

An Interview with

WILLIS K. DRAKE

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Conducted by James Ross

on

3 February 1983

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Minnetonka, MN

Charles Babbage Institute  
The Center for the History of Information Processing  
University of Minnesota, Minneapolis

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Abstract

Drake, founder of Data Card Corporation, discusses his career from his employment with Engineering Research Associates (ERA) to his work with Data Card. He remembers his employment with ERA from 1947 to 1952 and his growing frustration with the firm after it was sold to Remington Rand in 1952. He credits James Rand with considerable vision for business applications of computers, but criticizes Remington-Rand's management for failing to coordinate the activities of ERA and an earlier acquisition, the Eckert-Mauchly Computer Company. He also relates the circumstances surrounding the formation of Control Data Corporation.

WILLIS K. DRAKE INTERVIEW

DATE: 3 February 1983

INTERVIEWER: James Ross

LOCATION: Minnetonka, MN

ROSS: This is a tape recorded interview conducted with Willis K. Drake by the Charles Babbage Institute at Data Card on February 3, 1983. Why don't we begin by having you explain a little bit of your personal background. You were born in Minnesota?

DRAKE: Actually LaCrosse, Wisconsin, because that's where the hospital was, but I consider Minnesota to be my home. I grew up in Minnesota, went to grade school in Minnesota, went to high school in Minnesota, essentially in the Twin City area. Up to and through the freshman year at the University of Minnesota where I enrolled in aeronautical engineering in 1941; I finished my freshman year at the University here and then enlisted in the Navy as World War II had gotten under way. I spent four years in the Navy and was very fortunate, the last two of those four, to get put into something which was called the B-12 program, a Naval College training program. As a part of that I was sent to Purdue University where I continued in aeronautical engineering. I did not have the opportunity to get my degree at that time but I did get my reserve ensign's commission and served for a short time after that at the Naval Air Station at Jacksonville, Florida, as an ensign. I was around airplanes (the activity was relevant to my college training) and then, upon discharge late in 1946 I went back to Purdue to finish up and graduated in the Spring of 1947. I'm always interested by, maybe even fascinated by it now, what turns out to be such a low correlation between what happens to us as individuals, broadly speaking, in terms of how different our circumstance turns out to be as we go through life versus what we intended to do as we made those early career choices, such as deciding to be an aeronautical engineer in my case, someone else an EE, someone else an historian of technology, but particularly those first choices where you just don't have anything to work with really. It's throwing darts or its because you had an uncle you liked who did it, or you read something in a magazine, or some counselor perhaps at an early point in your schooling had helped to make those various choices and you work very hard and prepare. So obviously my intent in 1947 with my new diploma was to be an aeronautical engineer. I entered into that process that still goes on in the method that's used to go from your graduation and your degree to your first job, and that's an interview process where representatives from employers who are looking for individuals with your particular course

of study behind them to select or recruit in varying degrees of aggressiveness depending on things like the economy and what's happening in their particular industries.

ROSS: They came on campus the way they do...

DRAKE: Yes, same kind of a thing. I went through that process. I talked to the major aircraft companies at that time and I had actually in my mind ended up with two offers, one of which I accepted in my mind; for some reason I think I liked the interviewer better or something -- I didn't have much else to go on. And I was about to take a job then with McDonnell Douglas - I think it was McDonnell at that time - in St. Louis. So far that would all kind of fit in the planning part of it, the normal orderly process. Now it's best to go astray a little bit, and while walking across campus going to a class I walked through the Mechanical Engineering building, which was an efficient way to go from where I was going to where I wanted to be. For some reason that I could not explain to this day I spotted a little bulletin board by the door full of thumbtacks and cards notices and so on, which you will find all over campuses posting various kinds of notices and notes and so on. There was a little 3 x 5 card off in a mess of other stuff there, and what caught my eye was St. Paul, Minnesota. There was a little announcement card saying that a Mr. William F. Windget of Engineering Research Associates Incorporated of St. Paul, Minnesota, was going to be on campus a few days hence to interview graduates, and he was interested in talking to people, and one of the degrees was aeronautical engineering. I had never heard of Engineering Research Associates Incorporated, but I had heard of St. Paul, Minnesota. I had a strong desire to get back home, but I couldn't imagine there were jobs of any significance for people in St. Paul, so I signed up for an interview and I ended up meeting Mr. Windget, and he basically made me a job offer during the interview. He described an absolutely incredible enterprise, circumstances not at all like any other I run into before. He described a new small company, told a little bit about a background about the engineers who came from the Navy, and said that this company was going into business to be an engineering company to serve companies who didn't have competent engineering or who weren't sufficiently large to have first class skills. It was to be a multi-disciplined company so that it would have a broad range of these skills to sell, and one of the areas in ERA's program was an aeronautical group, and he gave me the names of Dr. B. H. T. Lindquist, who headed that department and a couple of other people, and he said that my first assignments, if I accepted this job, the company

was expected to grow rapidly and there be a good opportunity for personal development, but the thing they needed most right off the bat was somebody to write technical manuals, and that's what I would start out to do. Well, all the grandeur of McDonald and St. Louis and big names and so on somehow went by the board, and I opted to come back to St. Paul and go to work for this kind of unusual sounding, young enterprise which I couldn't picture it at all. So I went to work at ERA and got a badge and came into this weird facility which was the old American Radiator Plant out on Minnehaha Avenue in St. Paul...

ROSS: And this was in '47?

DRAKE: '47. And there were about, I think they had maybe 50, 60 employees at that time. I got through security stuff, they had high clearance requirements which were in place, they had areas where I could work until all of that was done. My first desk was up in a balcony in just a terrible looking place with a chair with three casters, an old beat up chair to sit in and so on and not much else. And very shortly I was joined by two other guys. One was a fellow named Bob Sorenson who had been hired from Northwestern University, and it was his first day there, and a fellow named Paul Hotte, who Bill had also hired on his campus tours, and the three of us found ourselves sitting up in that balcony in that little room and kind of wondering what was going to happen next, it wasn't all that clear. Then I met Dr. Lindquist and got a little exposure to some of the projects which they had worked on which were not very exotic; they were things I think they could do with relatively small contracts and get paid for and were not going to stress anybody's ability to analyze structures or to make a more efficient wing or do something very grand.

ROSS: Well they were really feeling around weren't they to...

DRAKE: They were totally opportunistic, but it took awhile to understand that because it is not the image of course we came with or I didn't.

ROSS: It's not the image people have of ERA today as well.

DRAKE: And it changed. The opportunistic contracts were, for instance, versus proprietary products. People don't

understand today, and that never did change. It was part of my own learning to try to do something about that with very limited success. In any event, it was not very long, over six months time I would say, that what had been the aeronautical department in effect ceased. It wasn't a valid idea. Conceptually it fit that early dream I'm sure of having a multi-disciplined deal in which you could get good talents to do whatever people wanted. But what began to take hold of the company even in a more increasing way not so much its own thinking but the reality of the major contracts that came from the Navy which were the continuation of the basic digital computer-like developments that the core engineering team there had done throughout the war. They had continuing strong desires to fund them, and so what happened, as a result of the reality of that part of it - and perhaps the unreality of the rest of it and the sheer force for revenue producing work versus non-revenue producing work - is that I very quickly, along with everyone else, found myself not in the multi-disciplined engineering company to serve all industry, but in what was then and what was fast becoming, or increasingly becoming, one of the few very major centers of what in hindsight we would certainly recognize as the beginnings of the digital computer technology in an applied way. ERA made machines that worked. They were product-like, even though they were special purpose, even though one or two of a kind may be made, it wasn't lab work, it wasn't research work, it wasn't haywire, it was...

ROSS: Very task oriented.

DRAKE: ...very task oriented in that sense, very practical, and I've certainly observed later on in light of some of the other things that I got to see, that it was probably unique in the world, certainly in that sense, that most of the things going on elsewhere were much more research oriented, lab oriented, knowledge gaining and...

ROSS: Asking broad and general questions.

DRAKE: Yes, right. And the interest waned once you would have to put one together. So I think ERA probably had... One of the things they did have a lot to do with was accelerating the process from essentially research kinds of thinking and activity and forcing or accelerating the application part of all this into hardware that worked and the idea of reliability and maintained ability; that's probably one of the major things that ERA did. ERA, you've probably been

told before, looking back at hindsight of course, was a start up venture. I never heard those terms and no one else ever talked -- it wasn't perceived that way. The term wouldn't have meant anything at that time probably but that's what it was. It was the combination of some guys with an idea, those were basically the Navy guys and a venturesome capitalist by the name of John Parker - who came from an investment banking background. He was also a very practical man. He found himself, at the time that these guys were getting out of the Navy and had the itch to stay together and do something, following their activity. John had a contract on a very advantageous basis with a Navy owned facility that had produced troop carrying gliders during the war, and of course the market for those vanished in kind of an absolute way. That place became empty. John also understood capital and had access to money and he was also a very shrewd capitalist. And not many people would know or would believe that up until the time that the company was sold to Remington Rand in 1952, the total paid in capital in that company was \$20,000.

ROSS: Isn't that amazing.

DRAKE: Just unbelievable.

ROSS: What kind of manuals were you writing. Were you writing manuals for the customers?

DRAKE: The customer was the Navy. And these were large scale, special purpose digital computer systems. And so the need for documentation for each of these things was horrendous because you had to do it for every one...

ROSS: From the ground up?

DRAKE: From the ground up.

ROSS: Yes.

DRAKE: And so this kind of helped the guys out. They were behind with some manuals, as Bill Windget described

to me in Purdue. We turned into a sizeable department with a lot of qualified people, most of them engineers who became technical writers and who produced these five foot shelves of individualized manuals to military specifications, and this was a hell of a lot of work.

ROSS: Something that I'm aware ERA did was to actually move outside their company in its technical departments and actually train, either educate the customer or cooperate with other either business enterprises or institutions who were working on digital computing. And they did that over a long period of time. Were the technical writers involved with that?

DRAKE: Not really. The technical writers were very much internal, and the thing that you have to remember that along with all this at that time this work was highly classified. That was a period in our society when that meant something; it was very highly respected and we were very, very careful. You just didn't talk about what you did, and so the interchanges that occurred with a few professional societies, and from one contractor to another, and from ERA to the Navy, and later to other government agencies, sponsoring agencies, were not very spontaneous. They were very, very carefully channeled and so on.

ROSS: I was wondering after speaking with Arnold Cohen whether there was another reason for some of that strict confidentiality, and that was that the Navy wanted to develop or wanted to have developed for them these digital computers but didn't want to have to go through, what was it, the Bureau of Standards which actually had the responsibility after the war for planning the government computing.

DRAKE: Yes, they never developed... So the Navy had the...you're right, so I'm sure there was some thoughtful attention to describing these tasks...

ROSS: The machines?

DRAKE: The machine, yes. They got code names and task numbers, and it was a result of another kind of effort



which I think relates to where we are going with this conversation that it wasn't the Navy...

ROSS: That issued the contracts.

DRAKE: We saw in two of the later machines, as we were growing in size, which the Navy saw as special purpose, kind of one or two-of-a-kind in the pattern of the past... We said to ourselves, Jesus, these are general purpose scientific digital computers of broad application and...

ROSS: And the 1100 series grew.

DRAKE: Yes, and so the push or the initiative - the perception first of all and the kind of follow-on activity that stemmed from ERA to see these as possible products and to have proper arrangements so that we could try to pursue those in our own right - did not come from the Navy. It came from the commercial enterprise - those who saw and began to think in terms of trying to do business by selling commercial versions of these things for a broader application.

ROSS: That comes at a later period after you. It appears from your personal history that you actually left ERA for a period of a year, a little over a year.

DRAKE: Yes. What was happening in my own mind at that time was...I don't know where that came from - I don't know quite why that was - but I kept being increasingly interested by: Gee, we ought to make products and sell them. And I would try to push those ideas, naively, in these instances because I didn't have any background in that area. I can't explain quite why that was but I didn't like much all this glue in the inertia and rigmarole...let's go. So, from the technical writing part of it, I had access to, or I had awareness of, what we were doing. I'll never forget, I worked on one manual for one of the last of the really horrendous relay machines. It was just terrible.

ROSS: In its complexity?

DRAKE: Just such a huge...

ROSS: Monster?

DRAKE: Monster. And if you think about what's involved when you write the theory of operation for machinery, what you end up doing is you literally are translating into words... I don't know if anybody would ever read it. You'd trace every circuit, every contact action, they have all got solenoids which have got a number, and the contacts are identified, and you translate into words what happens under all the various actions that occur throughout this system as it operates. And a guy that I worked with finished that thing and sat back - he was project engineer on the thing - looked at it and he shook his head and he said, "Boy, that's a lot of work." Then he said, "I think what we have here is probably an ultimate and this is probably the world's most elaborate wiring prose diagram." I agreed.

ROSS: Who was this? Who was the project manager in that instance?

