

An Interview with

KENT CURTIS

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Conducted by Jack Minker

on

18 November 1987

National Institutes of Health, Bethesda, Maryland

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NATIONAL SCIENCE FOUNDATION

An
INTERVIEW WITH
KENT CURTIS
by
JACK MINKER
on
NOVEMBER 18, 1987

(THIS TRANSCRIPT WAS PREPARED FROM A TAPE RECORDING.)

Preface

On September 17, 1987 a large group of computer professionals and scientific colleagues met in Washington, D.C. at a dinner to honor Kent Curtis, who had stepped down as Division Director, Computer and Computation Research of the National Science Foundation (NSF). Kent had been at the NSF since 1967 and had relinquished his position as he was critically ill with cancer.

My wife and I were honored to be seated at the same dinner table with Kent, his wife Herte, and their two children, Celia and Katie. While talking with Kent, I proposed that he write his memoirs describing his experiences at NSF. I believed that it would be important to the scientific community to have his perspective of how computer science became a significant scientific endeavor in the United States. I told Kent that I believed that he, Sam Alexander of the National Bureau of Standards and John Pasta at the National Science Foundation were the key people in the United States government who played major roles in enhancing computer science and technology. In his usual modest style he responded that he was merely a government bureaucrat and would not have much to say. I assured him that the attendees at the dinner did not believe that and, as a past Chairman of the National Science Foundation Advisory Committee on Computing, I knew of the important contributions he made in making the United States the leading country in the world in computer science. Kent's wife, Herte, and their two children agreed with me and encouraged him to write his memoirs. Realizing that he could not write easily in his weakened condition, I offered to interview him and tape record his memoirs. Kent agreed to this and said that he would let me know when his health permitted him to do so.

Following the dinner I phoned Kent several times to see if he was able to be interviewed. His health did not permit it. Finally, on November 18, 1987, I interviewed him in his sick bed at the National Institutes of Health. The text that follows this preface is a faithful transcript of a tape recording of that interview. The tape recording can be made available to interested individuals.

Kent was very pleased that we had begun to do the recordings and was anxious to continue. We spoke about how to obtain funds to transcribe the tapes. Dr. Judith Sunley, Division Director

for Mathematical Science at the NSF suggested that the historian of the NSF, Dr. George Mazuzan would be able to have the tapes transcribed. Dr. Mazuzan agreed as he believed it would be important for a history of computer science at the NSF. Kent was very pleased to learn that the tapes would be transcribed.

Following my first interview I tried, on several occasions, to continue interviewing Kent. Unfortunately, his health had deteriorated and we were unable to meet again. I was greatly saddened when Herte phoned me to tell me that Kent died on December 17, 1987. The computer science community lost an outstanding man who had raised the level of computer science in the United States to be the envy of the world. I was saddened to lose both a colleague and a friend. I regret that we could not have completed the interviews we had planned. I hope that this transcript will be the impetus for a history of Kent Curtis' contributions to computer science in the United States, and for a history of support for computer science at the National Science Foundation.

I would like to thank George Mazuzan, for help in having the tape transcribed. I would also like to thank Y.T. Chien and Andy Molnar of the NSF for their support, and Judy Sunley for introducing me to George Mazuzan.

Jack Minker, Professor
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February 22, 1988

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P R O C E E D I N G S

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2 JACK MINKER: November 18, '87, 9:45 a.m. This
3 is Jack Minker speaking to Kent Curtis at the National
4 Institute of Health. We're going to speak about Kent's role
5 in the National Science Foundation in building up the
6 computer science activity in the United States government.
7 Kent is one of the early people in this field. He, together
8 with several other people, were the key ones instrumental in
9 the government in pushing computer science, and these are
10 Sam Alexander of the National Bureau of Science, John Pasta
11 of the National Science Foundation, and Kent Curtis. Others
12 have also been important, particularly several people at the
13 Defense Advance Research Project Agency, but more towards
14 one aspect of computer science, than overall computer
15 science activity.

16 What I'd like to explore today is when Kent
17 started at the National Science Foundation, where he was
18 before he came to the National Science Foundation, and
19 particularly the early days of computer science at the NSF.
20 So why don't we start by you telling me, Kent, where you
21 were before you came to the National Science Foundation.

