Harvard's committee on computing facilities. There was pressure for computer science people to get involved with administrative computing, and I tried to distance us from that.

AKERA: You felt they were separate functions?

OETTINGER: Yes. The argument was that you don't have the English Department running the library, so why should the computer science sort of run [a computing center]...

AKERA: Indeed. And this is indicative of the status issue that computer science faced at the time?

OETTINGER: Yes. And then there were a whole bunch of questions as to whether there should be a centralized [computing]... Part of the tension was that Aiken was the center of things. And as people started to want to use computers for their own purposes, they weren't happy. I mean, Leontief could come; they were good friends and so Leontief had a good relationship. But it was Aiken's largesse to let Leontief do his input/output analysis on his computers.

And a new generation of economists in particular, and I think of John Meyer, in particular, was saying, "Why in the hell should I have to ask Howard Aiken for favors?" And computers were beginning to be available commercially. So Meyer set up an IBM 650 operation in the Economics Department. So I got involved over the next few years in the transformation of university computing. So I chaired a faculty committee, which was multi-school. And when I went on sabbatical to go to Washington, Van Ness...—I can't think of the right name at this moment—anyway, a colleague from the Business School, who had been the vice chairman, took over. So the mantle of management of the university's computing facility went over to the Business School. And then little by little, it just blew up, and people started having their own computers. There was for a while a computer center of which Harvey Brooks, as Dean, and I managed, and we hired a series of executive directors and so on.

AKERA: When was that established?

¹ Oettinger, "Reminiscences of the Boss," in I. Bernard Cohen and Gregory Welch, eds., *Makin' Numbers: Howard Aiken and the Computer* (Cambridge, MA: MIT Press, 1999), 203-214.

OETTINGER: It must have been the early '60s.

AKERA: '61, '62. That's good. MIT established their computation center in 1956, although their first big machine [an IBM 704] didn't come in until '59.

OETTINGER: But you see, there was this beginning of a bifurcation between the service center and the research team.

AKERA: Yes. I actually know some of this history fairly well, and it seems that there was at the same time a great deal of ambiguity about whether or not a central computation center could be doing research. Because one of the complications was that the central computing center staff typically had the best systems programmers available. You sort of hired them to do the service, but they wanted to do research once they found themselves in an academic setting. Is that consistent with your recollection?

OETTINGER: Oh, yes.

AKERA: Just to add to the record as well, I think one of the issues was that a computer purchase decision had to do with how this fit within the traditional facilities planning process of the university and its administration. So long as the computers were very large, you had to ask for space, and this made it not just strictly a departmental or sometimes even school-level decision, but you had to get the central administration [to support the purchase]...

OETTINGER: Well, and there were [other] issues. At that time there was still a good deal of rivalry, for example, between IBM and UNIVAC over subsidies to universities and so on. So I got deeply involved with Harvey Brooks in negotiations with the various manufacturers who wanted to, with greater or lesser restrictions, donate equipment—contemporary, obsolete, whatever. I mean, it was again a period of a great deal of storm and drama!

AKERA: Which company did you go with in the end? Was it IBM?

OETTINGER: It was IBM that ultimately won out.

AKERA: Now, did you look towards MIT or any other institution as a model for setting up a computing center?

OETTINGER: I think these were parallel [efforts].

AKERA: So you knew that other efforts were underway, but set policies based on Harvard's [requirements and circumstances] themselves.

OETTINGER: Yes.

AKERA: That's great. And as you say, so you were part of the key university committee that set up the center, but then the center itself was run by an executive director. Do you recall the name of the first director?

OETTINGER: It'll come to me. There were two of them. Well, Charlie Bradshaw we interviewed Bradshaw and then didn't hire [him]. It was another fellow whose name escapes me. He lasted a couple of years, but was such a rigid guy that we let him go and then hired another man who was here, then, for several years. But it's like with Jim Adams, it took me overnight to recollect the name. [Chuckles]

AKERA: If it pops up at any time, then please feel free to add it to the transcript.

Let me shift to a slightly different set of questions. Now, reflecting back after listening to the tape from yesterday, I just started to wonder a little bit more what made you decide to shift from computer applications research to ICT policy research? There was a natural progression. We sort of saw it in the interview yesterday. But still, for an engineering faculty to say, "I'm going to go into a world of policy," is still a substantial step. What made you decide to stop working on computer applications?

OETTINGER: Yes, well, I think that that's partly my own life history, but also the Harvard environment. I think it might have been different had I been at MIT. You know, I might have followed more of a path like Corbato or Fano and stayed technical. But in the Harvard environment, you know, and as an undergraduate, I took several courses in economics. And so it was kind of natural [to go the way I did].

AKERA: Right. Your trajectory was very different. I mean, even your background in machine translation. I think that's what I was hinting at yesterday, when I asked about how machine translation itself is a more cosmopolitan field, [especially when compared to] what somebody like Corbato and others did, which were much more technical in their orientation.

OETTINGER: Again, that's why I got into something like this. How can you be polyglot? And I happened to have had a multilingual education, and then the Harvard environment, continuing to study humanities and social sciences as well as engineering and physics and so on.

AKERA: Then the Program on Technology and Society also influenced your choices?

OETTINGER: [Yes.] You know, it exposed me to closer relationships with a diverse set of faculty members. So it's been a natural random selection.

AKERA: Absolutely. That's an interesting fleshing out of this history.

Okay. There's this other question I think we may have answered already, which is: What was computing at Harvard like during the time of your ACM Presidency? I guess we were speaking about a time that was a little bit before your tenure, but had anything changed by '66 to '68?

OETTINGER: There was a well-established computer center, and I had by that time recruited Tom Cheatham as a faculty colleague. Ivan Sutherland had also spent several years here.

AKERA: On the faculty?

OETTINGER: Oh yes, and did some of his early work here on head-mounted display.

AKERA: What were their departmental affiliations?

OETTINGER: You see, again, that's intimately tied up with [Harvard's history and organization]. It was the Division of Engineering and Applied Science, and there are no departments within the division, and so we were all members of the division faculty. And that's still true today, that the division environment makes it very easy to be fluid.