DRAKE: I think that was a guy named Jack Boekhoff, if I recall.

ROSS: Oh, I haven't run across his name.

DRAKE: That wasn't very exciting work by the way.

ROSS: No, I'm sure it wasn't. Pure headache work.

DRAKE: So I think part of my restlessness came from just being bored.

ROSS: Who did you have to try to convince?

DRAKE: Well, I think people look back at ERA and see what came out of it in many ways in terms of people and unusual career paths in things that have happened, caused to happen by the individuals who shared that experience.

I think part of that comes from the fact that there was a lot of... It was a small enterprise and it was new for everybody and it had this strange sponsored nature so that you didn't... Well, hell, there wasn't any marketing department, there wasn't any product planning. Its government contracts and its engineering projects and some accounting and mostly running to cover the payroll. So one of the groups there was the least structured of the groups, I would say, least committed and most imaginative, was a group that was run by a guy named Howard Daniels; Howard was a restless soul in his own right, an intellectually restless man with multi-disciplined interests. He liked mechanics and he liked magnetics and he liked electronics and he was full of ideas.

So, I liked Howard, and we got along well. I think some of the ideas for why couldn't we sell these to other people probably came from rattling around with Howard. Some who tended to work on gadgets and smaller things and components, things of that sort, were spending a lot of time with him. Howard sparked those ideas back and forth. I asked then if we couldn't try to identify two or three things there and let's give a model number and agree and figure out what they cost and see if we can't sell a few of these. It's not a very good basic marketing approach, but that's certainly how it started. And I kept poking at that, and the guy that actually -- he probably wouldn't remember it -- the guy that actually gave me the permission to spend some time on that was Bill Norris. He did it, typical of the times, by saying, "Fine. You haven't gotten a new title and you're still in the publications department and you're not getting any more pay. You can work on some of this stuff if you want to but don't do anymore than half time. Let me know what you're doing and go ahead as long as you don't spend any money." So we picked two or three of the things--I'll try to remember what they were--two or three of the things that Howard was working on...

ROSS: Where are we in time?

DRAKE: This would be...

ROSS: '40s.

DRAKE: Let's see this would be '49 maybe. Shortly before I left for my year. I made friends with a guy -- made friends, we were friends with the guy who ran our little printing operation, which was also part of publications. I wrote two or three product brochures, or the concept of what a product brochure would be, and got Bill Chamberlin -- there's a name from the past. Bill was the guy who ran the multilith and so on. And he got two and three colored stuff out of the multilith that you're not supposed to be able to do and it's not exactly a work of art, but it wasn't all that bad.

ROSS: Are any of those in existence that we could...

DRAKE: I'm sure there are some files around. They would be over at Univac.

ROSS: I'll look for those.

DRAKE: We'd made quite a few before we were through. And then I learned about new product releases and so we did that and we mailed them off and we started getting clippings and product things in magazines and people started to write in and ask for prices and so we had some of that sort of stuff, and I liked that. It seemed like it was a good idea.

TAPE 1/SIDE 2

And we got up to the point where we got permission to go to a trade show, which in those days was called the IRE show. It was held in Manhattan in a building on Lexington Avenue. So we designed a booth and got it made in our own carpentry shop and we had an ERA exhibit for the first time -- not really any products, but ideas that were for products. We got people to come by - there were mostly engineering people there anyway - and we got to shoot the breeze, and we got to hang around a little more, and so on, and it felt good. I felt we were making progress. So then we said, "Gee, if we're going to do this," and we expected results on it, "we have to be a little bit more professional.

We do have to understand better what we're doing and it can't all be done left handed," and so I asked to be given a new job. I wanted to be the commercial products manager or the sales promotion manager or, I tried three or four on, and I got turned down. I don't know why. "What qualifications do you have?" It had gotten to be this kind of thing. "Well, this is what I've done with nothing..." For whatever reason I don't know, maybe they just really did think it was ok to play with it but we're not going to do anymore. I took it seriously as lack of qualification and, I think, inability to sell them on the idea.

ROSS: ERA also would have begun some pretty heavy emphasis on the ATLAS projects on that time too...

DRAKE: Sure.

ROSS: ...and may not have recognized the necessity yet of...

DRAKE: Clearly it wasn't recognized as a necessity. The guy...

ROSS: Maybe that's a wrong way of stating it...

DRAKE: The two people who had the imagination enough to not be totally discouraging were Bill Norris and John Parker. And that's where I got the energy from, but it was all non-structured and without any real authority and no real program it's just sort of an opportunistic thing. So I wanted to try to do it better, get it organized, have a function identified, and be able to try to be effective with it, and that's where I ran into the obstacle personally. And so my reaction to that was to say, "Ok, this is what I want to do and obviously I'm not going to have the opportunity to do it here. I think you're wrong, I think I am qualified, and so I'm going to go get such a job someplace else. We were all good friends, and I think the reaction probably... Bob Patterson was the guy who ran the professional personnel part of the business, and I think he thought I'd go and try and I wouldn't get a job and...

ROSS: You'd be back.

DRAKE: ...I'd be back, and that would be the end of that problem. But I did get a job. And I got a job it turned out with another horrendously exciting, most unique enterprise. It was Lear, Incorporated, which at that time was based in Grand Rapids, Michigan, and was the creature of a guy who was famous and became very, very famous by the name of Bill Lear. My job then was assistant sales promotion manager. I was hired by a guy who was sales promotion manager and a technical guy, a good mentor, a comfortable guy, and I felt gee, I'm going to learn and I'm going to bust my butt and do a good job and so on. I did not know, of course, anything about Lear Incorporated except sort of the magic of the name. Lear, Incorporated was the product of a very dynamic egomaniac.

ROSS: Was it a post-war phenomenon?

DRAKE: There were some parts of it that... No it was a pre-war company. Bill Lear originally got interested in -- a totally self taught guy. I know he didn't finish high school.

ROSS: My goodness.

DRAKE: He got interested in radio really early. As an inventor he was tremendously restless -- he followed a lot of paths and did a lot of fundamental work and left a tremendous trail of achievement. But he was actually an autocratic, unpredictable eccentric and absolutely ruthless -- not in his own mind -- and a flamboyant, colorful personality. We are talking about a naive young man from Minnesota running into a whole new world. It was a very abrupt jump. Well, nevertheless, I didn't see that at the time, and I got my desk and got started and I got some jobs to do which I liked. I started to work on ads and on brochures and on releases. It was the year that Bill Lear was to win what was called the Collier Trophy, which was a prestigious award, which got major national and international publicity - that of course hadn't happened yet and I didn't know what the Collier Trophy was. Two to three weeks, not very long after I took the job, I drove up and rented a room - my family was still here [in St. Paul] with the house, we were wrestling with all that. The guy that hired me was fired by Bill Lear in an explosive confrontation. So my mentor was gone, and I was alone in this place, and, as the only person around all of a sudden, whatever was going on was mine to do one way or another. And it was in that fashion that I met Bill Lear, and as a guy who worked for him, I ended up in the

turmoil of excitement and fear and exhilaration and confusion and god knows what. And I did that job well, I got a couple raises, I got my title and moved into George's office -- it was typical of climbing up the totem pole, or whatever, in the books. The Collier Trophy thing came, and I met the editors of Aviation Week, and I met Gerard Piel who was responsible for the real rebirth of the current Scientific American, and I was flying back and forth to New York. I really was in that stuff, learning all the time, and of course that helped a great deal because the company was very newsworthy and Lear was very newsworthy and the products were novel and interesting.

I wrote a letter back to Bob Patterson, "Relative to our last conversation ..." So I got offered the job back at ERA, and came back. I wasn't gone very long, it was like maybe a year and a half or something like that, but when I came back I had a budget, it was modest, and I had the authority to hire another person. We were starting to think about the 1101 and very soon would be thinking about the 1103, we were thinking about it a little already. And a few of the other things that were coming out, magnetic drums were thought of as saleable products...

ROSS: Of themselves?

DRAKE: Of themselves. And it was turning real in that sense inside of ERA, and that's of course why the opportunity to come back there existed. It was perceived more broadly than when I left, and you can kind of see how that went -- it was kind of neat. And the excitement was really starting to build. Another problem was emerging at that time, however, in the whole thing, and that was that Jim Rand had the vision to believe that there was something in this electronic digital computer stuff that had to do with business machines. He had acquired Eckert-Mauchly in Philadelphia, and the UNIVAC I program on sheer guts and intuition, and he had no idea - I don't know if anyone else could have had it either - but absolutely no idea of what was going to be involved or required in order to translate that correct perception into some kind of reality in terms of a business. And...

ROSS: No real idea of what they purchased when they purchased Eckert-Mauchly?

DRAKE: His mentality and his experience was, "Let's see, we have made tabulating machines that really were number

two behind IBM for their whole life, typewriters which were competitive, a line of old technology office products which were high image and quality in their time." They really made their money out of Cardex, which were blocks of cabinets with drawers and then Cardex cards which were one hell of a fine supply item. They had a lot of money in it. They had one version for the public utilities and another for a major... Certainly not the way we look at it today. It's hard to imagine how it could possibly be that way but that was the state of the art. They knew how to make it, sell it, and apply it, and that's the way business operated. So, they were in that sense leaders, but there was not much dynamic technology happening in any of that stuff. So this went on and on, and it was mostly high pressure selling, and branch offices, and contests, and motivation, and this whole mentality was just sold hard.

ROSS: A totally different kind of manufacturing...

DRAKE: A whole different, just absolutely different. He put together a little bit of a kludge or conglomerate in that he took by acquisition. So the Shaver Division was an example of one that maybe had the least fit of all. Harry Lanside, the guy who did ? and Jim got together and they made a deal to form the Shaver Division and that made money. In the same manner they bought Eckert-Mauchly. And in the process of doing that, or before, they became aware of ERA, and I'm sure he had the concept that if he owned Eckert-Mauchly and he owned ERA he would own 95% of what there was and he could take their expertise about how to manufacture products and sell them to businesses and beat IBM.

ROSS: Do you remember any of the people that actually went to Remington Rand before the acquisition took place? There was a...

DRAKE: Well, the first guy that I remember going was Bob -- Bob Swanson, and he went up to the Norwalk Labs and an engineer who is still alive and is out at Dataproducts named Cliff Helms.

ROSS: The article by Tomash and Cohen actually points to a personnel raid that was conducted by Remington Rand in '49. That would have been just prior to your leaving.



DRAKE: It was, yes, just before I went up to Lear.

ROSS: Remington Rand certainly knew what was going on in ERA.

DRAKE: Yes.

ROSS: They weren't just stabbing in the dark.

DRAKE: That's right. That's right.

ROSS: When people in ERA began looking around, courting companies, for an acquisition, were you involved in trying to show what products were marketable at that time?

DRAKE: Personally?

ROSS: Were you an advocate of any sort?

DRAKE: In terms of at the time of the ERA recruiting, or the Remington Rand recruiting drive, no. It wasn't in my mind that way. I was...

ROSS: Manuals.

DRAKE: Totally! And thinking about trying to get a marketing function and a product attitude going in the company, but I had no concept workings outside the company. My leaving was the result of sheer frustration and my conviction that this was work I would like to do and I'm not going to get to do it here. So it had no connection with things in ERA at all... It had no place at Lear and it was a whole different world. About coming back, then, those

first people had gone and the perception -- Bill Norris' line and John Carter's line and even the project people, Arnie [Cohen] and Frank Mullaney and Jack Hill, particularly... Jack was another guy who enjoyed musing with us on trying to see products in the stuff; he was interested in that.

ROSS: How about Arnold Ryden? Was he an ERA employee at that time?

DRAKE: Bud was at ERA in those very early days, and I remember him, but not much. I didn't have anything to do with him. He was the system controller or something like that. So he was over in a different...

ROSS: Accounting.

DRAKE: ...accounting department, and we really didn't get to know one another until quite a bit later. Bob was aware of him, and we'd been able to keep track of where those contacts were but our relationship at that time wasn't significant either way.

Well, back in ERA again and from the Lear experience and with a growing interest in the senior management of ERA -- John Parker, Bill Norris - and now a department, modest but there, and a budget, we really started to focus on some of these more ambitious things. But it was about that time Remington Rand got into serious contact and association with John Parker to buy ERA. And that was, as I'm sure many others have mentioned to you, that was John Parker the capitalist being courted by people who wanted to buy something he owned and controlled. And he did control it in terms of ownership. And he wanted to make the sale; actually, nobody else in ERA wanted to make the sale. Bill particularly didn't want to do that, wanted to... Generally, the whole spirit was to go forward and do our own thing, and it was starting to happen, so there was a lot of optimism and ferment going and here was a big bucket of cold water. We could be employees of someone we didn't even know; shavers and typewriters were not our bag. So it turned out to be a very bitter fight internally. John tried to persuade us. It was a particularly John Parker-Bill Norris confrontation. Bill really represented the rest of the people and points of view, and sheer power prevailed. So Remington Rand bought it and John Parker moved to New York to become Vice President of Univac...