22 MR. CURTIS: Before coming to the National
23 Science Foundation, I was at the University of California at
24 Berkeley as division director for their Division of Computer
25 Research and Applied Mathematics. This included operations

NSF/lg 1 of a super computer center comprising CDC 6600 computers for
2 use in high energy physics, nuclear physics, nuclear
3 biology, all aspects of research, natural sciences research
4 involving nuclei.

5 It also included research and development of a
6 great deal of real time operating systems for use in
7 experimental systems for natural sciences. Small computers
8 such as the DEC PDP-1, PDP-2, had just come on the horizon
9 in the early 60s, and the Department of Energy, formerly the
10 Atomic Energy Commission's laboratories at Brookhaven, at
11 Berkeley, at Livermore, at Los Alamos, and others, were very
12 instrumental in developing these small computers into real
13 time control systems for doing physical experiments.

14 So it was out of this kind of a background that I
15 came to the National Science Foundation.

16 JACK MINKER: When did you go to the National
17 Science Foundation?

18 MR. CURTIS: It was in the summer of 1967.

19 JACK MINKER: And why did you leave Berkeley to
20 go to the National Science Foundation?

21 MR. CURTIS: Well there was a mixture of reasons:
22 the opportunity presented itself, and that was the most
23 important. Prior to that time, the National Science
24 Foundation had really paid little attention to computer
25 science, and support for computer science, such as it was,

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1 came through the Mathematics Division or Mathematics Section
2 of the Science Foundation, and consisted of two forms: one
3 was a support for a small number, possibly a total of about
4 a million dollars a year of research projects in largely
5 theoretical computer science and numerical analysis. The
6 second was support for the expansion of computing centers at
7 universities for support of the use of computing in research
8 in all of the sciences.

9 Now this was important in computer science
10 because it provided the first experimental equipment which
11 the computer scientists had to use in research in their own
12 field.

13 JACK MINKER: Did that happen before you started?

14 MR. CURTIS: Yes. That happened before I
15 started.

16 JACK MINKER: Who was instrumental in that
17 activity?

18 MR. CURTIS: The person who deserves greatest
19 credit, I think, for that particular activity is Arthur
20 Grad, who was in Mathematics at National Science Foundation
21 for some years, and saw the need for developing that kind of
22 activity, but the inspiration for that, I think, goes
23 directly back to John Von Neumann, who was on the board of
24 the National Science Foundation in the 1950s, and who pushed
25 the Foundation very hard to get involved, and to help the
26 universities get involved in the use of computers for

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1 research.

2 JACK MINKER: I see. That's interesting. I had
3 not known about that personally. Where is Arthur Grad from,
4 and where is he now?

5 MR. CURTIS: I don't know, I'd have to review the
6 history on that.

7 JACK MINKER: Okay. And was Arthur Grad in
8 charge of the Mathematics Division, or was he --

9 MR. CURTIS: He was at one point, yes.

10 JACK MINKER: He was at one point -- I see. And
11 he was your boss at the time?

12 MR. CURTIS: No. I never did intersect with him.
13 He had left the Foundation before I came.

14 JACK MINKER: I see. And who did you come to
15 work for?

16 MR. CURTIS: I came to work for Milt Rose.

17 JACK MINKER: Oh, Milt Rose was there at that
18 time?

19 MR. CURTIS: That's correct.

20 JACK MINKER: I see. And, so Milt was the head
21 of the Mathematics --

22 MR. CURTIS: That's -- well, let me make it a
23 little more precise. The two programs I mentioned which
24 were supporting both computer science had started under
25 Mathematics, under the direction of Art Grad, and then Grad
26 had left some two or three or four years earlier, and I

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1 came. And had been replaced by a succession of people, one
2 of whom was Milt Rose. But also during this period of time,
3 a report had been prepared under the direction of John
4 Pierce of Bell Laboratories.

5 JACK MINKER: Yes.

6 MR. CURTIS: And this was called the Pierce
7 Report. It was a report that John Kemeny of Dartmouth was
8 very instrumental in shaping and in writing, I believe, and
9 advocated that the federal government make computer literacy
10 at the college level a very high priority item for its
11 development of science and engineering education research.

12 JACK MINKER: What year was this?

13 MR. CURTIS: This was about the year 1966.

14 JACK MINKER: And you were there at the time?

15 MR. CURTIS: I was not yet there at that time.

16 JACK MINKER: You came in '67?

17 MR. CURTIS: That's correct.

18 JACK MINKER: I see.

19 MR. CURTIS: Now, the political context of that
20 report, you must remember then, it was published in the
21 winter of '6_-- well, the academic year of '66-'67. That
22 was Vietnam war, not quite yet fully blown, but leading up
23 to the period of the '68 election period, and you know,
24 increasing difficulty with that whole area.