AKERA: Be very fluid in your disciplinary commitments. That's fascinating. In Harvard's formal organization, is a Division above or below a School or a College ["Faculty" at Harvard]?

OETTINGER: In between. What happened was that United Shoe Machinery's Gordon McKay made a major bequest to Harvard, and Harvard got the money-- In fact, one of his provisions was that the income would go to his mistresses until they died, to give you a sense. It took many years for the last of his women to depart the scene. So around 1950, Jim Conant appointed Vannevar Bush to head a committee to advise Harvard on what to do with the McKay money, and the recommendations included converting the School of Engineering, which was an independent school, to make it part of the Faculty of Arts and Sciences, so that the engineering disciplines would be integrated with the science departments, not as an independent school.

AKERA: This is also when they're trying to elevate engineering to become more of a science.

OETTINGER: Yes. And that was the birth, then, of the division. And part of the division thing-- It had its own money, so that whereas departments are dependent on the Dean of the Faculty of Arts and Sciences, The Division, with the Gordon McKay money, had a kind of independent status, so that while the Dean of the Division reports to the Dean of the Faculty of Arts and Sciences, he has his own endowment and therefore more clout than your ordinary department chairman.

AKERA: What are the formal organizational labels at Harvard? Is the Faculty of Arts and Sciences a College or a School?

OETTINGER: It is the Faculty of Arts and Sciences, which operates both Harvard College and the Graduate School of Arts and Sciences.

AKERA: I apologize for being a little naïve here.

OETTINGER: Well, no, not everybody gives a damn about how Harvard University happens to have its organization chart.

AKERA: So what was the status of computer science at Harvard, then? Was it entirely placed within the division of engineering and applied sciences?

OETTINGER: No.

AKERA: And because there were no departments there was no specific entity called computer science?

OETTINGER: Yes. That has changed now. As a matter of fact, before you came yesterday, I just was looking up something in the course schedule, and for the first time now, the division course offerings are listed under Computer Science, and under Engineering Science, and so on, so this is meant to give greater visibility [to these courses], at least to students.

AKERA: Yes, and I think you mentioned that it really was the students who drove that change at Harvard. But quite late, in the '90s, as opposed to the '60s as at other campuses. I ask these questions because I was wondering whether the specific circumstances at Harvard influenced at least what you hoped to achieve through ACM—whether there was any connection between the particular needs of Harvard that may have influenced your course of action, or your orientation at ACM.

OETTINGER: No, but you refreshed my memory with the breadth of the SIGs and SICs. And it would have been a very congenial development because of the sort of breadth of the Harvard environment.

AKERA: So being very open to applications and diversity, just when computing was opening up.

OETTINGER: That remains very much part of my makeup in everything that I do. If I err, it's on the side of breadth rather than on the side of exclusion.

AKERA: It's good to establish this. Yes.

Okay. My next question was, how involved did you remain with ACM after your tenure as president?

OETTINGER: [Just] for a while, and then I drifted away. Partly when you're out of office, you really should get out of the way of your successor and not be a kibitzer and so on. And Galler and I were good friends during his vice presidency; we remain good friends to this day.

AKERA: So you basically passed the torch to Galler.

OETTINGER: Yes. It's the decent, sensible thing to do.

AKERA: Yes, of course. Now, did you remain active in any of the editorial boards or committees afterwards?

OETTINGER: I, little by little, gave up. Partly, you see, because as I mentioned to you yesterday, shortly after stepping down as ACM president, I got involved with the founding of the Computer Science and Engineering Board in the National Academy of Sciences, and that started absorbing most of my extracurricular time.

AKERA: Yes, of course. Now, this is a totally separate question. Several times during the interview yesterday you talked about 'overenthusiastic' research programs. You even used the

word “fraudulent”—“bordering on fraudulent,” I guess. I was wondering if you could sort of comment on this more generally. Was this too sort of a sign of the times?

OETTINGER: I don’t think people recognized it at the time, because government funding of big science was [still] a novelty. We emerged from World War II with the Office of Naval Research and then in 1951 the National Science Foundation and others, coasting on the aura of the Manhattan Project. So science was good and it helped win the war, etcetera, etcetera. But then little by little, the money got tighter, as it always does—you saw that citation in the *Communication with the ACM*.

AKERA: In fact, there’s a peak in federal funding just after Sputnik, but then it starts to decline during the mid-’60s.

[Tape 3A Begins]

OETTINGER: Yes, so the competition for money was my first experience with this, and I witnessed it sort of both on the US and the Soviet side. Each side would cite the other’s real or bogus progress as an argument with its own government to get more money. And, you know, if we look at the world today and the frauds being committed in various laboratories (there were cases at MIT, the Korean headlines and so forth), scientists are under great pressure to get their next grant, and often what they have to do is to either sell vapor-ware or make their proposals on the basis of what they have done and then use the money to do the next thing. So the pressures are enormous, and I think that in that period, a number of the investigators were just, either out of enthusiasm or out of desperation, hyper-hyping what they could do or what they had done.

AKERA: I’d love to get into the mindset of some of these strong advocates of computer technology at the time. I wonder if, to look at it from their point of view, whether or not there could have been a certain kind of mindset to make it okay to promote technology in this way?

OETTINGER: We have a similar thing, only in industry, with the various fraudulent type, late ’90s things.

AKERA: Yes, those associated with the dot-com boom?

OETTINGER: Yes, the dot-com boom and the WorldCom bust and the like, you know, the Bernie Ebbers kind of phenomenon. Some of those guys went so far that they performed criminal acts and were indicted and convicted.

AKERA: What all this links to is really the literature on the sociology of deviance, which doesn’t just set out to demonize individuals but it tries to understand where these behaviors come from. As a historian, what I see from this period is that the scientific community itself gets to a point where they start speaking rather comfortably about saying one thing to their sponsors and saying something else to their colleagues. Was that characteristic of the machine translation field at the time, and of other fields?

OETTINGER: Yes. Yes, I mean, I think there was a façade.

AKERA: Because this was for the greater good of advancing science. Science as whole needed funding.