ROSS: New division.

DRAKE: ...the new division. And what they bought was a bunch of talent. That was not at all what they wanted. It was a seething, unhappy, resentful atmosphere. It was all buzzy in the halls and not much else. Everyone was asking, "What are we going to do? They can't do that," and all that stuff. I understood that and I participated in a way with some of that chatter, but I didn't see it quite that way, I didn't...

ROSS: From your point of view marketing might become more important.

DRAKE: That's the way it looked to me. And I thought it was important to ERA and I saw this then as a potentially great accelerator for something that everybody in ERA, if they understood it, would be in favor of. But they didn't. I know they didn't understand it and I understand about the disappointment and all of that, but I remember thinking, "First of all, it's done, it's not going to get undone, and let's look carefully and analyze where we are. And in this posture let's explain to these people what they bought, cause they don't know."

ROSS: Who came down that you first had contact with in terms of Remington Rand high management. You were saying, "Let's explain to them...,"

DRAKE: The first initiatives, that I recall, were quite within ERA, and I remember some meetings that involved Erv [Tomash] and Arnie Cohen, Jack Hill, Frank Mullaney, Bill Windget - there would have been a few others. We sort of became a little task force, self-appointed. The idea was to put together a presentation that would be taken to New York and presented to Remington Rand management. That presentation depicted the 1103 as a product, the 1101 as a product. Ironically - an absolutely trivial thing, but it was such a symptom - what really caught the interest of the people in New York was Deal Howard's bore hole camera, and another product or mechanism that we built under contract, which was a profitable ERA product - it had nothing to do with computers - called an antenna coupler.

ROSS: Arnie [Cohen] and I talked about that.

DRAKE: Yes. And that paid a lot of bills. That went into the 707. It was an aircraft servomechanism package of quite elegant design and, obviously, reliability. It was one of the few things that ever happened here where you really had a product in quality production mode so you could ship.

ROSS: Let me diverge for a second and follow up something that Arnold Cohen couldn't answer. Well, he actually proposed it as a question that he couldn't answer. Why didn't the antenna coupler get the same sort of promotion and PR attached to it when the 707 started making trans-Atlantic flights? Everyone else connected with their products that were on the planes. Any idea?

DRAKE: Yes. From Remington Rand's standpoint, their interest was in the computer business. And they didn't...

ROSS: They didn't want ERA...

DRAKE: ...it just didn't fit their overall viewpoint. Furthermore, it had already started to emerge - remember this union or deal came out of disagreement - that the antenna coupler was a moneymaker. It was enough of a money maker so what then they started being called St. Paul operations they were "in the black." Eckert-Mauchly, of course, was a financial disaster, and John's in New York and he and Bill are intensely competitive at this point. They just...

ROSS: No reconciling their...

DRAKE: ...no reconciling. And so Bill is now the guy who's running something called St. Paul and there just wasn't an opportunity missed to be sure that people understood that there was St. Paul and then there was Philadelphia. So, I think the strong push on profitability and solid business, and we pay our way and so on, and the fact that our line was very importantly the antenna coupler was kind of salt in the wound. Pretty soon, what you would think would

be normal, positive interests in promoting interesting, newsworthy, and important things would prevail. It became almost a symbol of difference and we could run a news release on the antenna coupler...

ROSS: So really I can take that further and ask you: Was Remington Rand aware that there was conflict over a good number of matters between Philadelphia and St. Paul?

DRAKE: I don't think they were. I don't think they were at all in the beginning. John Parker was, I think, the greatest salesman certainly I ever worked for and maybe one of the greatest salesman I ever met, and he was positive and charming when he wanted to be. When he wanted to do something, he had a great ability to charm the socks off of whoever was involved. I mean, he would somehow go into a rosy euphoric glow... There are some anecdotes that I'll share. He made a great impression on me. I learned an awful lot from him, in my view both how to and how not to, but so those were just opinions. Anyway, Univac was now John Parker in New York as far as Remington Rand was concerned. Remington Rand at that point does not understand, I don't think, at all the true nature of the relationship that existed at that time between John Parker and Bill Norris. Furthermore, John Parker did not understand at all what the circumstance was in Philadelphia, just totally naive and unaware of that.

ROSS: Unable to give them any guidance at all?

DRAKE: He just accepted what he was told and he believed it. And what he was told was that our problem was going to be what to do with all the money we were going to make. And so the Remington Rand senior management is really looking to John Parker to be their guy there now and he's experienced in all that stuff. John was not a retiring or modest guy; he certainly wasn't going to say, "I don't know what I'm doing." He wouldn't think that even. So it was the halt leading the blind. And it took a long time before the realities of all this began to emerge. They emerged because of mistakes and mounting losses and missed targets, and all the time there's this jab coming from St. Paul saying, "Gee, I don't know, we're not having any trouble, glad to report. It's a pleasure to be able to report that earnings are up."

ROSS: So you went to New York and...

DRAKE: Coming back to an earlier point, I thought that we ought to get on about making this go. The first part of that then was this kind of little group thing at ERA which was putting together a presentation to the Remington Rand management. It pleased John Parker a great deal, it pleased Bill Norris a great deal, and it certainly impressed the Remington Rand people. They were euphoric, "Boy oh boy, its even more than we thought."

ROSS: Now this is a different type of presentation than you made the first time you went to a trade fair. This was...

DRAKE: Entirely different.

ROSS: Scale models?

DRAKE: Scale models, slip charts, artist renderings of something called the 1103, something called the 1101, bullets, and there were very qualified presenters.

ROSS: And you were convinced that this was... Did the proposal and the presentation take up the matter that IBM was entering the field at this point? Had announced the 701 and...

DRAKE: No.

ROSS: ...and you had competitive...

DRAKE: Let's see, we didn't dwell on IBM. My recollection of all that is that we really were...

ROSS: Well, there was no need to, but I do remember they had announced...

DRAKE: And if you remember, IBM's entry into the large scale digital computer thing did lag and their stated policy was... I'm sure if you could talk candidly with people who were involved with the decision making process in IBM at that time, they really didn't think that there was any place to go.

TAPE 2/SIDE 1

The presentations were made in New York and we discussed how we were going to organize production between Philadelphia and St. Paul with John in New York and Bill running the St. Paul thing Bill had a pretty good strategy in his mind on how it ought to go and John in New York wanting to run it all but not really being in control of what he was trying to run. You can see that over time this is going to get to be not very efficient and pretty vicious and very expensive. Certainly, I don't think any of the people in St. Paul had any vision like that at that time at all - quite the reverse, it was positive. I had a phone call from Bill Norris shortly after that New York presentation was made in which he said that John Parker had called from New York and asked if he could borrow me for a couple of weeks. That the first Univac I that was sold for business application was being installed at Appliance Park in Louisville, Kentucky, and he just had a long phone conversation with a guy in charge of that down there...

ROSS: This was General Electric?

DRAKE: Yes. And Appliance Park was a new deal at that time. It was really state of the art for those days; a quite automated, major appliance manufacturing facility, all built from scratch. They cut the ribbon and it was state of the art.

ROSS: Is this about '54, 1954?

DRAKE: This would be '53.

ROSS: '53.

DRAKE: I got the message that they were installing the Univac I, which was a showcase deal and they were going to promote the hell out of it and so on. There were some things that John thought that I could do to help them in properly presenting this to their various constituencies, and so Bill said fine. It was fine with him if it was ok with me, and so he called to ask if I would go and I said sure.

ROSS: You're saying that GE would actually use this as part of a program within the whole...

DRAKE: It was symbolic of Appliance Park leadership including the world's first use of terms like giant brain.

ROSS: What I'm asking is whether other people besides GE people would visit it.

DRAKE: Yes.

ROSS: Yes. Okay. So it was essential to have someone on site.

DRAKE: As of this point I didn't have any idea what their ideas were.

ROSS: No.

DRAKE: But it came across, in short, as we wanted to help this customer and if we can do something to help him fine; that's part of our sales... We want to share with this. And that was the extent of that exchange. So I got on the airplane and showed up at Appliance Park and met a fellow named Roddy Osborne, who was the man who ordered that first giant brain to be applied to business. I didn't find a circumstance that was looking for somebody that might have an idea or two to help in the sales promotion program; I found an absolute disaster. The system wasn't there. Parts of it were there; the building was there, the glass walls were there, the drapes were there, the spotlights were there, the power was in. The Univac I mainframe sat there. The tape units were there and that's all that was there.



There was a pile of stuff in the middle of the room, a big pile of stuff, boxes and so on, and some friends who were the customer's engineers who were assigned there - you might know some of them who came from ERA. Roddy Osborne - I turned out to be very fond of him - was a hell of a guy. He got screwed by events for which he had really no control. He was a guy who was very right and who got totally misled, importantly by our company. Importantly also in that it really was totally new territory and so nobody intended to have it turn out the way that it did. So, talk about how events sort of take over more often than you think in ways that are totally unplanned.

I ended up moving my family to Louisville and I lived there for two years and ended up working for John Parker in that role and I was called something like Regional Representative or something like that. But basically my job, if I'd try to categorize it in hindsight was project coordinator or, as my friends at GE called me, the friendly local representative on the spot. It was a fabulous learning experience, and no one will ever know how -- it doesn't matter -- but no one will ever know how what an absolute near disaster involving millions of dollars and two or three hundred people directly. There were three parties to that translation. There was Univac, us, there was a customer, General Electric, and there were the consultants, who had signed on the Univac proposal and recommended the applications and sold the commitment to systems support - Arthur Anderson was the company.

ROSS: They were employed over and over again weren't they? Like...

DRAKE: They were there all the time.

ROSS: But I mean for other reasons, by Remington Rand.

DRAKE: Well during the...

ROSS: The reason I asked...

DRAKE: Remington Rand tried to and did sell some more UNIVACs while this was going on, but no one ever tried to do it the same way again, and Arthur Anderson never quite had the same role, and shouldn't have. That had not

been a sound approach. On the other hand, sure, money, time, perseverance and finally, like the airplane, finally flew. It wobbled and went 20 feet and it was supposed to go cross country three hours but it ultimately got applied and became efficient and became a tool that rightfully has its place in the history of all this.

We talk about Remington Rand's ineptness or not... Let's see, here's a giant, leadership, corporate customer -- a showcase operation for the whole world, here's the first large scale, electronic computer to ever be sold for business application, that's [Appliance Park] the spot for that, here's St. Paul, here's Philadelphia, here's John Parker, and here's the Norwalk management.

ROSS: Geographically separated...

DRAKE: Geographically separated...

ROSS: Philosophically?

DRAKE: Philosophically, no comprehension. Plenty of comprehension in St. Paul but that's quite different. Very supportive to me I was able to get over and over and over again help that organizationally or any other way was not practical and wouldn't have happened, but I just had... I knew where it was. In the process of getting the products out John would tell me over the phone that there wasn't any problem, and I would say, "John, look." He says, "I got a memo right here." I'm giving you a feel about where I was in my own personal awareness and development at that time. I was a very young man. The first UNIVAC I that I ever saw in my life was when I walked into that room at Appliance Park. I never saw a brochure, I was ready for a tour, this is it. A thing that was on fire was that our guy, John Parker in New York, does not understand that there's nothing other than a little squeak of oil and the wheel would quit squeaking--nothing major. The Remington people were out selling additional units when it has not yet been built, and he absolutely didn't believe that.

ROSS: Can you be more specific about the actual deficiencies or problems. It had no peripherals, the customer didn't

know...

DRAKE: The system can't function unless you can get information in and out of it.

ROSS: It had no input, output?

DRAKE: It had no input, output.

ROSS: Because the Navy had been using this to process information that...

DRAKE: The only way to get in and out of that machine at that time was with a typewriter, to put on a little tiny reel of tape...

ROSS: Oh, that's right, it was tape readers, that was the output wasn't it?

DRAKE: And how the Bureau of Standards or the Naval base really used those systems, I don't have any idea. Because the system was designed for its business applications, its major input was punched cards. And its output was also punched cards, not deemed to be very important, but it was one of the peripherals in the line. Of course, it was a tape processing machine, so it and the system all went on tape-to-card unit servos and then you had card-to-tape, tape-to-card, and a high-speed printer. None of those three major input-output peripherals - the card-to-tape, the tape-to-card, or the high-speed printer - were there. And you can't run without those, except you go play a little game. The programmers were trying to write the programs for a whole range of business applications -- payroll, inventory control, production scheduling...

ROSS: So in essence they couldn't debug it at all.

DRAKE: Just little pieces.

ROSS: Now I'm understanding your frustrations.