25 It was the period in which the government was not

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1 sure it could have guns and butter, and was beginning to
2 wonder how it could constrain itself, where it could
3 constrain itself; and so this report came forth at a time
4 when there was a great deal of concern about the economic
5 stability on the one hand, and there was still some civil
6 concern about, and perhaps trepidation, I don't know, about
7 computing technology, and its impact on people and society,
8 and for someone to come forth and advocate that our
9 government invest several hundred million dollars a year
10 pushing computer literacy was really quite a radical
11 statement.

12 JACK MINKER: What was the outcome of the report?

13 MR. CURTIS: The outcome of the report largely
14 was that the National Science Foundation was given the task
15 of responding. The government as such did not respond, but
16 the Office of Management and Budgeting assigned that
17 response to National Science Foundation. NSF formed a new
18 office, called the Office of Computing Activities, which
19 reported directly to Lee Hayworth, who was the Director of
20 the Foundation at the time.

21 JACK MINKER: I see, it was not under
22 Mathematics.

23 MR. CURTIS: No longer under Mathematics.

24 JACK MINKER: That's interesting, because several
25 years later it became part of Mathematics again.

26 MR. CURTIS: That's true.

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1 JACK MINKER: Okay. So what happened then? Who
2 became -- who was put in charge of this activity to run it
3 and be head of it?

4 MR. CURTIS: Milt Rose was named head of this
5 office --

6 JACK MINKER: But he was in Mathematics.

7 MR. CURTIS: He was in Mathematics, but he had
8 been very concerned, very interested in this whole
9 development.

10 JACK MINKER: I see.

11 MR. CURTIS: And so when this office was created,
12 Lee Hayworth appointed him as head of that office.

13 JACK MINKER: I see. This is in '66.

14 MR. CURTIS: This was in --

15 JACK MINKER: '67.

16 MR. CURTIS: '67.

17 JACK MINKER: '67, and --

18 MR. CURTIS: And Milt then offered me the
19 position to come help get the office formed, and take the
20 position of Section Head for Institutional Computing
21 Services.

22 JACK MINKER: I see.

23 MR. CURTIS: Which was the large program that
24 undertook to expand campus computing centers.

25 JACK MINKER: That was a tremendously important

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1 activity, because the universities were wasteland with
2 respect to departments having any equipment. That's what
3 really started the impetus, not only departments, but the
4 universities as a whole generally didn't have equipment.

5 MR. CURTIS: That's true.

6 JACK MINKER: I know we at Maryland received a
7 grant from NASA to get our equipment; it may have been
8 partially supported by the National Science Foundation. I
9 certainly know that it was NASA at the University of
10 Maryland.

11 MR. CURTIS: I think we made a grant in Maryland.

12 JACK MINKER: (Inaudible) to us. Yes.

13 MR. CURTIS: It certainly was. It was a very
14 important program throughout the country, I think. And it's
15 had a substantial influence, not only in getting the
16 universities at the undergraduate level deeply involved, but
17 also in establishing the necessity of computing, so that the
18 universities accepted that as part of their own necessary
19 budgeting concerns.

20 JACK MINKER: Yes.

21 MR. CURTIS: And --

22 JACK MINKER: That was part of your initiative?

23 MR. CURTIS: That was part of it.

24 JACK MINKER: You insist that the universities
25 also contribute?

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MR. CURTIS: Right, right.

JACK MINKER: That's good.

MR. CURTIS: That was built into it from the very beginning.

JACK MINKER: And that was your idea?

MR. CURTIS: I'm not sure. That was, I think, part of the Foundation's idea. I'm sorry.

JACK MINKER: That's the hole, that you're speaking in.

MR. CURTIS: Oh, I'm sorry.

JACK MINKER: Okay, go ahead.

MR. CURTIS: No, I think that was built into these grants from the very beginning before I had anything to do with it.

JACK MINKER: I see, and what grants were you instrumental in, and to what universities were given the grants of this kind?

MR. CURTIS: Oh, I can remember several, but I don't remember all by any means.

JACK MINKER: Just the ones that you remember will be useful.

MR. CURTIS: Let's see, University of Princeton.

JACK MINKER: Princeton University.