OETTINGER: Yes. The paper that I mentioned to you yesterday that I wrote as a consequence of my NASA/BellComm experience with PERT was the same phenomenon in the aerospace world, where I still remember being sent on a trip to the West Coast. It was North American Aviation. They were a massive contractor, and they had trailers full of people whose job it was to jigger the PERT charts to keep their bosses off the critical path. And so my paper is a bull's-eye view of management in engineering; it was essentially a debunking of this.

AKERA: And so it really was a study in organizational sociology. Actually, I would love to dig up that paper up. Oh wait, it's not published. No, no, the bull's-eye view never did get published.²]

OETTINGER: It's in the proceedings. Remind me before you go; I'll give you a copy of that.

AKERA: I would love to have one. Okay. You mentioned that many computer scientists—those who became computer scientists—felt that there was a need to really establish their disciplines at the time. Can you, sort of by way of anecdotes, recall any specific conversations that are really indicative of that attitude?

OETTINGER: I can't pinpoint a particular conversation. You know, it was a common kind of conversation topic. Of the relationship with the math department or the electrical engineering people, and wanting to get out from under [them]. There was a kind of a pervasive type Geist kind of a thing.

AKERA: Yes. Now, did those concerns exist at Harvard?

OETTINGER: Well, less so, and depending on how you look at it. I was comfortable--

AKERA: You were free to do whatever you wanted.

OETTINGER: --with the division environment, and felt no need to press for independence, partly because within the division environment, computer science wasn't so terribly different from anything else, since there were no sharp departmental boundaries.

AKERA: And, in fact, engineering itself within the division tended to cross over rather easily into the sciences.

OETTINGER: Yes. And I had no difficulty in the Brooks Era, because Harvey Brooks was sympathetic about getting people appointed. You know, Tom Cheatham only had a Master's degree. He was probably the country's best software engineer at the time, and we got him appointed, which is in many universities, unheard of, to make a full professor out of somebody who didn't have a PhD.

² The citation is in Day 1 transcript.

AKERA: And at Harvard! Yes.

OETTINGER: So we brought in Sutherland after he had been head of IPTO at DARPA. We had Hao Wang, who was a logician. Yes, and so it was...

AKERA: Now, were there members outside of the division, people in the general Faculty of Arts and Sciences, who pushed for creating computer science as an independent program outside of the Division?

OETTINGER: Not really. Outside the division were the concerns for getting adequate service and time and so on for doing whatever the hell they wanted to do.

AKERA: But nobody on the outside adopted computer science, per se, as their focus...

OETTINGER: Per se. Right. Yes, and later, revisionists accused me of not pushing hard enough, etcetera, etcetera. But then when the student pressure began, then they started appointing more people. But from my point of view, it also became routinized.

AKERA: Now, here's another 'heated discussions' issue. During the conversation yesterday, you mentioned that overall the ACM Council was a very congenial, wonderful place.

OETTINGER: Yes. And looking at the list of members, yes, these are all people whom I, in retrospect, still have a warm feeling for.

AKERA: And are or were still in touch with for a long time, I'd imagine.

OETTINGER: Yes.

AKERA: So can you, for us, recall any of the heated discussions that *did* take place? You know, what were some of the points where people did have differing opinions they had to work through within the Council itself?

OETTINGER: I really can't materialize that kind of pinpoint thing, which is one of the reasons why I suggest you might talk to Jim Adams, because he was a fly on the wall. He would have witnessed this, would have had to suffer from pressures from different people, etcetera, etcetera, and might have a better recollection than I do of this.

AKERA: Yes, it really doesn't matter. It's just of interest if there was a conversation that you knew about.

I'd like to use this as a transition, then, to speak now in more detail about the ACM organization. And we'll go through this and see what we can dig up. What I'd like to do is start with the special interest groups and special interest committees, because I think there were some titles there that might trigger memories about some of the things that were going on at the time. I'm actually going to pull out the list itself.

So we can start with any group, but I thought maybe Professional Standards and Practices. This would have been one of the standing committees of ACM. Do you recall what they were working on at the time? Donn Parker, in fact, was the chair at that time.

OETTINGER: Yes. I think that was part of this drive towards ACM as a professional society. But I'm in a sense fabricating some of this from a contemporary viewpoint. If you looked at the most active groups, the special interest groups had a very mathematical, abstract, academic flavor. And this marks the beginning of wrestling with applications and the broader membership, and the notion that whatever scholarly standards might be practiced, that when people started doing programs that ran machinery or guided airplanes or missile systems or whatever, that just as in medicine or in construction, or heavy machinery, that one needed to develop codes of ethics and standards to practice that would assure the larger public that these were [done responsibly]...

AKERA: And also to establish qualifications, if I'm correct.

OETTINGER: Well, yes, punching tickets. Again, it'd have to do with status. In those days, it was a time when real estate agents started becoming "realtors". And we needed to have [credentials]...

AKERA: And everybody participated [in this kind of thing].

OETTINGER: Everyone. Yes.

AKERA: Now, if I recall, one of the things that happened was that there was a committee created--or maybe it was this committee--that created a certification program. There was a great deal of concern about the fly-by-night training schools and whether or not they were really providing a good service to the people that took their classes. But as you say, the underlying concern was really to establish a body of knowledge [that could be recognized] as computer science, more computing based, and to make sure that other people weren't claiming that label or claiming that title. One of the things that came out of the Professional Standards and Practices Committee, I believe, was [an official] guideline on professional standards and ethics.

OETTINGER: There was sort of a code of ethics that came out of that.

AKERA: Do you recall why they chose to go with guidelines as opposed to a formal code of ethics?

OETTINGER: Yes. You'd have to double-check this. My recollection is that it had to do with legal liabilities and with tax exemption and so on.

AKERA: ACM wasn't ready to take on that [kind of] burden.

OETTINGER: Yes.

AKERA: Although ACM has since then, hasn't it? It now has a code of ethics. Is that right?

OETTINGER: I can't tell you.

AKERA: Okay. Certainly other professional societies did have a code of ethics.