DRAKE: And this was all already like a year late, so you can imagine. So, in the meantime, huge amounts are being spent, there's all these people there -- they certainly aren't realizing any benefits, they're still having to run the tab room, and doing business as usual, and it was starting to be embarrassing, to them, too. There'd been a lot of publicity, just a very awkward thing. So, literally I'd have to say, "What's the problem," because I don't know, and I get an earful. So I call the guy I worked for, "Now John," and I say, "Gee." And I've got a little list of things which are, in hindsight, naive beyond belief, but that's what I think the problem is at that point. And John's amazed to hear that and he would inquire and would let me know. So I get back from him a, "Gee, the card to tape was due to ship on Wednesday, but there was a last minute change they feel that would enhance your liability if they put that in before they sent it and as long as its this late why we felt we ought to do that. Printer is slipped a little bit too; it'll be another couple of weeks. The tape-to-card is not terribly important, that's the last one to come, but the two key things are the card-to-tape and the prompter and here are the dates that they're going to be shipped, here's who's coming to install them." So I try to answer them [GE], "I've solved the problem. I've gotten the straight poop." Of course, neither of those things happened. So I called back to John and he didn't know they didn't happen. To make a long story short, I remember these meetings so well, I got called in by the GE Appliance Park manager, - he was a nice man - he was just at his wits end, and I've never been looked more directly in the eye in my life. He just said that, "Either this equipment is going to be here on this date or all of this stuff is going to be out in the middle of that street, and I'm not kidding you." Well, that was three or four months worth of this by the time he got to that point, and it just hadn't been any good. It was so mysterious because I had been given this specific information, and John is amazed. As this is going on, I'm starting to get phone calls... I also had a desk in GE and had a desk in the Remington Rand branch. I was a foreigner there because the tabulating machines part of Remington Rand was very hostile. They thought they ought to have the UNIVAC and then what's this guy John Parker doing with a new sales organization and all those guys in New York? It was another big fight that built up and it was not productive.

ROSS: They also thought they had to produce the computers or manufacture them as well?

DRAKE: Literally thought that was just part of their business. And they saw a duplicate sales organization, a lot of money, prestigious offices, all that.

ROSS: Completely understandable.

DRAKE: And so there's some more guys in the weeds. So I can go by and be welcomed into that sales office and have a desk and I ended up, because I did it all personally, in time making friends, and I got a lot of help from those people and I helped them. But as far as the administration of the organization of the company was concerned, that was a very local one on one level; the guy that ran the tab business was as much after John Parker as Bill Norris was which just added up the bad news, pumping it into Jim Rand and a guy named Art Rumbel, who was the executive vice president of Remington Rand in Norwalk.

ROSS: Was the big problem that ERA had been so used to servicing the customer, the Navy, who wanted them to succeed that delays, for example, would have been put up with?

DRAKE: See ERA had nothing to do with this.

ROSS: Oh, where was the holdup?

DRAKE: This particular GE Univac mess was Eckert-Mauchly in Philadelphia, John Parker in New York...

ROSS: Oh, so Eckert-Mauchly was building the...

DRAKE: Univac.

ROSS: Oh, I see. Oh, I get it, okay. I remember.

DRAKE: I touched on the nature of the approach of things, the thorough rugged designers that were at ERA, Eckert-Mauchly was exactly opposite. If you ever went into a UNIVAC, you wouldn't believe it -- you talk about a rats' nest of wires. Thirteen thousand vacuum tubes...

ROSS: Yes.

DRAKE: Anyway.

ROSS: My mistake was I kept thinking of the 1101, I'm sorry.

DRAKE: So St. Paul ERA is going. They said all along that thing would never work and except for personal access and support... St. Paul's in the black, "Are you guys having trouble?" And to the guys at Philadelphia, those were all details; meantime they got a new circuit that is going to be ten times as fast. The guys at EMCC were all working on that. They were a bunch of liars in a way. They were totally irresponsible in the sense of any feeling of commitment to the company's delivery program. Well, so, in parallel with the trouble and a chat back and forth with John, I started to get direct communications from Remington Rand top management. I actually got two or three phone calls from Jim Rand (whom I'd never met) and I started to get two to three times a week calls from Art Rumble, who was the power man in Remington Rand and a consummate politician and then again another ruthless man.

It was awfully hard to know what to do in that circumstance. I shouldn't have been talking to him if there was any kind of organizational structure at all. On the other hand, I'm not going to hang up on him. So I tried to present Harry [Rumbles?] some kind of a picture. But I finally, just on my own, bought an airplane ticket and I flew to Philadelphia and went to Eckert-Mauchly without an appointment and introduced myself, told them why I was there, and said I would appreciate a chance to see the card-to-tape converter and the high speed printer that are now scheduled to be delivered to Appliance Park on this date. I showed them John Parker's letter that I had. I found a card to tape converter that was spread all over a ping pong table...

ROSS: An actual ping pong table?

DRAKE: Literally, a big piece of plywood. And I found parts of the high-speed printer, and the project engineers, Earl Masterson was the guy who was in charge of the high speed printer, who is in this area at this point. He is a very distinguished guy, super mechanical engineer, and an honest man, and a similar guy who was in the card-to-tape thing, a guy I didn't happen to like as well. Anyway, they both look at me like I am crazy, "I don't know where in the hell you got any dates like that. Hell, this isn't going to be ready for a year from now." So I went from there to New York and said, "John, here's what I've done and I don't know what to do," and told him what I found. And his reaction to that was simply not to believe it, he said, "You're wrong." And, into the file drawer, he shows me that he's got this correspondence -- that supports what he has been telling me all this time. I said, "John it isn't true. I was just there. You go look." Without going on too much more about this, when I say that the management of Remington Rand was inept, they were inept. There is no other word for it. They were a very busy, politically vicious organization, in that sense, shooting one another off at the pass. Certainly not the most rudimentary way of trying to take hold of what I would consider to be a really normal approach to a major and important part of their business and then organizationally just coming at it from about nine different ways at once and each one looking for personal advantage by using bad news to discredit somebody else and win some skirmish of that kind. Full of that, just full of it. Personally, then, that was a tremendous and interesting and fascinating, exciting, challenging, frustrating, but very individualizing kind of experience - again, an incredible job. It finally worked. I felt good about that; I felt very strong personal identification with the fact that the installation finally did perform and the many times that it just about flew apart, it didn't, and I have a feeling that I had something to do with that.

ROSS: Two years instead of two weeks.

DRAKE: Yes, like that. Well, in the meantime, I'm out in marketing and marketing support, and as the claims came down a little bit then I started having the opportunity to all of a sudden people starting talking about territory and I started to go call on companies and my territory got expanded from Louisville; I also then was assigned Pittsburgh,

where there was a UNIVAC I, the second one, going in at U.S. Steel, a third one going in at Westinghouse, another one going at U.S. Steel up at Gary, Pittsburgh Plate Glass another branch office there, same thing -- gotta make friends, they didn't want any part of me for awhile. The U.S. Steel one went better because of something we learned at Appliance Park, and one of them was you don't go hire somebody to do it for you, because you have got to do it.

ROSS: Well, if you had an expanding territory you must have had an expanding marketing force then. Who else was marketing?

DRAKE: Let's see, that's not true.

ROSS: Oh?

DRAKE: The UNIVAC I marketing effort was based in New York City, headed by John Parker. The Univac sales manager, if you will, was a fellow named Luther Harr...

ROSS: Spelled Harr?

DRAKE: Two r's, yes. ...in company with a very dedicated technical guy, Herb Mitchell, Dr. Herbert Mitchell, who was a programmer. And the two of them, and John Cart, the three of them were a whirlwind of furious energy and they tried to cover the whole country. There was a support group -- I don't know if they ended up being a part of that. I had an office there too on the second floor, and that's where the people were wined and dined. That was where Herb went out and put on the seminars as technical expert, and we had training programs to teach UNIVAC coding and programming was accomplished at the facilities there. Two floors away is the tab department who made an alliance with Bill Norris out of St. Paul, and so there came the enthusiasm for what soon became the File computer.



ROSS: I never knew that was the origin of that.

DRAKE: That was conceived by the tab people in Remington Rand and...

ROSS: Now that's intriguing.

DRAKE: Bill, you know, he took the position, "Are you the people for that? Fine we have some ideas." We had some interesting concepts. It was to have much larger random access memory, in terms of multiple drums. It was to have the concept of, I'd almost say, multiple terminals, at this point --multiple input output stations. A lot of systems things would come more logically from the minds of tabulating machines people than would come from people who were coming out of the labs with massive electronic...

ROSS: Special purpose.

DRAKE: Yes, right. So, that's what happened during that time. I got more and more into the UNIVAC I business, more and more into New York, got promoted, again. Then a big thing happened, that being about 19--, lets see, '57, '56, maybe '56. I couldn't possibly analyze what all of the political forces that finally came into a kind of explosive action -- just exactly who was where, what, and why. But, all of a sudden I got a phone call from Bill Norris asking me to meet him in New York, as did Erv Tomash - I've left Erv out of the story. We were doing the same thing. Erv was out on the West Coast, sales manager for the 1103 program. We stayed very, very close friends all through the years, and we were seeing this from, in many ways, the same vantage point and in some ways from different vantage points. So I remember showing up in New York at Bill's request and seeing Erv was there and...

ROSS: Was [Arnold] Ryden there?

DRAKE: No, not yet. And Bill asked us over to the hotel room, not the office, and said, "Look, I know you guys would understand a lot why there is a very fundamental change that's going to be implemented tomorrow," or

something like that. He said, "I'm going to be the Vice President for Univac and replace John Parker. You're to be a part of this. You people, who he knows and can trust and are out in the reality of the marketplaces that are of concern. I want very much to have you participate very closely in the implementation of this program. We'll finally get this son-of-a-bitch right."

ROSS: He was impatient?

DRAKE: He was right in the sense that it was messed up and he certainly was pursuing a personal conviction that he had maintained for a long time and he was going to prevail.

TAPE 2/SIDE 2

Obviously when that was announced you have a terrible situation for a little while. First of all, I had worked very closely with John Parker, and with Luther Harr and with Herb Mitchell; we were allies in the sense of the mission and the way that it was constituted. And I certainly had a long relationship with Bill, and he had helped a lot in things we were able to do sometimes in making it work without any particular reason for him to do that. My own nature would have been to go on at that entirely differently, but it was bang, and it was just ego-shattering for some people. I personally would think it did not have to have been so abrupt, but on the other hand, maybe that's the best way; I don't know. In any event, once that was announced, the whole thing shatters, and you've got a whole field out there, you've got all the customers who have worked with these people and so on, and all of a sudden there's a new shooter -- that guy from St. Paul, who they don't know. Obviously, its been very abrupt, and how the hell are you going to continue to do business? All those things come up.

So Bill had to move fast, and he was prepared to do that. He moved in, there was a little plant, and we worked hard at it and so on. It lasted less than two weeks, and the politics weren't over yet, as it turned out. There were enough votes to get Bill into that position, but they must have been dicey, and other forces prevailed. And, basically, the job was taken away, and it was back to St. Paul. At that point, there was no way to put the old thing back, and there was

no new thing, just a mess. And so Bill said, "Why don't you come back to St. Paul? I've got several things I'd like you to do. This is all going to get sorted out yet," and so I did. Erwin went around once on that and said, "No," and he quit and became involved with Telemeter Magnetics out on the West coast and started to become an entrepreneur at that point in time. I went back to St. Paul and I was an assistant to Bill.

He gave me a task to locate -- pick a location, something to do - pick a location... He postulated a new R & D facility that would be run from St. Paul, an ERA like enterprise. And that thing was growing, and we needed to have a facility that would complement the one here, start small, but it would be in a warm weather part of the country. We'd have something going at both ways, something for everybody and so on. And so I got the job to analyze that and to go do a search and find one and work on a business plan for it and try to identify a couple of team members and we would have the opportunity to do those things and go start it and run it. That seems so clear and nice and new things to do that we were broadening beyond the kinds of things that have happened over those other years. So I went into that with great enthusiasm and we picked Tucson, Arizona. We leased a building, our little key team from here started to put together the business plan and were ready to go.

ROSS: I was never aware of any of this.

DRAKE: Yes, the reason was because it never happened.

ROSS: No, I assume that. But I was never aware...