MR. CURTIS: Princeton, Illinois -- who else? I'm not sure, really Jack. This slips my mind.

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1 JACK MINKER: Sure. Okay.

2 MR. CURTIS: We gave twenty or so the first year
3 I was there.

4 JACK MINKER: I see.

5 MR. CURTIS: The range of -- well, let me put it
6 in different context -- when the office was begun in summer
7 of '67, this was the start of fiscal year 1968, which at
8 that time, the government's fiscal year began in July 1st.

9 JACK MINKER: It has slipped since then.

10 MR. CURTIS: Yes, it did. The government's --
11 the budget for this office was about twenty-two million
12 dollars.

13 JACK MINKER: Yes.

14 MR. CURTIS: For all of the activities of this
15 office. Now the (break in tape) -- created, and which he
16 put Milt in charge of, comprised several activities. This
17 institution of computing services activity was one of them,
18 and that had a budget of something like ten million or so.

19 JACK MINKER: Yes.

20 MR. CURTIS: Then there was an Office of
21 Educational Applications -- this is what it says, of
22 computers.

23 JACK MINKER: Who was in charge of that?

24 MR. CURTIS: Arthur Melmed was put in charge of
25 that. And he subsequently left the Foundation to go the

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1 National Institutes of Education and then on -- stayed there
2 and retired about a year ago.

3 JACK MINKER: I see.

4 MR. CURTIS: Another section was one on -- called
5 Education --

6 JACK MINKER: Does that help?

7 MR. CURTIS: Yes. Was one called --

8 JACK MINKER: Go ahead.

9 MR. CURTIS: All right. Another one was called
10 Education, Research and Training Section, and that concerned
11 itself with the questions of how to train more faculty, more
12 undergraduates, more graduate students, in developing
13 problems for their use of computers, in developing curricula
14 for their use of teaching computers, in teaching, and a
15 variety of activities of this sort.

16 JACK MINKER: Who was in charge of that?

17 MR. CURTIS: Let's see. I think Tom Gallie was
18 actually, from Duke University.

19 JACK MINKER: I see.

20 MR. CURTIS: I'm not absolutely sure.

21 JACK MINKER: And did this support the ACM
22 curriculum 68?

23 MR. CURTIS: It may have.

24 JACK MINKER: It may have.

25 MR. CURTIS: But I don't know for sure. These

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1 are things we could look up. It's easy to recover that
2 paper (Inaudible).

3 JACK MINKER: Sure, sure. Okay.

4 MR. CURTIS: Then there was another flier, sort
5 of an independent offices kind of thing. Fred Weingarten,
6 and Fred was at that time then a person directly responsible
7 for supportive research in computer research.

8 JACK MINKER: Yes.

9 MR. CURTIS: And his program came to something
10 less than a million dollars a year.

11 JACK MINKER: Less than a million for research,
12 oh my. That's something --

13 MR. CURTIS: And then after being there for a
14 year and a half, about, perhaps it's less, I changed my role
15 in the office, but it complete the role -- as you note that
16 Glen Ingram, who is now at the National Bureau of Standards,
17 was Deputy Director of this office --

18 JACK MINKER: Yes.

19 MR. CURTIS: And then, I guess a year after the
20 office was formed, I changed my role and became -- Donald
21 Aufenkamp came to the Foundation, and he became head of this
22 Institution of Computing Services section, and I switched
23 over and took over the task of being head of what was called
24 the Research, Education and Training, -- or something like
25 that

26 JACK MINKER: So you combined --

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1 MR. CURTIS: We combined some things.

2 JACK MINKER: Weingarten was then reporting to
3 you?

4 MR. CURTIS: Yeah, right.

5 JACK MINKER: And whoever was in Education --

6 MR. CURTIS: No, Arthur did not. So Education
7 got out of it. I think that was it. That was an internal
8 matter within NSF. The Education Director at NSF felt that
9 it should be responsible for the educational applications.

10 JACK MINKER: I see, then having it under
11 Computer Sciences.

12 MR. CURTIS: That's correct.

13 JACK MINKER: So it was pulled out of that.

14 MR. CURTIS: So it was pulled out. So Fred
15 Weingarten did report to me in that instance, but
16 Weingarten, I mean Melmed did not. He moved over to the
17 Education part, and then on over to the National Institutes
18 of Education itself. Then, well there's some coalescing
19 activities. In some respects there was substantially lower
20 budget, but a wider range of responsibilities, and my
21 perception in doing that was basically that the Computer
22 Services, the Institution of Computer Services part of the
23 Foundation's programs was not going to increase in the
24 future, and that's the subject worth talking some about, I
25 think.