OETTINGER: Yes. But my recollection is that there were legal issues, IRS issues, a whole bunch of things, and it took a while to get that settled. But my memory is dim on that.

AKERA: Okay. The Committee on the Curriculum and Computer Science, which came up yesterday. You mentioned that there had been many attempts to [develop a standard curriculum], but you felt that it was effective only to a certain degree.

OETTINGER: Yes. Well, again, you know, let 100 flowers bloom and so on. I mean, there were people who were interested, for whatever reason, in internal battles in their school or an ecumenical feeling or whatever [who] wanted to promulgate standard or ideal curriculums.

AKERA: And so they wanted to work outside of their own organization, and used the ACM to establish a curriculum and then push it back on their own [institutions].

OETTINGER: Push it back *up* on their own.

AKERA: Now, did that effort succeed? Or did it have trouble within the ACM itself in the sense that there are so many different ways in which people wanted to push computing that it was hard to agree on anything?

OETTINGER: You know, [some] succeed[ed]. As I recall, there were some publications. I don't know if they had any effect or not. My guess is probably not, because different schools had different objectives, different tastes, and so on. You know, the U.S. educational system isn't the French one.

AKERA: No. And there's a great deal of diversity, which is part of the US tradition.

OETTINGER: Yes.

AKERA: Would it be fair to say that computer science at this time was indeed very diverse and that different schools approached it in different ways?

OETTINGER: Yes. I mean, I think that that's true, and remains true.

AKERA: As of this point.

So the Committee on Organizational Reform. This group came up in the specific Council minutes that we looked at for November 1967. Do you recall why it was proposed to create a committee on organizational reform, and perhaps whether it's important that Frederick Brooks became the chair of that committee?

OETTINGER: Well, you know, I guess you're right. Fred more than any of my contemporaries (Fred was a few years, maybe four or five years behind me here).

AKERA: Yes. A graduate of Harvard?

OETTINGER: Yes. Fred was the most managerial of the lot. And his role in developing the IBM 360 thing, he was a manager, and would have [noticed] the seat-of-the-pants informality of ACM at the time.

AKERA: And felt he had to do something about it?

OETTINGER: He had to do something to get it cleaned up. And I would have endorsed that, but would have gladly passed it on to somebody who had an interest [in doing so] and knew what they were doing.

AKERA: Yes. Had knowledge about [such things]. That's right.

OETTINGER: Yes.

AKERA: Now, just for the record, Dr. Brooks at that point was at the University of North Carolina.

OETTINGER: Also, he had already...

AKERA: ...left IBM.

OETTINGER: Well, yeah. But that means that he had his managerial career behind him and reverted back to academe. But he still would have had this niche to apply it to a professional society. Sure.

AKERA: Now, the Joint Users Group, is that something that came about during your administration? It's listed here as a special group. And I know that there was some conflict around it.

OETTINGER: Yes, that's interesting because you mentioned yesterday about SHARE and the other user groups. My guess is (and I have no distinct recollection) that this was an attempt to make a place in ACM for users as opposed to providers. But as best as I can remember, users didn't want any part of it. [Chuckles] Their concerns were not those of a professional society. I mean, they wanted to beat the manufacturers over their heads; they wanted to get concessions.

AKERA: Yes. Now, users in this sense, though, most of them were probably programmers. Is that correct?

OETTINGER: No.

AKERA: I've done a little bit of research into SHARE as an organization, and it seems that although we call them users, these really were the systems administrators who served as intermediaries between the...

OETTINGER: Oh, yes. They were not the loan officers in the banks, and they were not the direct [users of the machines]...

AKERA: Right. Exactly. They're not end users.

OETTINGER: They're not end users. Yes. There's a tendency in many programs to think of users as the folks who use the tools, as the mechanics who use the machines. Yes.

AKERA: But I imagine that sometimes that raises the same issues as with the business data processing group, or profession, because these are people that don't really share the new computer science agendas-- although timesharing, [and some of the work on] operating systems [and] languages might be different--but certainly [it was] not artificial intelligence, [natural languages], computational linguistics, and so on. I think they were at least a kind of contingent within the larger ACM frame of vision who may have wanted to have a different [path], I suppose.

OETTINGER: Yes. I think you're right.

AKERA: Okay. The one that came at the end of the list yesterday that Jean Sammet appears on. The Committee on Special Interest Committees and Groups. Do you recall why that committee was created, what its purpose was, and why Jean might have been interested in it?

OETTINGER: Well, my guess is that the issue would have been the criteria for taking an exploratory activity and giving it some sort of recognition. And also, there would have been the question of how to pay for the damn things and who to access for what.

AKERA: Right, because a lot of these groups wanted to issue newsletters, but they needed funding. So they eventually started charging their own members two dollars, three dollars. But until that happened, you wanted to foster these groups?

OETTINGER: Well, and I think as you can see, because there was a luxuriating growth of this, my guess is that we created it in order to get some...

AKERA: ...to encourage it?

OETTINGER: Well, encourage it, but to have some kind of pattern, some kind of order to how it happens. And some fairness so that it wouldn't be a matter of inconsistent [development]...

AKERA: ...with anybody sort of creating one?

OETTINGER: Yes. right.

AKERA: Then finally, the Special Interest Committee on the Social Implications of Computing. I believe they called themselves SIC². Do you recall when that group came into being, and what some of the work they did was? The name I have here is Anatol Holt, Applied Data Research, as the chair of that committee at the time.

OETTINGER: Yes. You know, that's funny because I don't think of Tolly Holt as deeply interested. He was one of Grace Hopper's people. He began life as a protégé of Grace Hopper's. I think of him as a compiler guy and so on. But it was funny, because in later years this is the sort of thing that Donn Parker got more interested in. Holt may have had some kind of political itch, you know, a [sense of] social responsibility.

AKERA: Now, you were involved not with 'social responsibility,' but with the policy aspects of computing in Washington. But those two agendas didn't really cross at the time?

OETTINGER: Yes. They were not necessarily the same. Yes.

AKERA: Is there any other special interest group or committee that you'd think worth chatting about?

OETTINGER: There were so many of them! [Laughter]

AKERA: Well, it's the sign of a very lively organization.