DRAKE: It got that far. And one day a guy named Thornton Frye - I'd seen him a couple of times before, came into town from New York - from Remington Rand. He was always called a consultant, Dr. Thornton Frye. And he just came in and he basically had a hell of a stormy meeting and said there wasn't going to be any new facility. Certain programs that had been assigned to St. Paul were going to be moved; Bill would report to, I don't remember who it was, but in the interim you'll report to me. It was just a devastating head-on assault on what was home base here, if you want to look at it that way. Well, if you think of all of - I've sort of shared this from one view point, and you

would find a comparable view of this mess, a long time mess, viewed differently by different people depending on where they were, but I would guess with fair unanimity that it would be awfully hard to explain on any rational basis at all. And to see IBM coming into the ascendancy -- they had all the time in the world and just plain took the ball back without any trouble at all. And then to see the home base, which was kind of the one rational part of the whole thing, from this view point anyway, and now that's somewhere the politics that worked and that's going to get taken out of contention here. That was the circumstance. That's kind of where it was when I was back in New York on something, and Bud Ryden was there, too, in town, and I hadn't seen or talked with him for a long time. We said, "Let's have lunch." He had worked for Honeywell and for a bank or something and he was sort of on his own at that point. Basically he was saying, "Gee, I'm not in the middle of it," but he knew a number of other people, "this must be an awfully difficult thing," and he had heard that some of the people were considering leaving. Bud perceived that these people, and he had in mind that the St. Paul people one way or another, very likely were just going to scatter to the winds, that this is probably as far as the loyalty and the hope and the up and down thing is going to work, and if Bill was going to get emasculated here why there's no more rallying point and so that would kind of be it. And he said, "Gee, that didn't make any sense; there's an awful lot of value and experience and it's timely." He's the Harvard Business School kind of a guy and so he thinks in terms of how you start companies and plans and things that were totally out of, I think, anybody's experience really. And he planted a seed on that day. I was only in New York for a short time; I was coming back here. I said, "I'll see when I get back to Minneapolis I don't know what I think about it. I didn't even know how the hell you'd even do it, but I agree with you, and it sure seems that there's an awful lot here that should just not be fragmented if there's some other way." And he talked to Frank and he talked to Bill and he talked to Bill Keye, Jim Miles, a lot of guys. A dozen maybe, in that same way. We began to talk to one another, skeptically, and then a little less skeptically, and then when Thornton Frye came again with sledgehammers, the formation of CDC was the result. And so the idea that Bud had, and he wrote it down, "Here's how you can finance it and..."

ROSS: Oh, he did? Arnie told me, and I was just going to ask you, that part of the prospectus had been written up on your kitchen table.

DRAKE: Yes, we did. And once we decided to go, to try to do this, the key thing was whether it could be financed. Nobody had any money, anything at all comparable to what it would take to do that. Bud's idea was that we would raise the money by selling shares to the public, and it's easy too. 600,000 shares times one dollar is \$600,000 and you see that's what we need, so obviously, it can be done and yet nobody was really, could be, all that sure. I think I was interested, very much interested, in the idea, and I was probably... I don't know why, but anyway, I said, "Well, somebody needs to be first. We can't do this inside of Remington Rand or inside Univac, it's not right, so I'm going to resign and..."

ROSS: Become the first employee.

DRAKE: ...and I'll become the first one who goes out to try to work in some organized way to lead an effort and join with Bud in leading an effort to raise the \$600,000 and we'll try to do it. And finally that's what happened, so we did something that hadn't been done before and raised the money and they rented us a space in the McGill building and the initial team came on board and went to work.

ROSS: Why don't we pick up from there next time. It's a dynamic enough tale that we ought to approach it when we're fresh. Before we stop, give me a wrap up of the early ERA.

DRAKE: Those experiences all the way from being an ERA employee, being an employee in that organization and the reality of what that organization was, and the highly individual things that happened and were allowed to happen and where individual's instincts, interests, energies, visions, could be pursued to a degree that is not normal. Somehow, out of all that, I think, is why so many came out of that experience who have functioned in many instances in an amazing way as effective individuals. And you find this abhorrence of large bureaucratic methods, just anything is better than that almost. Just almost won't engage with it intellectually, it's just forget it. And that leads to, I think then, to some of the entrepreneurial things that followed, that have taken place--CDC being the first evidence of that and many other things including this one [Data Card].

TAPE 3/SIDE 1

ROSS: How did you go about planning the beginnings and objectives for CDC?

DRAKE: The initial concept of a new company to be a vehicle for the talent group that had worked together in Univac and earlier days in ERA, the vehicle for going forward - obviously the decision had been largely made by these individuals to leave the Univac organization. So, the idea of not just going out and individually seeking other employment, which everybody could have done and in a traditional way, but the idea of examining the possibility of staying together and working together by forming a new company was the first step, and that, as I indicated to you earlier I think, was originally the idea of Arnold Ryden, a Harvard Business School MBA graduate, different from the rest of us in that regard. He had a different educational background and terms like business plan and cash flows and balance sheets and alternative methods of financing were at least academically familiar to him and represented an area of real interest on his part. So he was the guy who, in my memory, introduced this idea of forming a new company; as a result of that some of the individuals who were distressed and who were considering career changes began to think seriously about that idea.

We got together and talked about it, several times, and there evolved then a business plan for this hypothetical new company which was simply reduced to paper in a readable, logical, sequential way, a written plan, which explained what the objective of the company would be, what areas of business it would expect to pursue, and what kinds of people were required in order to pursue these business objectives. We went very quickly amongst the individuals then as to who would be doing what - very specifically went from general to specific fast, you can imagine, and each of us as we thought about it had shared with one another and had come to an understanding of what our individual jobs would be once this company got started. And the result of the prose business plan then, of course, lead to the translation of that plan into money terms, budgets. What's the magnitude of the investment required; and what is the application of these funds? And parallel to that the development of sales and earning's forecasts and cash flow requirements that flowed from tracing the expected time tables, objectives, sales, and earning's results of executing the plan.

ROSS: You said that this was all new to you.

DRAKE: Right.

ROSS: Was it a scary proposition or exciting?

DRAKE: Fascinating. A little bit unreal. And it just -- that tests -- we talked earlier about these kind of assumptions that we sort of -- we think we understand something, we're comfortable with it, we've steamed through life and it's always there and so on, but until you really, for one reason or another, are really provoked or forced to poking into it, you don't really understand it. You think you do, but you don't. And nothing like having to try to do it in order to begin to think clearly and specifically about what are the components that are involved here and to understand in a real way then the process.

One of the facets of the group or the facts of the group, besides being somewhat naive and pretty hard to really tell what's real and what isn't in this forwarding looking way, it was also a common factor that nobody had any money. So the first reaction is, "Gee, this is really interesting and so on but, so what? Where's the dough going to come from? I don't have any, do you guys?" We added it all together and we had 15 [thousand dollars] or something and that wasn't obviously going to do much. So we had to get that out of the way and jump with some degree of conviction, to the idea that Bud proposed, which was that it would be possible to finance this new company from a zero start, with no company, no track record, no products, no nothing, except the plan through the sale of shares to the public. And to the best of my knowledge that was, if not the first time, an almost first time effort at such an approach.

ROSS: Certainly within the computing industry.

DRAKE: Yes. And when we say public sale now we're not just talking about going out and selling some stock to

some individuals, that's been done many times before, but the idea of an underwriting, a broad underwriting to a broad, a potentially broad, audience, and within the laws and the regulations and the credibility of society as it might look at that. We didn't have any real appreciation of how really unusual this idea was until we got into it. We just accepted that most people buy shares in a lot of publicly owned companies so that's okay so let's go do that. Because that was the swing decision, the rest of the plan had been participated in, was shared and with enthusiasm with the individuals who were going to go forth and do this. The one big unknown then that was absolutely go-or-no-go was: is it true? Can we raise \$600,000 through a public underwriting, basically from a plant and a commitment from a few people, some biographies? Those were the assets really, they were...

ROSS: That's right.

DRAKE: The experienced team as individuals, the credibility they might have from prior work experience and so on, and the judgement of the business plans: what is it, is it promising, has it got a chance, is it sure fire, what is it?

ROSS: Describe for me a little bit the plan itself, for example, do documents exist...

DRAKE: Yes.

ROSS: In whose possession would they be?

DRAKE: The only copy of the -- I'll just call it the book...

ROSS: The so called prospectus.

DRAKE: Yes. The only copy that I have seen in recent years Bud has.

ROSS: What were the individual responsibilities, how were they metered out? And who were the individuals, other



than you and Ryden and Norris.

DRAKE: Right. The initial job assignments, if you will or allocations or functions, that individuals somewhat performed, Bill Norris was clearly to be the CEO and President. Bud was to be a chief financial officer of the company, vice president of finance. My job was to be director of marketing, and everybody else was going to be developmental engineer or something related to that; there were people who knew something about manufacturing obviously, but the task was--nothing to build yet, so it was basically developmental engineering.

ROSS: Who were some of those people?

DRAKE: Let's see, key people in that group were Frank Mullaney...

ROSS: Yes.

DRAKE: ... Seymour Cray certainly, Bill Keye, who is still with Control Data, Bob Erickson, who is retired and lives out in Phoenix, Howard Schekels also out in Phoenix, Pete Zimmer, who's around town here, Bob Kisch, who is around town here, Arnold Ryden, and myself.

ROSS: Anyone other than Ryden who came from the outside?

DRAKE: No. And even Bud...

ROSS: That's odd as well.

DRAKE: ...yes. Even Bud was at ERA...

ROSS: That's right, for a time.

DRAKE: ...for a time, so he wouldn't have known about this group, I don't think, except that for some reason he was alert to circumstance and provoked this idea.

ROSS: Were any of those that you've mentioned, or ones that you haven't mentioned, people who had left ERA to go to Remington Rand prior to the acquisition of ERA by Remington Rand? In '47 a good deal of people...

DRAKE: Yes, no those guys, the ones I remember there, were Bob Sorenson, and Cliff Helms, Hugh Duncan.

ROSS: None of them shared your dissatisfaction with the organization?

DRAKE: The communication just disappeared. I don't know what they thought.

ROSS: Yes.

DRAKE: They had moved away and had a different life and they certainly didn't have -- they were not involved in the circumstance the way that people were here; they had different roles already.

ROSS: All right, let's return to the business plan itself. What were some of the objectives?

DRAKE: Let's see. We had identified the computer industry, digital computer industry, as the major opportunity area and we postulated vaguely some product ideas, including a new medium or large scale digital computer, the idea of some smaller ones, the idea of some accessory machines. We envisioned, for example, something that many, many years later turned out to be a point-of-sales device. We envisioned something called a production data recorder which would be a terminal like idea that we conceived of that would be in a machine tool array floor to record, somewhat automatically and somewhat with manual input, basic production data the result of which would turn out to affect things like payroll and inventory and...

ROSS: And probably parameter control as well of actual tooling.

DRAKE: Yes. We envisioned an automatic readout gasoline pump which are starting to be around in various ways. Some of these things were really early concepts, not at all in accordance with our ideas in terms of where they stood in terms of reality and economic feasibility at that time; in fact over a long period of time they have turned out to be fundamentally good ideas that are one way or another in use today. We were very, very naive then in our judgments as to where these kind of good product ideas fit in terms of reality.

ROSS: Which reality? Already existing products, or...

DRAKE: No, the fact it's...

ROSS: Production capabilities?

DRAKE: ... and the fact that just because you can do it, because of the technology you can make a machine that can do that and obviously that would be desirable because look at all the good things that would come from it, we didn't appreciate the tremendous inertia and interactive nature of the systems that are out in the world and where it doesn't matter if you can do this because it's got to be...

ROSS: Integrated.

DRAKE: Integrated. We're not in a position to change the banking systems and if we have a great product idea that does a lot of good things that all you have to do is change all the banking systems in order to use it, the odds of getting too far with it in that point of time are pretty slim. The one area that was most real in the whole thing, then, was the one that you'd expect, that's just a direct extension of earlier efforts at Univac and ERA before, and that's the development of a new large scale computer, the digital computer which was a success. And that is the product that ultimately launched the company.

ROSS: In a product market, however, that you'd always wanted to tap.

DRAKE: Yes. I personally was really hot to do that, and that enthusiasm was shared in various degrees of interest, "Absolutely fine, if that works fine, who cares?" That was really an individual... Another one of the pioneers I should mention who was in the group was Jim Miles who is around this area too. I keep thinking about that, I guess I haven't named everybody.

ROSS: The products that you've described were not just uncommon but reflect almost a philosophy of trying to cut out a market for yourself.

DRAKE: Yes, to take this technology base which we really felt strongly about, and envisioned, new and complementary in a way applications were we could do jobs, tasks that were being done less effectively in our view, by applying this technology to a new and better way to do the jobs. So it was truly innovative from an application standpoint. It was market oriented, and that was all right, but pretty far off target in terms... For example, I remember one day making a presentation to Chrysler Corporation - this is again a part of this kind of naive...this lack of appreciation of what the real world was. I had corresponded with them, and we had some brochures and so on, and this happened to be a session that related to the production data recorder. We had established a rendering and we had decided what the components were and what the functions were and we could describe this device accurately and with a good feel for its costs and how it would function and so on. That part was all right. And so I was making a very high level sales call, that's what it would amount to at that point, invited by the vice president of manufacturing of a major Chrysler operation. I was talking to 15 guys who run that deal and who were involved in manufacturing, and we had a fascinating discussion, I thought. I remember feeling very good, "Gee, this is a real turn on." Good back and forth, good questions. I had answers to a lot of them; I felt pretty good about it until we got right toward the end of the meeting. And a guy who was really quite kindly, leader of the group, said thank you and most interesting ideas and some really good ideas here and so on, but he said, "Could I ask you a few other questions?" He said, "What provision do you have in your unit here to seal the card input slot, which it had, in a

fashion that would eliminate someone pouring metal filings in that slot. And do you have a method to armor the cables so that people will not be able to cut the cable in two?"