26 JACK MINKER: Yes, okay.

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MR. CURTIS: And that --

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JACK MINKER: Why don't you expand on that?

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MR. CURTIS: All right. Why don't we mark that

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for the future?

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JACK MINKER: Later we'll come back to the

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coordinated experimental research initiative which relates

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to this very much.

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MR. CURTIS: But that, it was my perception

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indeed that Computer Science as a science was going to

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become important, an intellectual feature of our whole

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landscape, and that it was important and that I would like

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very much to become associated with that development.

13

JACK MINKER: As indeed, you have been the key

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person in the United States, in my opinion, in that area.

15

MR. CURTIS: That's why I chose to make that kind

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of a move at that point.

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JACK MINKER: That was very astute judgment at

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the time, yes.

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MR. CURTIS: Why don't we stop for a second?

20

JACK MINKER: Okay, sure.

21

(End of Side A.)

22

JACK MINKER: (Inaudible), 10:30 a.m., and this

23

is Jack Minker speaking with Kent Curtis, and we're going to

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pick up on some of the items that we spoke about a half hour

25

ago.

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1 MR. CURTIS: Let's pick up on some of the
2 questions involving the Institution of Computing Services,
3 for which NSF gave support to universities throughout the
4 country, expanding computing centers, so that they could be
5 more effective in supportive research in all areas of
6 science and engineering, natural sciences, social sciences,
7 and all. And indeed, the support for humanities and arts and
8 letters that was provided at universities also came -- (break in tape)
9 -- program, through the provision of equipment, but made the
10 equipment available for research in those areas. One of the
11 roots of that program lay indeed in the perception by John
12 Von Neumann, that computing was going to be a fundamental
13 tool of research in all areas of science and engineering and
14 that the universities should become involved in training,
15 not only in the way they conduct their research, but in the
16 way they conduct their educational activities, and the way
17 they train their students, and that students should grow up
18 with the background of having computing as a natural tool,
19 that they have among their repertoire tools for solving
20 problems, as they come to them.

21 And it was for this purpose that the Foundation
22 was encouraged by Von Neumann and by those who followed him,
23 to establish this kind of a program, and the program was
24 established first in the mid 1950s, or later part of the
25

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1 1950s. I think the first awards were made perhaps in '55 or
2 '56. And it gradually grew through the period of the next
3 ten years, until at the time I took it, in the summer of
4 1967, it was an activity of about ten or eleven million
5 dollars a year, and it was an activity that truly spanned
6 the whole spectrum of sciences. The institutional proposals
7 came from the institutions, not from a department, not from
8 an individual, but really from the institution requesting
9 support for computing for the use of the whole institution,
10 and for the use of the institution primarily in research,
11 but also in education and others.

12 It was expected that the institution would carry
13 a substantial portion of the budget right from the
14 beginning. It was also of course expected that company
15 discounts on equipment prices would be important. But these
16 were never considered as part of the institutional
17 contribution. These were considered as discounts.

18 JACK MINKER: How did the universities react to
19 having to put up their own money?

20 MR. CURTIS: Some of them objected very
21 strenuously.

22 JACK MINKER: Why did they object?

23 MR. CURTIS: Well, let's see. I guess in part
24 some of them objected because they objected to paying their
25 own way. One very prestigious university in our country --

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1 JACK MINKER: Could you mention which one it was?

2 MR. CURTIS: No, I won't mention which one it

3 was.

4 JACK MINKER: (Inaudible).

5 MR. CURTIS: But it was once said that we did not

6 become great by paying our own money for computing, and they

7 felt that way about other things, not just computers. They

8 did not become great by paying their own money for anything.

9 JACK MINKER: That's interesting-a self-serving
10 attitude.

11 MR. CURTIS: Well it establishes, you know, a

12 certain relationship, or confirms a certain relationship

13 between the university and the federal government.

14 JACK MINKER: Yes, indeed.

15 MR. CURTIS: And it's not a viable relationship.

16 JACK MINKER: Did anyone object because they

17 weren't sure they saw the importance of computing --

18 MR. CURTIS: Oh, I'm sure, yes. There are a

19 variety of reasons for concern, uncertainty in about all of

20 these areas. The area was new. There was many reasons why

21 the institutional people needed or would like to have had

22 better stability and better assurance about the costs and

23 cost controls. What they -- often in these instances they

24 were sold a program for institutional computing services,

25 getting a computer center, getting it established, expanded,

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1 maybe smaller computers hooked in, in some sort of a local
2 network way.

