An Interview with

ALBERT BOWKER

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Conducted by Pamela McCorduck

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Abstract

Bowker discusses his role in the formation of the Stanford University computer science department, and his vision, as early as 1956, of computer science as an academic discipline. He relates the difficulties he had in convincing colleagues of his view, his success in hiring George Forsythe in 1959, and the creation of a Division of Computer Science in 1963.

ALBERT BOWKER INTERVIEW

DATE: 21 May 1979 INTERVIEWER: Pamela McCorduck

LOCATION: UC Berkeley (Berkeley, California)

McCORDUCK: This is a conversation with Albert Bowker on 21 May 1979 at the University of California at Berkeley.

When you were Assistant Provost and Head of the Statistics Department at Stanford, you requested that a study be undertaken in 1956 by Louis Fein and the study was to evaluate computer science and what Stanford might do to build a distinguished program in these fields. Why did you think that this would be an important academic discipline?

BOWKER: Well, it seemed to me that the field of computer science was emerging as a discipline. Mathematicians had been interested in numerical analysis and in some aspects of computer science, but the potential of the field in terms of other kinds of things -- artificial intelligence, coding, and various uses in engineering and science seemed beyond the interest of any of the conventional departments at Stanford. It just seemed to me that something new was coming along.

McCORDUCK: Well, it strikes me as a very visionary view and I'm curious about how you happened to have that vision and other people didn't. In fact, a great many people didn't.

BOWKER: Well, I had been committed for a number of years to increasing, if you like, the applications of mathematics and had been active in developing statistics in operations research, mathematical methods and the social sciences and econometrics. In general, my interest is things that are on the fringe of new applications of mathematics and statistics. Most of those activities have remained pretty strong at Stanford. It also seemed to me this was an area in which the University could with relatively little investment although there was some argument about that, make a contribution.

The alternative model and one which is going on at MIT and which is now going on here is to encompass this field in the Department of Electrical Engineering, and although that has worked pretty well in a couple of places including

Berkeley, it seemed to me that always ran the risk of having the field dominated by hardware which as things have turned out has made great, great strides but still many of the unsolved problems and many of the interesting problems deal, deal with a variety of these applications.

McCORDUCK: Do you happen to remember why Louis Fein came to mind when you decided to commission this report?

BOWKER: Well, he had some interest in this field and was around Stanford. I've forgotten exactly now why I talked to him. I talked to a number of other people and many of them were quite negative.

McCORDUCK: But still you persisted. What was Terman's role in this?

BOWKER: Well, he tended to follow my advice in these areas and I'm sure he was...He and I had worked from the very beginning to develop new machine capabilities at Stanford rather than a joint activity at my laboratory and at his when he was Dean of Engineering. We had worked together for a long time on computing matters.

McCORDUCK: Apparently there was quite a bit of resistance to implications of the Fein report because a letter came to Terman around thirty months after he had submitted the report -- that must have been in early 1960, saying why has nothing been done. Now according to the records, that's not quite true. By that time George Forsythe had been hired. Were you instrumental in hiring George Forsythe?

BOWKER: Yes.

McCORDUCK: How did you happen to pick on George?

BOWKER: Well, he seemed to have a lot of the qualities, both personal and professional, we wanted. Of course, he was also very acceptable to the Mathematics Department which was where he was housed originally. He was one of the leaders in the field.

McCORDUCK: In any case, Terman seemed to have put Fein off by saying as far as he was concerned, the faculty were always coming to him with one hot project after another and this was just another hot project as far as he was concerned. He couldn't see that this was any better than any other hot projects circulating in the air. What I'm curious to know is how you managed to convince a lot of people who were resistant to this that it wasn't just another "hot project."

BOWKER: Well, I think Stanford was trying to create activities growing out of research largely, but activities that in some sense fell in between basic science and engineering. the Department of Applied Physics is another example of the kind of development of certain fields in which the University had a distinguished role. Particle physics had been in the rage and still is to some extent and was not really, strictly speaking, engineering or at least would have been carried on by people who had good backgrounds in physics and applied science; so that I think our general point of view was to try and be sensitive to these areas which were inter-disciplinary in a way but inter-disciplinary between different fields of science and engineering rather that the way that word is usually used which is to mix various social sciences.

I don't remember exactly when Dr. Terman changed his mind. In fact, my recollection is that the department may not have come into being until after I left or at the time I left.

McCORDUCK: As a Department, in fact, it wasn't founded until 1965. As a Division it was 1963.

Well, I think I left in '63 and I think we had set it up as a Division and I'm sure I was instrumental in doing that.

McCORDUCK: So you had Forsythe? In fact, maybe we can pursue that in just a moment. Apparently one of the things you said to George Forsythe (I got all my information, by the way, from the Stanford archives. George kept superb notes to himself and things like that; notes exist and I must say if you ever go read these, you'd be flattered out of your mind by some of these things. They are very, very complimentary to you.) One of the things you said in your farewell conversation with him, apparently you telephoned to say goodby to him when you were leaving. Where did you go?