ROSS: The work place realities!

DRAKE: Never in my wildest imagination did I have any feel at all for the environment, the adversarial environment on the manufacturing floor of an automobile company. I didn't give any thought to those things at all. My reaction was, a guy did that you fire him. That was naive too.

ROSS: Someone who we haven't mentioned is Erwin Tomash, did...

DRAKE: Erwin was not a part of the forming of Control Data. He had already left the company. As I indicated when we were still within the Univac organization, Erv had basically taken on the assignment of marketing the 1103 computer system, large scale scientific computers...

ROSS: That's right.

DRAKE: ... and he was, I think it was, West Coast sales manager or something, and that was during the same time I was at Louisville.

ROSS: How did he -- he did get hooked up with CDC didn't he?

DRAKE: No.

ROSS: Oh, I see.

DRAKE: No. When he left he joined a small company out in Los Angeles called Tele meter Magnetics, which was a

company owned by Paramount Pictures and was really working at the forefront of what became the finite core technology. He was president of that and built it for a number of years until one day Paramount said, "Gee, we've got some news for you, we've just sold the company to Ampex," and he gave that a try for a little while, but they didn't do it very well, certainly in terms of...no sensitivity at all for the people involved. And after a few months of that Erv said, "Not for me," and he just left, and many others did at that time.

This all comes together at a later point--Midwest Tech related thing, but one of our investments at Midwest Tech was in a company called the Telex Company and we had started a new products division, which was aimed at peripheral, computer peripheral, products, electrical-mechanical stuff. The major product development area was concerned with disk files in an early time and the secondary one was high-speed printers. It was killing us, the costs of the developments were beyond, really, the capacity of Telex to fund it. And we had limited expertise in that area anyway. So here's Erv and a team of guys who have left an established enterprise with a lot of background and a lot of understanding of the product and the product area, were looking for something else to do, and so we came together again. Erv formed Dataproducts Corporation, merged basically with the systems division is what we call it, part of Telex, which is the computer peripheral part. That's where the products came into Dataproducts. We spun, in essence, the bulk of the ownership of that division off to the shareholders of Telex, who now became shareholders -- still were shareholders of Telex. But their ownership represented ownership in what had been the systems division and was now really shares in a new corporation, Dataproducts Corporation, which Erv was the head, and that's a whole other story.

ROSS: Yes. We'll probably want to return to that. That makes those chains of events a lot clearer to me. Let's go back to the capitalization of CDC.

DRAKE: Yes. The 600 [thousand]. That's what came out of our business plan as our requirement. We proposed then to sell 600,000 shares of common stock at a dollar a share to the public. In order to do that, we needed to get the approval of the State Securities Commission of the State of Minnesota. It was our intent to sell the shares only to residents of the state of Minnesota and that meant we were exempt from certain SEC registration requirements and so

on--a much simpler process. I left then the employ of Univac first, and my assignment was to accomplish this financing or at least get it far enough along so that that big question mark, can you or can't you...

ROSS: The other ones would then leave?

DRAKE: Exactly. Bud was not in the company, so he was already on the outside, and the two of us then worked very closely together to accomplish the financing.

ROSS: Were the Rem-Rand people aware that you were doing this, or excuse me, the Sperry-Rand people?

DRAKE: Yes, they were aware that I had left, they -- they being the management in New York and so on, I think, were not aware at all that there was a program underway to form a company at that point. I don't think that was there.

ROSS: So the decentralized form of organization at that time helped you.

DRAKE: Probably.

ROSS: Because otherwise you...

DRAKE: However it was -- I don't know what would have happened. It wasn't very long after we really got... Once we had the money it was microseconds before we got hit with a lawsuit from Sperry charging all kinds of terrible things. I know from talking with people who were involved with it in the reflection had softened, a less emotional viewpoint from something that's a long time ago, that as it appeared it was clearly thought of as harassment and an effort to squash this thing before it gets going.

ROSS: And you predicted that. Were you aware that that was something you'd have to contend with?

DRAKE: That never crossed my mind. I think maybe some others did, I didn't...

ROSS: So none of the company objectives as you set them out originally incorporated any form of protection against.

DRAKE: No, we had a very high, I'd say moral, perception. We talked actively about for god's sake don't anybody take any drawings, don't do anything here that would warrant such action. But companies don't own people and of course the feeling was very strong that if ever there was an instance where individuals had poured 250% of themselves into an effort to try to make it go we had a lot of self gratifying feelings of having worked awfully hard and gone more than the last mile. So it was not hard to make the break in that sense.

Raising the 600,000 dollars turned out to be a tremendous adventure, because first of all, I guess it would be a challenge enough in its own right anyway just the nature of it. But it was complicated by the fact that it was unprecedented. So I remember the first meeting with the State Securities Commissioner and some of his aides. We went down with our notebook and had a conversation just like this and we wanted to follow whatever the procedure was and were there for advice, to register properly the sale of 600,000 shares of common stock in this new company which is in the book at a dollar a share to citizens in the state of Minnesota. I remember the gentleman's name, he was Mr. Hull, I got a chance to talk to him some years later and I know he shared with me then what their thoughts were at the time, which they weren't able to do at the time. And to him and to the people there this idea was absolutely incredible. They weren't thinking about the law -- but over and over again they'd say, "But you don't have any products, you don't have any plant, you don't have any machines, you don't have any customers, you don't have any money. And you want to sell stock in -- in what?" "In this company that we have formed. Here are the articles of... by-laws. Here's our business plan, that's what we want to sell the shares in. We buy some ourselves to the limit of our ability and go."

Well, it took quite a while, a lot of meetings, and we never got turned down and it was always the same kind of a thing, "Again explain this one more time. Do you really think anybody is gonna...?" He was really sort of kind of trying to counsel us I think in that. "You seem like nicer people than that. And obviously you don't know what



you're doing." But of course we thought we did and so we, not too knowingly as it was going on, we were very perseverant, we kept coming back, and they kept saying, "Yes? And what else do you need to know," and finally I remember the meeting where Mr. Hull said, "Okay, we aren't able to give you a full registration at this point but here's what we're prepared to do." He gave us a form, he said, "Here is a subscription form that you need to use, use this form," and it basically pointed out that this was an unusual and very likely highly risky affair and the individual who signed it had to say that they had had a chance to read and had read and had had explained to them the nature of the business and they realized that there are no assets and if this has any future its all to come. There was nothing you can base any value on now. "So you go get people to sign up for 600,000 shares of stock using that procedure and using this form and then you bring those forms back to us and we'll agree that you can go ahead and sell shares."

TAPE 3/SIDE 2

DRAKE: So, we went away to do that, and several weeks went by. Well, I was calling people and I was having coffee meetings in the morning and lunch meetings and afternoon coffee meetings, and I didn't have one single order of stock. It was a lot of conversation. I got to go home and talk to the wife. A lot of uncertainty. Who was I talking to? I was talking to people just like us. The Piper Jaffrey's of the world and so on turned it down flat. So it didn't take long at all. It was really a solicitation of one on one with regular people, individuals. I'd tear all over and I'd work like hell and by the time I started at breakfast and then finished with a ten-o'clock meeting in somebody's house at night I'd maybe get 6 or 8 people and then I'd go back again and get more questions and so on. It started to get kind of discouraging. And then one evening, it was ten-o'clock at a home with both the husband and wife there and so on two of them looked at me and said, "Gee, we'd like to subscribe, a couple thousand shares or something, couple thousand dollars," they signed the form, and that was the first order, and I thought, gee, that's pretty exciting.

ROSS: Do you remember who that was?

DRAKE: I do, but I -- the person who was the first subscriber to this day doesn't know it, and I've never told anyone who that was.

ROSS: Is there any reason not to?

DRAKE: I think so...

ROSS: Okay.

DRAKE: Yes.

ROSS: That's fine.

DRAKE: But now it's like... A lot of people [thought they] were and why not? It was a courageous step for all of them. But psychologically, that is like the first order always, I'm sure that changed me, and I became more confident and hit the day with a head of steam, and we got a second one and a third one, but it was going to be a long time before we had 600,000 shares at that rate. So Bud and I got our heads together and we said, "Gee, this isn't enough, we've got to figure out something to speed this up," and we conceived of the idea of inviting a dozen people over to the house in the evening and make one pitch to twelve people and recognize maybe there'd be a little interaction and so on - a sort of a Tupperware...

ROSS: I was just going to say that.

DRAKE: Didn't know about Tupperware at that time but it's a method that's certainly been used successfully. And...

ROSS: So, over the kitchen table you were...

DRAKE: In the living room actually, we had... People came, and at the end of our pitch at that time we'd say,

"Progress is coming along, we've got some subscribers and things look good." At the end of that first meeting in the living room another one of the guys who ultimately became part of the founding group, an engineer who joined the company early on but who, I don't know how or why had known him all the time, one way or another he obviously was in better financial shape than any of the rest of us. And he just stood up and said, "Gee, this is interesting, I think it's a terrific idea," and I think he subscribed for 15,000 shares or something was it 20,000 shares? A big hunk by our standards. No sooner had he done that than two other guys said, "Gee, that's more than I want to do but I really want to participate," so we maybe got four or five of those twelve signed up including one sizeable one. And our plan was to hold a series of these meetings, so we had people invited to come to the next night, twelve again, except the next night about 30 people came. And it didn't take anywhere near as long and...

ROSS: You didn't need to go through your whole spiel probably.

DRAKE: We had to do what we did legally, but this long drawn out "How about this, how about that" part of that just sort of compressed, and there was a different thing going. And the third night, it was an unbelievable experience. Again we only invited twelve people. There were cars parked outside four blocks in every direction. We didn't have a great big house, the phone was ringing, my wife came and tapped me on the shoulder, house is full of people, and said, "Do you know how many people are out in the living room?" I said, "No." She said, "Well, I got to 50 and there's more, the doorbell is ringing and there..."

ROSS: That's astounding.

DRAKE: Just amazing.

ROSS: So how long after this new...

DRAKE: That turned the whole thing and within another couple of days, we had about 600,000 shares subscribed but over a million, a million and a quarter and we were shutting it off. One of my neighbors came over the night of the traffic jam out there and said, "Gee Bill, I can see you're very busy and I don't have any idea of what you're selling but

I want some." Well you know, he got some, and just to kind of make a little point about what happens when it works. For most everyone who subscribed to those shares, the net effect of it over time was to totally change their lives. My neighbor was a guy who traveled and sold small tools to garages and filling stations and so on, and he became a millionaire and began to live differently and so on over time. I still run into... I continue to run into people, many of whom I haven't seen for years and years and years, who go back and identify with that experience and it's a tremendously...you could use the word satisfying, it sure as that because it was happy. But somehow...

ROSS: You can share in their gratitude.

DRAKE: Yes, sort of like that.

ROSS: What did the Security and Exchange Commission -- or excuse me the State Security Commission...

DRAKE: Back down to Mr. Hull not with 600,000 but a million two hundred and some thousand signed up and the phone still ringing and so on, and those guys were absolutely nonplused and they just gave up. "Okay, you've got to do one more thing," he said, "and then you can go ahead and sell it." And they gave us another form. They said, "When you take their money, if they give it to you..."

ROSS: They were still skeptical?

DRAKE: "...when you take their money, they need to sign this form," and it was just a tighter version that says, you know, that, "Basically I'm crazy but I agree." And our situation at that point of course is the difference when you're oversold. We had to allocate everybody back, which we did proportionately and now the psychology is one of scarcity rather than who the hell would do this. Although it took a long time, it seemed like forever to get going, once we got the pendulum swung gee it all came to a blazing finale in just a very few days. So we went down and rented the office space down at Park Avenue and put in a telephone and bought a typewriter, all those things. It's an interesting thing to think through. It happens to everyone who goes through this I'm sure. Here's the concept and

you've got comfortable with that and the idea that the basis to form a company and so on you got comfortable with and you got it down, but then there comes a day when you got a key in the door and now, "What are we going to do? What are we going to do first, who is going to do that, and so on?" So it kind of came a piece at a time. Within a month then we had I suppose ten, twelve people coming to work who had started to work on things. So that's how the 600,000 dollars was raised, and that whole thing became a model, which stimulated a number of other new ventures, things that Technology Company in venture things that said, "Gee, that's how to do it and..."

ROSS: Did others consult you?

DRAKE: Yes, they called up from all over, people called up from all over the country, "Is it true what I hear, a rumor?" Something was in... A few things showed up in the papers, the Wall Street Journal and other places and kind of cryptic and short, and then quite a bit of coverage in the papers here. They got interested in it and for several years we had an awful lot of press, just take something over to the paper and if not they'd come up and ask you what happened today, it was a fascinating kind of a thing.