3 We had set up a program level of this based on
4 the assumption that they would be paid for, many of these
5 costs by research recharges, to grants and contracts. But
6 in fact the federal government did not come through. In
7 many cases, with those research monies. And so the
8 university was left holding the bill. They had very good
9 reason for concern. They were -- as a consequence often a
10 deficit item. Sometimes, only on rare occasions am I aware
11 of the deficit having run so high that it became embarrassing
12 and unsupportable, and somebody would be fired as a
13 consequence. But that also happens.

14 JACK MINKER: Is that right? I'm not aware of
15 that.

16 MR. CURTIS: So money is a very difficult area.
17 Well, another aspect of this whole business was the Pierce
18 Report on computer literacy and making the computer literacy
19 a high priority objective of the federal government. It
20 increased the emphasis on teaching, on the relationship with
21 the teaching computing and far beyond what it had been
22 before.

23 JACK MINKER: Do you think that many people
24 object to the government supporting education, it should be
25 done at the local levels? Would any of -- this happened in
26 the -- or not an impetus from National Science Foundation,
27 that is the tremendous burgeoning of computer science in the

NSF/lg

1 schools?

2 MR. CURTIS: That's a good question. I really
3 don't know. I really don't know. I think at the same time
4 while many people object to federal control of what's taught
5 in the schools, many people do not object to federal support
6 of school cost, and if they could find a way to let these
7 two slip by -- one by the other -- and the same thing is
8 true in universities in Germany in fact, since World War II,
9 in the German constitution, the federal government cannot
10 control education in Germany. That has to be a state
11 controlled activity. And as a consequence of that, it may
12 establish a university and designate it as a major
13 university in field X, say, of which computer science has
14 been one in some instances.

15 The assumption is and explicitly must be
16 (Inaudible) that that university will take over full
17 budgetary responsibility for that activity within five years
18 or so. And, well, the same kind of thing can happen, and
19 these kind of constraints can be built in to relationships
20 here. And as long as this can be done, people can get by
21 with that as well. So it's never become a conflict at that
22 level, I think yet.

23 JACK MINKER: Well, from my perspective I think
24 that the support from NSF was crucial in two regards: one,
25 I cannot -- both NSF and NASA, NASA should be given credit
26 for

NSF/lg 1 giving out computers to universities also.

2 MR. CURTIS: Yes.

3 JACK MINKER: And I don't think that the
4 university would have bought large computers for many years
5 without that kind of support and that kind of leadership,
6 and I think that someone at the national level looking at
7 the broader picture than the parochial local level is
8 extremely important for this nation, and I don't think
9 that's deleted in the hands of the universities to do
10 things. They're very slow moving; there's a lot of
11 infrastructure built in and people don't want to give up
12 their domain, and what do you do when a new area like
13 computer science comes out? Where do you get the lines
14 from? And it's a problem, and I think that the role of the
15 government was crucial here to give computers, and to also
16 foster and push education and to give the impetus for doing
17 these kinds of things that might not have been done for many
18 years.

19 MR. CURTIS: I think that's a very sound
20 perception Jack. I really ^(inaudible) ~~Jack~~, I think our ^(ex) experience which,
21 in the CER program, bears that out very strongly.

22 JACK MINKER: Oh, absolutely.

23 MR. CURTIS: And indeed it designed that program,
24 had that in its mind from the very beginning, as you well
25 know.

26 JACK MINKER: Yes, we'll come to that too. Yes,

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1 although the CER was critical, it brought the computer
2 science departments which were wasteland with respect to
3 computing, and not with respect to research, but wastelands
4 with respect to getting hands on working with computers, the
5 CER was very critical and would never have been done at the
6 university level. That I can guarantee you, and we'll talk
7 about that and some of my experiences here and why I say it
8 would never be done at the university level. That CER, I
9 think, was an extremely important, major initiative, and I
10 think that you were the man in charge of it and pushing it
11 all the way in the government. At any rate that's for later
12 on. Let's come back to the early days.