OETTINGER: Yes.

AKERA: Let me shift then to publications. Just for the historical record, can you tell us what the principal ACM publications were at the time, and what some of the decisions were surrounding them?

OETTINGER: Well, you know, the *Journal* was the earliest one.

AKERA: Right. '53?

OETTINGER: I don't remember. And then came *Communications*.

AKERA: Yes, in '56 or something.

OETTINGER: Yes. Which was more informal and was meant to be partly technical but more sort of the house organ of the ACM.

AKERA: Really to inform the membership about what the Council was doing and so on. Elections, membership...

OETTINGER: Yes. And then *Computing Reviews*, the reviews journal that provided a summary—abstracts of what was going on beyond the *ACM Journal* itself. Because by that time there were beginning to be more and more publications, and then little by little, these special interest committee and group newsletters wanted to go periodical.

AKERA: Oh, yes. And they actually then became formal ACM publications.

OETTINGER: Became formally publications. Yes. So there was constant pressure to create these things to meet emerging needs.

AKERA: And this really was a reflection of the growth of computing itself as a field.

OETTINGER: Yes.

AKERA: In fact, one thing worth noting is that *Computing Reviews* went from a quarterly publication to a monthly one during your administration. And in fact, the central office had to hire copy editors at least to make all that go more smoothly.

OETTINGER: Oh, yes.

AKERA: Now I'd like to just name a couple of the editors-in-chief and the editors just to see if you recall anything about them—who they were, not necessarily [what university or company] they worked for, but [their work with] the publications. I guess the chair of the Editorial Board was Mario Juncosa. What was his background? What did he do?

OETTINGER: As I recollect, he was one of the West Coast people and was a hard worker. Eventually, Ashenhurst, as I recall, took over a number of [publications]... Ashenhurst and [Aaron] Finerman and so on—they were a hard-working bunch of people. They took responsibility for the publications.

AKERA: And then how about C. C. Gotlieb?

OETTINGER: [Calvin C.] “Kelly” Gotlieb, University of Toronto. A very active member of ACM.

AKERA: Did he steer the *Journal* in any particular direction? Did he have a certain interest or agenda as far as what he wanted to see out of the *Journal* at the time?

OETTINGER: By and large, my role was in seeing to it that competent people were in charge and then leaving them alone. And Gotlieb I've known well over the years, and [he was not one] to get in any trouble.

AKERA: Yes, so you felt that he did a very good job in advancing the *Journal*, in helping to make the academic quality of it rise?

OETTINGER: Yes.

AKERA: Anything about Gerald Salton or Aaron Finerman. Who they were?

OETTINGER: Well, yes. Salton was a Harvard colleague for many years until he went to Cornell. Information retrieval was his bag, and he created this sort of scholarly world in what would now be databases and data mining and so on.

AKERA: Yes. And he was the editor-in-chief of the *Communications of the ACM* during this period?

OETTINGER: Yes.

AKERA: Did the editor-in-chief of the *Communications* of the ACM tend to be somebody with a more systems programming/applied emphasis as opposed to the editor-in-chief of the *Journal*?

OETTINGER: Yes, I mean, the *Journal* was more of a mathematical abstract kind of a thing. The *Journal* might not have welcomed something on databases, whereas the *Communications* was...

AKERA: ...very much was open to those publications. And really, in some ways, the *Communications of the ACM* is much more about current developments in the field and what the current topics of the emerging fields are, whether or not they have strictly academic credentials.

OETTINGER: Yes.

AKERA: I imagine the review process itself was slightly different... or maybe the pool of reviewers.

OETTINGER: It would have been different, yeah.

AKERA: And then Aaron Finerman?

OETTINGER: I think Aaron was at Stoneybrook and edited reviews for many, many years. Again, was totally dedicated. A hard worker.

AKERA: It's very lucky for ACM to have had such good people in the editorial division.

OETTINGER: Yes.

AKERA: Let me shift then to the question of other organizations. We talked about the Data Processing Management Association yesterday. How about AFIPS (American Federation of Information Processing Societies)? Can you elaborate a little bit more on what you told us yesterday? Actually, even going back to its origins, how did AFIPS come into being? And then what were some of the issues?

OETTINGER: Yes, I'm trying to think of the guy who was one of the leaders. He ran a software firm in Philadelphia. I cannot remember. AFIPS provided, I think, a transition from the scholarly/academic base of computing to the industrial base. ACM was never a home for trade

shows, if you will. For exhibits, for a place where a manufacturer, either a large one like IBM or a lesser one, could buy booths and do what trade shows do. The Joint Computing Conferences began to meet that need, and AFIPS then kind of became, among other things, the manager for these trade shows.

AKERA: Now, if I recall, there was a larger goal for AFIPS. You already had the Joint Computing Conferences, which were co-managed by delegates from...

OETTINGER: ...ACM and I took their lead.

AKERA: That's correct. But then at a certain point (and I'm sorry I don't have the date), there was this decision to create AFIPS.

OETTINGER: I think this had to do, again, with the incorporation of DPMA or its successors and so on.

AKERA: An attempt to really try and represent the entire field?

OETTINGER: It was trying to represent all of the various interests.

AKERA: And hence the *Federation* of Information Processing Societies.

OETTINGER: Yes. Because it would have become clear that a single umbrella organization wouldn't do it. You're either for intellectual or for purely turf reasons. And this provided... My guess is that the manufacturers were heavily in favor of this because it met a need.

AKERA: Now, was AFIPS successful as an organization?

OETTINGER: My sense is that for a period of years it was. The shows were great. And little by little, it started outgrowing all the convention facilities, it became so large. And it generated revenues hand over fist. But I was not, either while ACM President or later, involved, except peripherally, in the AFIPS politics. So I happily cashed their checks, but did not...

AKERA: ...push for it or try to make something out of it that it really wasn't.

OETTINGER: Right.

AKERA: Maybe we can then move over to the ACM central offices and speak about some of the individuals there. Just going through the list, you spoke about Walter Hoffman yesterday. Maybe we'll start with Don Madden instead. What did Don do during this period?