ROSS: What were your first products? And how soon did they come?

DRAKE: Didn't come very soon. Matter of fact, my definition of product is something that you've sold to somebody and we didn't do well at all in that regard. What we did was as a -- again we were -- except for some sponsored work from the Navy which was really a holdover from old days and was helping on the development of the new computer and that's a long term development thing. One of the real practical handicaps in selling something to somebody was that again the fact that it's not established and we can't show them one and we can't show them the factory and the balance sheet is there but we're just spending money we're not taking any in and so not much credibility with that from the standpoint of a conservative person who's responsible for buying cash registers or business machines. It's pretty hard to make... You can talk your arm off but not very attractive.

ROSS: You said you did do some bidding on Navy contracts when it came time to. I assume that those were

originally logic paper designs. Did you have to resubmit the bids when it came time for production?

DRAKE: Didn't quite go that way. We stuck with the premise that we wanted to develop a proprietary product and that was the 1604 computer. That's a massive development program and if you hit it even efficiently in a total way beyond our resources. And yet we didn't want to get into a deal where we didn't own the rights and the government did. I think they would have funded it in a traditional way but then it wouldn't have been ours, in as simple and clean a way. So Seymour, who was in charge of the project, came up with a different tactic and he started to build something which got named "Little Character." "Little Character" was a bit serial demonstration machine. The circuitry and the functions that dropped out would be the 1604. And the idea was that to a really sophisticated buyer - so we really had the need and we understood and had the credibility of prior performance - that that demonstrator, which we could afford, would be enough in order to warrant actually getting some purchase orders. Around the purchase orders you can finance, and so "Little Character" was kind of a boot-strap approach. And the 1604 was the first product then, the rest of the stuff never really became real.

We did one other thing that helped us - I think maybe it was critical, because we were having so much trouble running into this lack of credibility. We said, "Gee, we've got to have some credibility; we gotta be making and shipping something; and we got to do it before we've gone broke"--while there is still asset and financial resource here. So we acquired a company called Cedar Engineering, which had a factory, and it was making electro-mechanical products, what I'd call mostly for the aircraft industry, little motors and servos and actuators and a lot of coil kind of stuff. It was profitable and it had been around a long time, run by a seasoned old hand in the business. That became the Cedar Engineering Division of Control Data Corporation. We were able to take people on the plant tour and we had revenues and receivables and manufacturing employees, space.

ROSS: That paid off and it's been an enduring business philosophy at CDC.

DRAKE: It had tremendous importance. It wasn't a good business, particularly, it was a bad, hum-drum business, but it gave us credibility that we desperately needed and that was the reason we did it. Some very neat people came

out of that. Tom Camp, who's one of the senior officers at Control Data today. Tom was a young sales guy, a contracts guy with Cedar at that time. Some of the others have since gone, so it didn't turn out that how the company turned out during those early years...there's very little correlation between how it turned out and what was in our plan, very little. And the two real things that occurred then were the development of the 1604 and the success of that program and, as a bridge to get there, the acquisition of Cedar Engineering and the financial credibility that that represented.

ROSS: Who did the looking around and chose or decided upon Cedar?

DRAKE: A guy that came... Again I think it was Bud that came up with first the idea of the acquisition and then, "Where is one?" Then everybody I think had participated in the reality of whether that was something that we should do, how much we should pay for it. Bud and Bill negotiated the acquisition with the guy who was major owner and president of Cedar and he came into Control Data as a director and a senior vice president.

ROSS: Have you mentioned his name?

DRAKE: Let's see, Jim...I'll think of it in a minute. I haven't seen him for a long time. He was used to running his own show and he was an old shirt sleeves tough guy, not a bad man, but impulsive and quick tempered, and it wasn't terribly long, maybe several months, it wasn't very long before a lot of bad feeling came that really blew up and there was a stormy exit and some near lawsuit like things and so on but finally it was arranged and he left and moved to Florida and bought a boat, I think.

ROSS: How long did you stay with the new corporation?

DRAKE: I think it was about two years. There's a combination of a couple of things that occurred, maybe three things. First of all, at the time of the formation of the company, my understanding, I felt clearly, I felt it was a commitment, an understanding as to what my job was to be. That got compromised really seriously right off the bat.

I accommodated to that and worked within it some, but I guess it bothered me to some extent.

ROSS: Did you feel your potentials weren't being used as fully as possible?

DRAKE: Yes. And it was an important change for me.

ROSS: Okay, you've had that feeling a couple of times that you've mentioned before.

DRAKE: Right, right. So maybe it's a pattern. It's a reaction to a circumstance. Secondly, you're absolutely right, this exposure to a whole new area of understanding and involvement and with a most wildly exciting way--the finance side of venture capital, new venture participation. Overwhelmingly exciting and attractive idea -- I mean I just -- my mind went in that direction. Dissension also had developed in the company between Bill Norris and Bud Ryden, and that turned nasty. I never really got tangled up in that too much but it had to be. It was a small group. So when Bud proposed the formation of what today would be called a venture capital company...

ROSS: You couldn't resist.

DRAKE: ...couldn't.

ROSS: I think that's completely understandable.

DRAKE: Yes. And his model again it's... he had a tremendous contribution to all this because I was not a person had who read Fortune magazine or who came from the business school or had any particular background at all in that area, it just wasn't in my habits. But Bud was fascinated, and had been for a long time, by what was the model for what we ultimately did here, and that was a company called American Research and Development Corporation...

ROSS: I was just going to ask you...



DRAKE: General Dorio's company out in Boston was the first one.

ROSS: Did Ryden have contact with him while he was at Harvard Business School?

DRAKE: I don't remember.

ROSS: Because...

DRAKE: Yes, I would guess he probably might have. Anyway, he knew a lot about it and he was fascinated by it. So what the proposal was...

ROSS: That group by the way, just to register it on tape was the venture capital behind DEC.

DRAKE: Yes. Right. And several other enterprises out there. But you...

ROSS: Oh, yes, definitely I was just restricting it to the computer.

DRAKE: ...so with that kind of company as a model and with the Control Data experience--venture capital experience, that just seemed like a tremendous idea, to just work on that stuff all the time. What could be better and knew all kinds of people with ideas and believed a lot that this was a worthwhile thing.

ROSS: You didn't have to go back to see Mr. Hull I hope.

DRAKE: Never had that. I saw him, but we didn't have the... That was all a little more routine and had been done many times by that time. The proposal then was to form what turned out to be Midwest Technical Development Corporation. It was truly modeled after American Research and Development in its legal -- the kind of investment company it was, its structure; it was to be publicly owned which was a difference...

ROSS: Place in time. This is...?

DRAKE: Let's see, if it was about two years '57, '59 I'd say, '59 or '60, something like that. And we left--I left Control Data and it was my feeling at the time on good terms with Bill Norris. He, well I know he felt that I was absolutely nuts to be associated... He just absolutely had no confidence left relative to Bud, so he was very emotional and that was very high level hostility, so I suppose some of that rubbed off.

ROSS: Did you start working on Midwest Technical Development Corporation while you were still a CDC employee?

DRAKE: No, we hit that very cleanly, and as a matter of fact at Bill's suggestion he retained me on a kind of a consultant basis for a period of some months on a reduced compensation, and it was really helpful. And then somehow the development of explosive growth of CDC and its program and then the correction of Midwest Tech we didn't have much reason of overlapping. There were many years when we didn't have any contact at all. Midwest Tech turned out to be a hell of a good idea, it was timely and we did it well. There was a lot of tragedy in it before it was over, but if anyone ever wanted to go back and analyze where we were in that investment company in terms of portfolio investments, the shareholders of that company had important claims of what it would turn out to be an awful lot of money. We participated in the formation of National Semiconductor Corporation. We participated in the beginnings of Telex. We participated in the beginnings of Dataproducts. We participated in the beginnings of Scientific Data Systems. It's incalculable.

ROSS: I assume that documentation is available.

DRAKE: Sure, it's around somewhere, yes. Bud's a good keeper of stuff and I would guess that that's the easiest place to get it. I don't do much of that, so I'm not a good source for literature. I'm not a very good historian. My boxes of stuff are not gonna be too valuable to the Charles Babbage Institute. What had happened - I don't know if

this is worth commenting on - all ties together. What was happening as a result of, I'd say the Control Data experience and those that followed it and the Midwest Tech experience, was really a proliferation of publicly financed new start-up enterprises. I'll never know quite where all the squeaks came from and so on but, in hindsight, certainly this activity must have been viewed by some institutions and some people as threatening. We were young, and I suspect, kind of cocky.

ROSS: You weren't actually stepping on toes, but it was bothersome to see somebody...

DRAKE: I think there must have been some of this. To this day, I don't know what happened.

ROSS: Now this is what I suspected.

DRAKE: I know the results, but I don't know how it happened or why, and it's unexplainable by the facts of the enterprise; it was not a failure; it was an outstanding success. It was a highly moral enterprise, highly moral. And I've since ceased to dwell a lot on all of that. It was catastrophic in so many ways. I did take advantage within the last year or so of the new Freedom of Information Act, along with my brother who wrote a book about this describing the Midwest Tech experience. I think that is worthwhile - that's an accurate well-documented treatise, obviously our point of view. However, there was a trial and the judge's decisions are there and so on.

ROSS: What was the indictment? And by whom -- by the SEC...?

DRAKE: Brought by the SEC and the charges were, I thought I'd never forget those phrases but they included terrible things like gross abuse of trust, and two or three other like kinds of words. It was a civil case, it was not criminal.

ROSS: Were you charged with taking benefits that you weren't offering your stockholders?

DRAKE: There's a whole list of items. Some of them were really nitpicks on just procedural things. We employed expert counsel. The thing that led to the gross abuse of trust, that kind of charge, was based on the SEC claim that the officers and directors of Midwest Tech took preferential positions for themselves...

ROSS: In terms of investment?

DRAKE: ...in terms of investment opportunities that rightfully belonged to the shareholders. The judge found that that wasn't true, and it wasn't. Unless you were particularly interested in it, I'd say that something of fundamental importance...

TAPE 4/SIDE 1

DRAKE: The point I was going to make was I'm not a cynical person. I've not come away from the experience I don't think with that turn of mind at all. But I have almost -- what's the right word - I don't have much faith in something called the government in that awesome kind of reverent respectful way that I used to have. If I explain - I won't say to you - but to a typical person what happened, they don't believe it. They don't disbelieve me, they think I'm... maybe they do, I don't know. But it's an incredible thing. We don't, thank god normally in our lives, we don't normally see what real human beings do or can do from time to time wielding the treasury and the power and the press and the public opinion they actually have a horrendous power. Obviously, there are times when the disciplines or the checks and balances don't function. So here's something that in the name of the public shareholders of this corporation absolutely, predictably destroyed them. There was no way that this could serve those shareholders. And they didn't. It destroyed the enterprise; it destroyed all the values. In the case of... We had an outstanding board of directors drawn from leadership people from the University, from investment banking, top-flight, wonderful people, many of them late in their lives and so on. Just destroyed them.

ROSS: Some of the names I have are Byron D. Smith.

DRAKE: Byron is with Univac again at this point.

ROSS: Neil Amundson.

DRAKE: Neil Amundson, who was head of the chemical engineering department at the University, a professor.

ROSS: There is a key building named after him?

DRAKE: Yes, a guy like that. Ed Howard, who is a senior partner at Piper Jaffrey, Henry Stephenson, who was a retired vice president of Red Owl Stores; Howard Daniels, a very, very distinguished engineer; John Andres, an establishment person here with a long, long background - well anyway. One thing I can add to that, I'll make the point again that I really think that it's important to understand, it's broadly important for people to understand how that system can work and be sensitive to that, because its a... With the passage of time and the effort to go back through the Freedom of Information Act, I'll take the time to finish that loop off, we found some extremely puzzling correspondence. We found some... and I haven't told anybody about this. I don't even know what to do with it yet. I don't intend to sue the government. I don't quite know what to do with it yet. There is correspondence that shows that the team, the examining team if you will, that was sent out here, and the procedure by which this whole thing was launched, the way the press was used...

ROSS: Abnormal?

DRAKE: Awful. Just awful. However, they came out here and they rifled through everything and just stirred things up pretty good for quite awhile. And there's correspondence back from that group to the commission saying that they really have not found any evidence to support the charges and they were recommending that they not proceed with the trial. There's a letter back from the then head of the commission instructing them to proceed and not commenting at all on the...There was a time in the trial -- the judge was a marvelous man Judge Norby who is now dead, a really outstanding man. He would be a model in my mind of what a judge ought to be. He finally gave his order, and the SEC really came away with nothing, except as the judge pointed out some highly technical and

unintentional and, he thought, not really important, and certainly nothing that justified the charges that were made. These guys still wanted something, and they basically tricked them.

ROSS: Tricked the judge?

DRAKE: Yes. And there's some correspondence that shows that they did that knowingly. It was awful hard to understand any of that, therefore, and I say again I have no idea where it came from. It obviously came from somewhere other than in my opinion, the normal workings of the SEC and its reasonable regulatory commission.