13 MR. CURTIS: Well, okay, let me get back here. I
14 was pointing out that the Pierce Report put more focus on
15 the use of computers in education. And on the role of
16 government in supporting education, as opposed to research
17 itself. This was a matter of -- during the period of time
18 now, of '68 and '69, a matter of very considerable
19 importance to the government because of the increasing and
20 steadily escalating costs involved in Vietnam and elsewhere.

21 And the government simply thought it could not
22 support that. And this is why that whole office, I think,
23 was given to NSF, to the response to the Pierce Report,
24 which had created quite a stir. The response was to tell

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1 NSF to do something appropriate within the budget that it
2 had.

3 JACK MINKER: Was the budget increased at all?

4 MR. CURTIS: No.

5 JACK MINKER: It was in the budget.

6 JACK MINKER: So where did the funding come from?

7 MR. CURTIS: Well, it came out of a realignment
8 of funds. You know -- that's one of the ways that
9 priorities get assigned.

10 JACK MINKER: Yes, but which activities lost the
11 funds (Inaudible)?

12 MR. CURTIS: I don't know the detail.

13 JACK MINKER: And what was their reaction?

14 MR. CURTIS: Oh, I'm sure of their reaction, if
15 they were aware that they were the ones that lost. Now you
16 can't always be aware.

17 JACK MINKER: Yes, because even starting a new
18 activity at the National Science Foundation without more
19 funds requires that someone loses, budget, as an
20 infrastructure there as well as at the universitites that we
21 just spoke about, and they don't want to lose their money
22 any more than university people.

23 MR. CURTIS: No, that's quite right, and so as a
24 consequence, it was simply, in terms of a net overall
25 supportive science, I would guess there was a net zero gain

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1 at that point. I don't know that for sure, but I would
2 guess it's -- that net zero is probably not far off, but
3 there was, by virtue of establishing something, there was
4 some slight shift in priority, because it gave computing a
5 priority it had not had to some degree.

6 JACK MINKER: Now this was probably around 1968,
7 '69?

8 MR. CURTIS: That's correct. The office that I
9 came to join was established in the summer of '67, and
10 that's when I came. That office persisted until, well, I
11 don't know, three years or so, and Milt Rose was head of the
12 office for the first two years, and then Milt left the
13 Foundation to go to Colorado State University, and John
14 Pastar came from the University of Illinois, and he became
15 head of the NSF Office of Computing Research, or Division of
16 Computing Research.

17 JACK MINKER: It was a division.

18 MR. CURTIS: It was a division of computing
19 research, that's correct.

20 JACK MINKER: He was not in Mathematics, he was
21 just --

22 MR. CURTIS: At that time not.

23 JACK MINKER: I see.

24 MR. CURTIS: There were a lot of internal
25 organizational details, I don't know how much interest those
26 are, but the first office that John came to, oh, what was

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1 it? It was still the Office of Computing Activities; he was
2 still reporting directly to Hayworth. Hayworth was not
3 entirely satisfied with that. But Hayworth of course was
4 then dismissed, not dismissed, but his term as director of
5 the Foundation expired.

6 JACK MINKER: I see.

7 MR. CURTIS: And it was at that point that there
8 was some confusion created by Nixon's inability to find an
9 appropriate replacement for Lee Hayworth. You may recall
10 there was some negotiations with Long at Cornell. But that
11 got mixed up in this supersonic airplane, and the
12 endorsement or lack of endorsement of the supersonic plane
13 by the president's science advisor committee.

14 JACK MINKER: The Commerce Department was heading
15 up a study on that.

16 MR. CURTIS: Yes, something like that. I don't
17 remember now the full details -- who was doing what, what
18 have you.

19 (Break in tape.)

20 MR. CURTIS: It was finally felt by Nixon, I
21 think, that this was advice that he didn't want, and he
22 disregarded it. But it created then a very hard feeling
23 between him and members of the scientific community.

24 JACK MINKER: I thought the judgment of the
25 scientific community was not to go ahead with the supersonic
26 airplane?

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1 MR. CURTIS: That's correct. And Nixon let them
2 go ahead.

3 JACK MINKER: I see, I didn't realize that.
4 That's new to me, too.

5 MR. CURTIS: And so as a consequence, I think
6 this created some hard feelings, and there was some
7 question, I think Long was involved in that in some
8 respects. It came out in a somewhat slightly embarrassing
9 way to all involved. But again, I can't quote the details
10 to the site of the embarrassment. But then, having almost
11 decided to make that nomination, he pulled it back and there
12 was no nomination for quite some period of time.