OETTINGER: Don, from my point of view—he was a superb executive director and brought order into things. You know, Myrtle Killington and Irene Hollister, those two sort of ante-dated me by a considerable period. And they were, essentially, for all intents, they were the organization. As it grew, it became clear that it was a bit beyond their talents and their amount of available time. And so I don't remember it, but Forsythe must have hired Madden. He came with the territory when I arrived.

AKERA: That's right. But in a sense, during your administration, you also helped bring a lot of additional people into the central office.

OETTINGER: Yes, well, this was Madden and me recognizing that it was time to expand the staff, so that we could provide [services]-- I mean, if we're going to raise the dues and bring order, we also had to deliver stuff, and we couldn't do that [without a bigger staff].

AKERA: That's right. It was all tied together, and that was when the decision was made to raise the dues to \$25 per member.

OETTINGER: Yes. And so the hiring of Adams was one element of that. But Madden essentially took over the management of the place. ...

AKERA: Now, is that a role that fell on the shoulders of either the President or Secretary in the past?

OETTINGER: As far as I can recall, it was the two women. There were capable people, and for a small scale thing [quite adequate]...

AKERA: But the decision was made to hire an executive director to really sort of run the whole organization.

OETTINGER: Yes.

AKERA: Now, just for my curiosity, as President, how often did you visit the central office?

OETTINGER: Very occasionally.

AKERA: More was done through telephone and correspondence, is that correct?

OETTINGER: Yes.

AKERA: In other words, you really counted on Don Madden to really be taking care of things, unless something needed attention.

OETTINGER: Yes. Yes, Madden, as I recall, was very good at running things and calling on me and the Council when there was some issue.

AKERA: Do you recall anything specific about Jim Adams?

OETTINGER: Well, yes. I mean, he was a very enthusiastic and likeable sort of guy and was very effective at proselytizing—spreading the word. He was Mr. Outside; Madden was sort of Mr. Inside.

AKERA: You say he was a very good person to bring into the organization at the time.

OETTINGER: Yes. He was a warm, pleasant, outgoing personality.

AKERA: Do you recall any of the other staff that were added at the time or were there at the time? There was a Lynn Williams who was the advertising editor, somebody who brought in the advertising stuff.

OETTINGER: Well, no direct contact that I can recall.

AKERA: Okay. Or the new EDP person, the data processing person.

OETTINGER: No. You see, those were things that Don Madden took care of. We provided him with the money. I mean, that was worth it. [Laughs]

AKERA: That's fine. Now, I will be speaking with Bernie Galler next week, as I've mentioned him before, and so was wondering if you could tell us a little bit more about Bernie.

OETTINGER: Yes, because Forsythe was kind of a formal, dignified person.

AKERA: Yes. Your predecessor?

OETTINGER: My predecessor. And Galler was a bouncy, amiable, energetic sort of fireball. So I think that between myself and Galler, we kind of provided the transition from this somewhat stiff-necked, academic, scholarly ambiance to a more lively, more outgoing organization.

AKERA: Yes, which reflected the change and tenor of the computing field itself. So Bernie and you helped reach out to the larger group of programmers emerging at the time.

OETTINGER: Yes.

AKERA: Was he, then (and this, I think, is consistent) a very active Vice President?

OETTINGER: Yes. I cannot recall specifically what he did, but he sure as hell was present at Council meetings and was active. I mean, I think of it as an amiable collaboration.

AKERA: Yes. And he stepped forward to do anything that needed doing?

OETTINGER: Yes.

AKERA: The specific committee he headed at the time was the Committee on Information Dissemination—the committee that recommended initiating the computing surveys and tutorials, as well as the weekly newsletter. Do you recall any of that work that he did? Of course, I'll be talking to Bernie soon.

OETTINGER: Yes, get it from him. You know, so many of these committees were created to figure out, "What the hell do we do next?" I tended to concentrate on getting the resources. You know, I took the heat on the money side. The substantive, "What do we do with it? And who does it serve?" I delegated it.

AKERA: As far as working out the specifics?

OETTINGER: Yes. Well, partly because I didn't feel particularly passionate about one outcome or another—the people who were passionate needed to figure out how to channel the passion.

AKERA: Nor as a voluntary president of an organization could you afford to spend that kind of time to delve into the specifics, [I suppose].

Okay. Shifting topics now, as far as the ACM Council goes, can you remind us what the structure of the Council was at the time? There was an executive committee that was a subset of the Council.

OETTINGER: I believe so. I don't remember who was on it.

AKERA: I should know this; I apologize. I think it's the officers and then the executive director. Madden would have been sitting in on those meetings as well. Whereas for the Council itself, representation tended to be geographic, so that there were the ten regions...

OETTINGER: Yes. There were a few at-large, and mostly the geographic reps.

AKERA: Right. Then who were not represented were the special interest groups and committees, at that time. They did not specifically have a seat on the Council, although some of the individuals overlapped.

OETTINGER: Yes, there was, I suspect, some overlap. And I think some of them we weren't too stiff-necked about letting them sit in.

AKERA: I see; so the meetings were sometimes open.

OETTINGER: Yes. That's my recollection. That we had some of the SIGNUM people, either by invitation or some of them wanted to come and, you know, why not?

AKERA: Now, do you feel that this was good for the organization, to focus on geographic representation as opposed to topical, disciplinary based representation?

OETTINGER: Look, you know, again, it was 40 years ago. But my recollection is it didn't matter much one way or the other.

AKERA: That these are all people enthusiastic about the computing?

OETTINGER: Yes. And by and large, the executive committee and the executive director framed the agenda, and the Council was kind of rubber-stamping.

AKERA: Unless they felt passionate about something.

OETTINGER: Yes, but you know, that's why Herb Grosch stands out, because whether it was in Council or otherwise, he always had a strong opinion about something or other, which then required pacifying and so on. But fortunately, there weren't that many Herb Grosches. I don't recall there every being a Council push wanting to string up the President or the Executive Director or whatever. You know, one took their advice, and probably appointed some of them to SIGs and SICs in order to defuse or develop some issue.

AKERA: It really was more like an advisory committee in that sense, because they would have had the broader...