BOWKER: I went to New York. I was head of the City University which is the municipal college system in New York.

McCORDUCK: I remember that now. When you called him to say goodby, you said to him, you recommended to him, that the Computer Science Division not stay in Math, in fact do its best to get out of Math, because you detected some resistance on the part of mathematicians, resistance to hiring non-mathematical but nevertheless legitimate computer science types.

BOWKER: Yes, well, I think it`s true around the country where very few departments of mathematics have taken the lead in this field. There is some activity in ours and other areas but generally mathematics departments tend to emphasize the pure mathematics. The Stanford department had more emphasis on classical analysis than on applicable mathematics if you like, than most in this country, but still was not terribly interested in becoming primarily an applied mathematics department and still isn't.

McCORDUCK: My impression is that there is practically no communication between mathematics and computer science at Stanford even to this day with the possible exception of Don Knuth. Were you involved in the recruitment of Bill Miller?

BOWKER: No, although it does seem to me, I've forgotten exactly when he came, that I did work out an appointment for him in computer science, or else I was consulted about it at length after I left. I can't remember just when he came. The primary, SLAC were the people who really brought Miller to the campus and we thought he ought to have some academic relationship so the computer science relationship was worked out. I heard about it and I think if he came while I was still there, I would have been involved in it but I wasn't the main force. Dr. Terman probably was most interested in that. But of course we were all interested in the relations between SLAC and the campus and we had some very, very unpleasant and difficult times with the Physics Department about that time so we were interested in building other bridges.

McCORDUCK: What was Physics resistant to?

BOWKER: Well, they had originally wanted SLAC, but when people got there they didn't give them academic

appointments or let them teach. People of faculty calibre were part of the battle and we were interested in other ties to the campus outside of Physics.

McCORDUCK: As you look through the archives, through Forsythe's papers, there is a continuing theme of how to raise money, and apparently it was Forsythe's feeling that computer science was underfunded, that they were hoping to get more for their money than they had a right to get. He felt you were sympathetic to that point of view. Do you remember that?

BOWKER: Well, it was always difficult. I don't suppose any of this forecast the full extent of the use of computers in instruction. At Stanford we were supporting our hardware pretty much as research activities and ?? and of course that hasn't been possible to do there or here because the instructional uses are now so important. That's something that has developed in the last 15 years. It wasn't true in 1963. Here at Berkeley I think a majority of the students and I mean more that half have some computer related course or experience while they are here.

McCORDUCK: You mean as academic experience?

BOWKER: Yes, Stanford may be a little bit ahead of us in that.

McCORDUCK: I guess at Dartmouth it's a required subject.

BOWKER: Dartmouth of course pioneered that.

McCORDUCK: But one of the things that struck me was that despite the fact that there was a great deal of trouble about raising money whether it was from the Sloan Foundation or ???, these were the kind of people who came through and said, well, maybe they'd give some money and maybe they wouldn't. The AEC was considered as a possibility and so forth. One possibility came up and that was funding by selling idle time on the Burroughs 5000 and you were apparently adamantly opposed to that. Do you remember why?

BOWKER: I can't remember why I would be adamantly opposed. There was a problem which has developed since

and was developing then, and that is having the University engage in a quasi-commercial activity. Today one would be hit for income tax as unrelated business income. the Universities are facing a number of cases. I probably would have been willing to cooperate with a non-profit organization but to get into competition with service bureaus which were springing up, I thought might be important and probably thought that was unwise.

McCORDUCK: Do you remember why?

BOWKER: Well, for this reason. We shouldn't be in commercial business.

McCORDUCK: In fact, I didn't realize this, but Stanford had been selling time on the small machine, I guess the 650, to a bank in San Jose and it was felt that perhaps they could go on doing this sort of thing with the bigger machine.

BOWKER: Well, I don't know. There were lots of things. There was also talk about merging the scientific instructional machine with a group that was interested in data processing and business operations of the University. I guess that was later to some extent but I was opposed to that, still worrying that scientists and people interested in the use of the machine ought to get priority on it.

McCORDUCK: That brought up another sore subject which was the whole business of allocation of resources and apparently at one point Forsythe was asking you, asking the administration, directly through you, on how to deal with this sort of thing. What happens when the Professor comes in who is a good user and says, "I've just got to have the machine right now because I'm leaving on a three month trip." That was the classic example of people who came in wanting special service then getting very angry when they couldn't get it. Apparently he was hoping for some kind of guidance from you. Were any general rules laid down?