13 There was an acting director for (Inaudible)
14 months. Then there was a director appointed who stayed not
15 very long. How long, I'm not sure, a year perhaps.

16 JACK MINKER: Do you remember who that was?

17 MR. CURTIS: He came to NSF from Johns Hopkins
18 and went to San Diego, and he studied butterflies, if I
19 remember or fireflies, but I can't bring his name to mind.

20 JACK MINKER: We can always find that out. Okay.
21 What happened (Inaudible), impact on your office, or?

22 MR. CURTIS: Oh yeah, you know, all of these
23 things have an impact on this sort of (Inaudible) structural
24 organization. What can a director of an organization do?
25 Not much. He can reorganize; that's one thing that he can

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1 do, and so that's the sort of thing that they would tend to
2 do. Now through all this, having this one little office,
3 Office of Computing Activities, reporting to the director
4 was something of a nuisance, and was -- very soon became
5 something of an afterthought and everyone's bottom of the
6 plans. When the foundation was requested to develop budget
7 plans or develop long range plans or develop whatever, then,
8 you know, except for those few of us who were directly
9 involved and directly concerned with those particular
10 activities, the rest of the foundation wasn't, and they
11 didn't care that much, unless it was brought up before them
12 constantly, which it could not be, it would tend to be
13 overlooked. And so it soon became the situation that it was
14 -- oh God, we forgot about them, let's put them in here. And
15 so it was, there was established a new director in the
16 foundation called a director for scientific and
17 international and technical affairs. No, that's not what --
18 scientific and international programs -- I'm not quite
19 sure, but it had some of these kinds of flavors.

20 And our office of computing activities was stuck
21 in there as one of the national, or international; I
22 couldn't quite tell you what.

23 JACK MINKER: Which other activities were there?

24 MR. CURTIS: Oh, other activities that were there
25 included (Inaudible), National Atmospheric Research Program.

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1 It included the, at that time, the international, not
2 international, but the information sciences program,
3 whatever that was. I've forgotten what the name of that was
4 at the time. It included the international activities of
5 the foundation that were managed.

6 JACK MINKER: (Inaudible). Sort of an
7 afterthought group. (Inaudible) they didn't know what to do
8 with, they put under one umbrella.

9 MR. CURTIS: That's right. And --

10 JACK MINKER: Who was in charge of that then?

11 MR. CURTIS: The person put in charge of that was
12 a chap from O&R, the chief person for the Navy at O&R, Tom
13 Owen.

14 JACK MINKER: What was Pasta's reaction?

15 MR. CURTIS: It was in this period of state when
16 Pasta was appointed. So he was appointed head of this
17 Office of Computing Activities in this kind of a director
18 you see.

19 JACK MINKER: I see.

20 MR. CURTIS: Now Pasta's reaction, is let's see
21 what he did, and what he did was to agitate, to have a
22 division of computer research established (Inaudible) for
23 research. Now to make that an understandable statement,
24 that when we look at other aspects of the internal
25 organization, the foundation at that time had this

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1 international or mish-mash director that we just talked
2 about. You had a director for research which included
3 physical sciences, engineering sciences, biological
4 sciences, social sciences and, well essentially all the
5 research you can lay your hands on with the exception of the
6 ocean, or atmospheric sciences, I believe. And then it had
7 -- but that was a huge directorate. Now that was most of
8 what the foundation did, and they also had a director of
9 science education. You had had, it had had a directorate on
10 what they call institutional programs, and that is helping
11 departments expand by getting facilities and buildings, and
12 so on. It had discontinued that at the end of the 60s, and
13 the -- replaced it with an applied science director called
14 RANN, Research Applied to National Needs. And so that was
15 sort of the structure at the time when John Pasta came, but
16 he was successful in getting the foundation to agree to
17 establish a program or a division of computer research in
18 that context, and in the division of research, or the
19 director for research.

20 JACK MINKER: Oh, that's good. So he was pulling
21 out of that conglomerate group of international (Inaudible),
22 and he was successful in that. When was he successful?

23 MR. CURTIS: He was successful in getting that
24 done, I think about, oh, '72.

25 JACK MINKER: '72?

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MR. CURTIS: There about.

JACK MINKER: I think we have about two more minutes on the tape, and this seems to be a good point to cut off.

MR. CURTIS: All right.

JACK MINKER: And why don't we stop and we'll pick it up from this point again, okay?

JACK MINKER: Very good.

(END OF TAPE.)