OETTINGER: Yes. You know, we listened, but it was not a board of directors from which the executive committee took orders.

AKERA: That's good. I'm going to just mention several individuals by name, just to see if that triggers anything. Herb Bright, did you know him?

OETTINGER: A long time member and very active, solid guy who was an effective member. I can visualize him sitting around the table, offering good suggestions, but not being obstreperous.

AKERA: Jean Sammet? Could you tell us about her?

OETTINGER: Jean was a very constructive, very capable, hard-working woman. I mean, of course, she succeeded Bernie as President. Well, it was somewhere along the line, not long after me. She's a very capable woman, at a time when relatively many women were in the business. It's so funny, because later on women started complaining about sexism in the field. And having sort of lived with Jean for many years in this environment, it never occurred to me to think of women as inferior or undesirable. She seemed like the prototype of... I think what may have happened is that in the early days, there were more women, and then somehow there was a dip.

AKERA: Computing became a very male dominated occupation or profession, I think.

OETTINGER: Yes, but it wasn't initially.

AKERA: No, because there were a lot of women coming out of mathematics who were involved with computer programming.

OETTINGER: Yes, you know, when you think of Grace Hopper and Jean and so on.

AKERA: Ida Rhodes.

OETTINGER: Ida Rhodes—my god, Ida was a major colleague in language translation whom I still remember very well. She was a wonderful woman. I remember one time we were on leave, and I was living in Washington and my wife came down. My kids were with me. We went to visit Ida at the National Bureau of Standards. She took one look at my son, who was about three years old at the time, and then took a look at me and then says to my son, "You've inherited \$2,000 worth of orthodontistry." [Laughter]

AKERA: Frederick Brooks is on here, but we've spoken about him before. The other name I noticed was Ed Feigenbaum, who happened to be on the Council at the time. Do you recall him?

OETTINGER: Oh, yes I recall. Well, see, Feigenbaum and I never got along too terribly well. He and of course Herb Simon were part of what I disparagingly call the "artificial intelligentsia." So I tolerated him, and he tolerated me.

AKERA: Could you give us any anecdotes? You don't have to, but can you give us any stories about him?

OETTINGER: I don't have any particular stories. The claims that came out of Simon and Feigenbaum were always, to my mind, overblown. And then they retreated to calling it "contributions to software development." And that's probably true. The funny thing is, they never achieved the grandiose goals, but along the way they contributed rather mightily to the development of programming languages.

AKERA: That's right. So in that sense, one thing about Dr. Feigenbaum's work is that it triggered the same kind of concerns that you had with machine translation and education technology.

OETTINGER: Yes. But you know, a lot of solid programming came out of it!

AKERA: Sure. That's right. I think that's all I need to ask about ACM. Is there anything else that you recall about the organization?

OETTINGER: I think we've covered quite a bit. I think if you have the time and the energy and so on, I think a phone call to Jim Adams would help round things out. He was a close observer of the scene. I mean, Madden is gone; you can't quiz him. But Adams would have some interesting recollections.

[Tape 3B Begins]

OETTINGER: ...just take some of these observations where he would have seen them from a somewhat different angle. He was involved over several different administrations. That would give you a good picture here.

AKERA: I think Rick at the ACM History Committee would appreciate this suggestion. I think it would be valuable to do as well.

OETTINGER: Let me know if that contact information is still up to date.

AKERA: I will. In closing the interview, I'd like to ask some broader questions. So first, what was the intellectual configuration of computing at the time? We've been talking a lot about organizational matters and the broader context, but not so much about the core of what was happening in computing at the time. What were some of the exciting developments in the field, between '66 and '68?

OETTINGER: Timesharing was one of the biggies. Dumb terminals were the rage.

AKERA: Because that would bring down the cost [of computing] because if you just had a terminal...

OETTINGER: Yes, and a shared machine somewhere.

AKERA: From your perspective, was that an exciting development for the field? Was it more operational and not so much computer science? What did you think about timesharing at the time?

OETTINGER: An interesting gimmick. Let me address that somewhat obliquely. Timesharing and any number of techniques—the relationship between computing and communications—there was always a certain measure of religious fervor in the advocacy of one thing or another, either by academics who had an investment in one kit of tools or another, or by the corporate entities who made money on one side or the other.

AKERA: On the fiscal side of it.

OETTINGER: Yes. My view was, and still is, that that's not something one wants to fall on a sword for; that there is movement and emphasis on one or the other, depending on relative position.

AKERA: So as the head of ACM, what you would want is to foster all of those different approaches. It's not really to encourage or discourage anyone. Well, encourage all of them.

OETTINGER: Encourage all equally well. And encourage rational thinking about the mix of tools available, depending on the economics. There were times when storage got cheaper relative to transmission; times when transmission started catching up. But in general, storage got cheaper faster, and transmission, because of the monopoly, regulatory steam, etcetera, etcetera.

AKERA: And as a consequence [these technical advances], the underlying architecture of computing changes. You started with batch processing, go to time sharing, get personal computers, then you get client server technology. And this reflects the general changes in the relative cost [of components].

OETTINGER: Yes. Now at last, the broadband, cheap bit world is coming around, after having been held up for a couple of decades by the monopolists. You have another transition where there's Web-based this versus client-based that, an economic shift. And then concerns over privacy influence whether the economics, whether you store it here or you store it there, and how much you download versus... So, [these kinds of things] keeps playing [themselves] out. My professional view is that the important thing is to understand the relationship among all these elements, so that if you're developing a product or whatever, you optimize according to the economic bounds.

AKERA: Do you feel the research in computer timesharing helped advance the cause of computer science as a discipline? Or was it marginal?

OETTINGER: It was an important development, after all. We now take it for granted.

AKERA: The way I look at it is that it was a very important stepping stone for establishing very strong computer science programs at various places, including MIT. So people like Robert Fano, and even Corbato, that's where they cut their teeth. But then very quickly, they stepped out or stepped beyond it and said, "We really are about a much more general research program in computer science. We don't want to be stuck on this one topic."

OETTINGER: On this one particular technique. Which makes sense.