BOWKER: Well, I'm sure the computer center had some discretionary money it could use. Probably it was fairly limited in those days to the acceptance of the importance of computing as an instructional tool in the general funds. Funded activity came somewhere later, I think. It was hard for me to believe that people who did big research things weren't taken care of.

McCORDUCK: Well, it's just a matter of timing. We kind of forget how primitive these machines were compared to what we have now and how hard it was for everyone to get as much as they wanted -- similar to the gas crisis. What's your impression of George Forsythe personally?

BOWKER: I had a very high opinion of him. He and his wife were very pleasant and attractive people. He worked very hard; he was dedicated to not only his own work but the building of Stanford. He did a splendid job.

McCORDUCK: I spoke with Alexandra Forsythe the other week. That was great fun. She is really a splendid person.

BOWKER: Is she still teaching, or is she retired?

McCORDUCK: Well, I guess she's quasi-retired in the sense that I don't think she teaches any more, but she's got a new book coming out. She's very busy. I think that covers all my specific questions. I have one general question: that is, was there any point when you could see that the Stanford Computer Science Department would be a great Department -- a point where the critical mass became such that you thought, "Ah ha, this is going to be a great Department."

BOWKER: Well, certainly the appointment of a couple of other people besides Forsythe began to give us confidence, I remember particularly McCarthy. We began at that time with him working in something which was accepted as useful by everyone; he seemed to be working on tremendously important projects. The people we then began to have as visitors and the younger faculty seemed pretty outstanding to me. In some ways there wasn't too much competition.

McCORDUCK: That's one of the advantages of being a pioneer.

BOWKER: Very few people were really going in the direction we went.

McCORDUCK: That's why I was curious to know how you had this vision, that just weren't that many. And even the people who were there first with the most like the Moore School at the University of Pennsylvania, somehow

never got off the ground and to me it's a great mystery as to how you people managed to do what you did at Stanford.

BOWKER: Well, there was probably an element of luck in there. Timing was part of it.

McCORDUCK: True, but one makes a lot of one's own luck and a lot of one's own timing.

BOWKER: Universities today facing economies and bleak financial pictures are probably much less likely to jump into new disciplines unfortunately. We still try here once in a while but it's tough. In those years Stanford was bringing in incremental money and it was possible to start new things without bleeding existing ones too much.

McCORDUCK: But even so, there were going concerns, shall we say, elsewhere and they just never seemed to get going.

BOWKER: Well, MIT was doing pretty good work but there most of the leadership was coming from electrical engineering. I remember giving a lecture somewhere at one of these IBM conferences when I said the discipline was emerging and everybody pooh-poohed me, even the computer science people, so we'll see. We'll try it in a hundred years.

McCORDUCK: Yes. I suppose if you look on that time-scale, the final verdict isn't yet in, but it certainly seems that a lot of dynamic activity is taking place in something called computer science.

BOWKER: In mathematical statistics and statistics in general, the use of computers is absolutely essential for modern work and not only capability for data processing, but also all kinds of theoretical investigations can be undertaken today which were beyond us for years. So I suppose I had some feeling for the possibilities in my own field.

McCORDUCK: Yes. But you know academicians are very arrogant people and I think a lot of people in statistics or mathematics or physics or any of the big users of computers probably had the notion that they could more or less

improvise whatever computing techniques they needed as they went along. It seems to me it took a certain amount of again, vision, no other word for it, to say, "no, this is going to be a discipline unto itself and it will absorb the intellect of somebody who is steeped in that discipline." You can't just do that out of your back pocket because you happen to have an application. And I suspect that's where a lot of the skepticism came from.

BOWKER: Well, anyway, that's the way it happened. I think in general that was a pretty dramatic period in Stanford's growth. Dr. Sterling had come in as President I guess (in '49 or '50, something like that) and Stanford was kind of at a crossroads. It had some departments that had been traditionally good and some pockets of excellence and some problems of less than excellence and mediocrity, and the question really was whether to go big time. In retrospect it seems like a pretty sensible decision that he made to do that.

McCORDUCK: That was his decision?

BOWKER: I suppose he saw the possibilities. It would be very difficult today for another university to start up and say they wanted to be big time, either public or private.

McCORDUCK: Simply for reasons of money?

BOWKER: No. Many of the universities are fighting to keep their position. There are some exceptions, some of the southern states are still pouring money into their educational systems. But the creation of the full-fledged research institution would be pretty difficult today. Stanford always had the tradition, but it was uneven, especially up to an during World War II.

McCORDUCK: I did my undergraduate work here and at that time, if you were smart you went to Berkeley and if you were rich you went to Stanford. That was the reputation it had.

BOWKER: First under Doug Whittaker then Fred Terman, the two men if you like who were committed to excellence. Then of course Dick Lyman came in as provost. Now I gather Don Kennedy is coming back. It should be an interesting chapter.

McCORDUCK: It should be. Well, thank you very much.

END OF INTERVIEW