AKERA: What were some of the other core areas in computer science? Artificial intelligence, I guess, would have been one of them.

OETTINGER: You get at one of my weaknesses. Or to put it in another way, one is a prisoner of one's development. It's hard for me to think in terms of specialties, because they always seem to me to be an overemphasis on one aspect of a heterogeneous field. I sort of got out of the field and moved toward my economic/political/policy orientation before computer science became a bunch of specialties. So I can't react very well because I don't know what they are.

AKERA: And that isn't the direction you followed.

OETTINGER: Right. Today, when I look at my faculty colleagues, they're specialized in particular areas, and they think that that's the universe. Okay. That's necessary, but I'm more of a generalist.

AKERA: Just to establish for the record, would it be fair to say that numerical analysis was then declining in importance?

OETTINGER: Yes. One of my colleagues—contemporary, as he's still on the faculty here, still teaches numerical methods—one of these days he'll retire, as I will, and then it'll disappear because a lot of this stuff is now deep inside some chip or deep inside some software and we take it as a given. Unless you're in supercomputing and...

AKERA: ...those marginal differences still do matter.

OETTINGER: Still matter, yes. If you're doing massive nuclear or astronomical or whatever calculations, then some of these issues [do matter]. But for the ordinary person, it's built into somewhere in Windows or it's built somewhere in MATHLAB or whatever.

AKERA: Sometime in the interview, you mentioned software engineering as sort of an emerging field. I wonder if you could tell us a little bit more about the emergence of software engineering, the history of software engineering.

OETTINGER: I think I mentioned to you yesterday in the period between '68 and '72 when we were developing this Computer Science and Engineering Board at the National Academy, Jerry Haddad, who was the Vice Chair and an IBM vice president, was very much concerned with this

notion. The people at Bell Labs were very much concerned. The large-scale software systems were emerging in the aerospace industry and the nuclear field and the military systems, and the beginnings of enterprise systems. So the notion that software wasn't just something that you scribbled on the back of an envelope, or on a yellow pad by mathematicians, or by amateurs—that somehow, you needed rooms full of people who did stuff in pieces that then had to be integrated and had to work in synchrony, and with reliability and quality control—all sorts of things that were characteristic of civil engineering.

AKERA: It comes out of 'production,' an engineering mindset.

OETTINGER: Yes. How to transfer that—what would an engineering discipline and mindset look like in the software enterprise?

AKERA: What was the name of the National Academy of Sciences committee again?

OETTINGER: It was the Computer Science and Engineering Board. It got abolished and there was a hiatus of several years, and they then created one that's still alive today. I forget what its name is.

AKERA: Was part of the impetus for calling it the Computer Science and Engineering Board this interest in software engineering, as opposed to computer engineering?

OETTINGER: Yes. At the time, the National Academy of Engineering didn't exist. Haddad and I insisted on the science and engineering because of a concern that this was an applied field as much as it was an abstract pure science.

AKERA: I imagine the word "engineering" doesn't show up too much in the National Academy of Sciences.

OETTINGER: No. That was the beginning of our becoming an irritant to that oyster. I told you the story yesterday about the hibernation bit and so on. But yes, we sort of made it a price for admission: "We're not going to play unless you let us..."

AKERA: Other players active in [software engineering] at the time would have been NATO—NATO was interested in software engineering.

OETTINGER: Interoperability of NATO systems was always a concern. But when push came to shove, the economics of supporting national industries always won out. It's a good thing that the Soviets never crossed the border, because the Dutch couldn't talk to the French or couldn't talk to the Brits or couldn't talk to the U.S. They'd have to send a guy on a motorcycle, who with luck would be polylingual. The French were especially bad about that, pushing a national industry.

AKERA: This is a very specific question, but I had always thought that it was IBM's difficulty with operating systems development, timesharing, and software development in general that might have really created the impetus for software engineering. But it sounds like, from what you're saying, that it really came more from a difficulty in the application domains?

OETTINGER: I think so. But probably a combination of those.

AKERA: All of these things were going on at the same time. The synergy of concerns about how to make software reliable.

OETTINGER: Yes. In the telephone business, the people came out of the background of large-scale network engineering, and they were trying to apply that kind of discipline. Once the switches stopped being electromechanical and became essentially computers, there's a whole set of issues that they understood with electromechanical devices, but they couldn't quite figure out how to do it initially with the software.

AKERA: The last question I want to ask for the whole interview just has to do with the *history* the of ACM. What happened to the organization after your tenure? I sort of asked you this yesterday, didn't I? I'm sorry.

OETTINGER: The Association seems to be alive and well. [Laughs] I didn't kill it off!

AKERA: Any sense of which way it went? A way to describe the history of ACM at the end of the '60s and '70s in particular?

OETTINGER: I can't give you any authority. As I told you, I stopped thinking about it because I got involved in the National Academy.

AKERA: And then separately, you became a member of the Charles Babbage Foundation. I'm just sort of curious, how did you then develop an interest *in* history?

OETTINGER: Once again, it's Armer and Galler—they roped me into it.

AKERA: Oh, dear. [Laughs] It doesn't end, does it?

OETTINGER: No, no. Erwin and Adele Tomash, they were the moving spirits. [I had] a certain measure of guilt, because I resisted until now and until a few years ago when Bernard Cohen was doing the Aiken stuff. Getting too much into historical things in my own life. And there was pressure from early on to be kind of a chronicler of Aiken and so on.

I didn't want to spend my life as an Aiken student. So I resisted. But then as I got older, I assumed some responsibility to help get an historical record, and the Babbage thing seemed like a good cause that they were trying to create in Minnesota—an institution, with a repository. You know, sure. A little dues paying is necessary. But I'm much happier to see professional historians like Cohen and yourself dealing with this. It shouldn't be a job for amateurs, I must say.

AKERA: I have to say, I think you write very well. I very much enjoyed reading the two pieces that you have written.

OETTINGER: Thank you.

AKERA: Dr. Oettinger, let me close the interview at this point. This has been a wonderful interview. I thank you. ACM thanks you very much for all of your time.

OETTINGER: My pleasure.