ROSS: Certainly there would be no reason for them to...

DRAKE: None, that I can see.

ROSS: The result wasn't only financially devastating, you've never done something like that again.

DRAKE: I tried very hard to not have an exposure, a personal exposure. That's the residue of that experience, because I now know that it can happen. You can't avoid it completely or you can't do anything so as an officer of a public corporation you have exposure. It's quite different than the exposure you have as an officer or director of an investment company under Act 40. So I would never participate in such a thing again, if organized in that fashion.

ROSS: From what you're saying, the SEC stymied innovation.

DRAKE: Did incalculable damage. Now what happened, other things were influenced by, I think, certainly here in Minnesota... That was a shattering, noisy, very visible, disheartening event. We were thinking of the positive side: that you can do it, the doers and the ideas can be financed, and they can create jobs and they can make new and better products, and all that stuff. The state went into a mode, as did the nation, with the trend to regulatory excess. That was the decade where that was coming more and more into being. So what was happening here, specifically in

Minnesota, were very substantially, very restricted arbitrary regulatory procedures which in effect, coupled with the tax policy changes, stopped, just stopped the process; we went for about ten years here where nothing happened. I submit that that's got something to do with why we're in an economic disarray at this point. Had that not happened I think we... Doesn't mean we wouldn't be subject to economic cycles, but Minnesota historically had the ability to not be so influenced and I think we are now and that has something to do with it. Those excesses are being changed again, that's an optimistic thing. I think the process is being rediscovered, starting to be understood better again, and guess what?

ROSS: In fact government is taking a lead here.

DRAKE: Yes, it's starting to work again. It's basically good news.

ROSS: You left Minnesota.

DRAKE: First of all, I was terribly confused. I don't know quite what I was thinking on a day to day basis. I sort of wandered around for a while and I went into partnership with my brother. We decided we would be consultants. That was a place to go and some things to think about and work on and sort of not just disappear.

ROSS: Who were some of your clients?

DRAKE: Importantly, Dataproducts.

ROSS: You were involved with this for several years.

DRAKE: With Dataproducts?

ROSS: Well no, I mean as a consultant.

DRAKE: Not for a long time. The gap of years here, the trial and all that took a long time, went on for months, and that was a totally consuming thing. I didn't think about anything else. I was down in the courtroom everyday.

ROSS: Did that end in '62?

DRAKE: Well, it's a matter of record and I don't remember exactly. It probably was, it probably ended in '62. But we can find that easily.

ROSS: I'd asked you about clientele.

DRAKE: Yes, so we had Dataproducts. We had a little company which made battery chargers, what the heck was that called? It's interesting that the names don't even stick with me other than the Dataproducts and there were probably four or five of which the Dataproducts involvement was overwhelmingly the most important. The rest of it was kind of scramble and something to do.

ROSS: What kind of services were you offering? Market analysis?

DRAKE: Yes, marketing things, sale promotion, and advertising kinds of things, and financial; those tend to be the kinds of things that came up. The Dataproducts assignment was to come and review a market decision that they had made, a product and market decision that they had made and comment on it, analyze and comment on it and try to come up with some kind of recommendation; go like crazy, or cool it, or dumb idea, or it's a great idea yet for whatever. And...

ROSS: And that product was?

DRAKE: That was an end-user. Dataproducts, traditionally, had been exclusively an OEM supplier and they were examining whether or not [it was feasible] for them to bring to market a free standing system which would be sold



directly to end-users, which importantly involved their high-speed printer, a tape deck. It was an off-line print station, which was the product at that time. I found that to be an exciting idea and that led to Erv saying, "If you really think that's a red-hot idea then why don't you come and do it?" I think that was some combination of a belief that that was a good job, that I'd do a good job for him, and partly friendship. So, obviously things were not all that happy here, and that was an exciting idea and it was positive. So we talked it over at home. We decided to do that and I made up my mind to move to California. Our two kids were still in high school and it was the mid school year so the typical thing was to say, "Fine, I'll go out and travel back and forth and then when school is over we'll move." By the time that time came, I was increasingly convinced myself that I was fascinated with the job, and I liked that, and it was growing. I had a lot of freedom. It was kind of like building a little company within the company, but I sure knew I didn't want to live in Los Angeles. So it didn't happen just like a lightning bolt, but its what you do--you start to procrastinate for another year. So I worked at that for four years, but we never actually moved out there.

One of the ideas that had come into the part of Dataproducts that I was concerned with took the form of a few guys who were ex-Dashew people, who came by and talked about an enthusiasm to develop a new plastic card embossing machine. Dataproducts made the decision to make an arrangement with them under which they would line up some money to finance their development and so on. And that had been done. I had nothing to do with making that arrangement, but as it moved along and as the end-user part of Dataproducts program began to become real, that was the logical place for the activity to be parked, and so I became responsible for that. In the process of doing that, I found a tremendously exciting market opportunity. I felt a lazy, lethargic, quite ineffective long established dominance of the market by Addresso Graph-Multigraph and not very good activity from the other supplier, a smaller Dashew Business Machines. So while the development team over here was working away to come up with a new and better machine, we were doing...

ROSS: Dataproducts seeded them?

DRAKE: Yes, with an agreement under which if x happened this happened and Dataproducts really had the right to acquire it or not. From our standpoint, when I was working at the market side of it, to understand anything about

plastic card business, the more we looked, the more of an opportunity it seemed to be. So the class of product was the one that we were comfortable with--a relatively sophisticated electro-mechanical computer-compatible peripheral, is really what it is. Whether it's a printer, or an embosser [there is a] lot of commonality. We also learned about what was happening in the systems that were coming on, the revolutions in both retailing and banking, so that the machine-readable card is a key to an automatic system, which had never been used before. It was a requirement and there was no way in the world these products that were in the marketplace could be modified or adapted to that; they weren't even computer compatible at that time. It's just really amazing, an amazing opportunity. So we got very enthusiastic about that, only to find about six, seven months later that the development team really didn't have a better mousetrap; they had a system that was never going to work, for sound, technical reasons. That's a disappointing moment. You've got your appetite all whetted up and you're all set to go and then you don't have a horse. However, another guy who was and is an extremely inventive -- very, very creative--a mechanical genius, in my opinion, a very exceptional man, and who Dataproducts had supported in his activities out East and had called upon him to come and help access this product development and help us decide if we had something or not, and so he helped us see that we didn't and went away...

ROSS: Who was that?

DRAKE: His name was Jack Grillac. Jack called up a couple of weeks later, called Erv who was in London, in the middle of the night. Jack is not a guy who... [He'd say], "Now I want to talk with you," and worry about the world and what time it is and so on later. He was really a painter or something and he said basically, "I know how to do it." Erv is half asleep, he told me the story, and says, "Who? What?" To make a long story short, Erv called, and we met Jack in New York within a matter of a couple days and sat down, and Jack showed us how to do it: A basic mechanical design, a linkage, a component, a method, and it was brilliant. Like a good mechanical design, elegantly simple. Bang, all the lights go on again. So we went back to California and then sorted out kind of where this fit or didn't fit as far as Dataproducts was concerned. And, you know, we had a column for and against to figure out what the balance was. And that was a very thoughtful exercise. We came to the conclusion that this is a very good idea but it doesn't fit Dataproducts' circumstance, so if we're going to do anything with it, the best thing to do is go back

to our old recipe again and build a company to do it, start a venture. So that decision was made, and that didn't take me very long to decide that the ideal place in the world to do this was in Minneapolis and away we went.

ROSS: What was it about the embossing business that didn't fit Dataproducts peripheral product line?

DRAKE: Their particular corporate circumstance at that time was first of all a very, very full development plate. They were working on about nine things at once that were viewed by them to be very central to the main theme of the business so they had a big over commitment. They didn't have any energy to... Furthermore, they strategically were in a mode where they didn't have a lot of cash and they didn't want to go raise money. Their stock was depressed and they saw the day coming when the performance resulted from the things they were working on [would] be real and would bear results. So their money mode was to stretch and to conserve and not take on more debt and not dilute the equity at those prices. Thirdly, although the end-user business at that time had grown quite large, there was some real wonderment in Dataproducts as to whether they belonged in that business either. That stemmed from the fact that they had embarked on a very aggressive leasing program of the hardware, not a very sound reserve policy. It really had the rubber band stretched pretty tight. So here was another end-user product, not sold to the same market even that the off-line print stations were, and the feeling that gee, they really had an awful lot on the plate there too, so it didn't fit either way. It didn't fit in terms of the money and the development talent capacity to take on and do a bang up job with a major new product.

ROSS: They would have had to completely revamp their structure in order to take it on.

DRAKE: Yes. And so I think very wisely their decision was, "This is a good idea, let's participate we've invested time and money so far to get this point to this degree, let's..." The term technology transfer was never more appropriate.

ROSS: Was it used?

DRAKE: No. But that's what it means.

ROSS: Oh, certainly.

DRAKE: So, we invented the term afterwards sometime. So they transferred -- we had a handshake - starting then. Dataproducts agreed to invest, if you will, in a new company to be formed. [They put in] everything they had that related to this, and that was mostly a bill, but also critically important, the idea of how to do it and that came from Jack. A lot of benefit came from learning how not to do it. In addition, they agreed to invest in founders' equity along with whatever team I would bring together to form the management team for the new company. We worked out the business plan and started with our team and our business plan and about a million bucks that came from personal investments from the group that came together around the notebook and from Dataproducts who invested money, in addition to their technology. It worked out pretty--the shareholders of Dataproducts have been handsomely rewarded. The program was pursued with that tremendously productive zeal that can come with a small, motivated, qualified, sure-targeted, liveable inertia circumstance that comes in the entrepreneurial stage. Well, it was a good idea. We came up with a terrific machine, and so the opportunity to start from scratch and run the business I found to be sort of a missing piece, and I have enjoyed it tremendously. I feel quite fulfilled. It's a marvelous feeling. That about takes us up to today.

First of all, the kids turned out great which is - considering the violent events, uncertainties, particularly the SEC period where the kids were old enough to understand what was happening, and so on - I have to be particularly appreciative of what had to be a good job done, particularly by their mother, and something that maybe speaks to the kids, too, and the environment in which they lived. They both became doers. My son Bill, our son Bill, took engineering, took double EE, and went to Cal Tech. And he was out there when I was running back and forth to California. We got to know one another in a little special way, I think, because a part of that was sort of helpful to me and maybe to him. So he graduated and he got a job out in California, in a small company--I had nothing to do with it - and he veered into marketing, except he's an excellent engineer. He's gone at this thing a little differently but he sort of came to the same kind of a thing. He's a very quiet, low, gentle guy, low profile guy, and sure bright. In the course

of a weekend phone conversation a few years ago, at the end of the conversation he said, "Gee, there's something else I wanted to mention to you." "What's that?" He said, "I just quit my job and I'm going to start a company." Well, he's married by that point and not really all that solidly fixed and he wasn't looking for advice particularly, he wasn't looking for money, it was just something he wanted to --you know, "What's new?" So he's been at that for a few years and he's learned an awful lot and he's finally got it working. I've not tried to be a "here's how to do it person" at all. He asked me to be on his board, and I've been delighted to do that, but he's just busted his butt, and part of that was making mistakes and part of it wasn't, and he's a very, very effective guy today. He's just approaching the point where he's going to start to feel some satisfaction. It's been a challenge and worry and all that for quite a while.

ROSS: What about your daughter, is she in business?

DRAKE: Yes, she took biochemistry and she got her masters degree from Rice. She was an undergraduate at Mount \_\_\_\_\_ and her first job out of school was with a company for whom she still works called Diamond Shamrock. She's located in their central research facility just outside of Cleveland. There is an amazing series of accomplishments there, too. She has a lot of responsibility at this point. She runs three major research programs. She probably has fifty people working for her. She's respected in her company. They pay her well. She keeps getting promoted and she is another independent doer. She has no time for crap. She doesn't play the organization game. She's not hostile, she's just very genuine, very direct and it works; it's working for her. I don't know that you could predict it with any degree of certainty, but I will be surprised if it doesn't turn out that at some point she goes into a venture. I just feel it coming, and it's not something that I've ever advocated particularly. I don't know where that takes us but that's what happened to the kids.

ROSS: Well, you're doing everything. It takes us right into your advocacy for starting new ventures on a large scale in Minnesota.

DRAKE: Yes. Besides coming back home, which was the driving force, behind that there was the decision to come

here to do this...

TAPE 4/SIDE 2

DRAKE: What I found after we started Data Card here in 1969, I was simply unaware at that point of the degree to which the environment, tax and regulatory environment, particularly, in Minnesota had changed. I didn't inquire into it; it never crossed my mind. I hadn't been through that kind of an exercise for a long time I just presumed it was like it was. Well, we learned the hard way - it wasn't. And there were plenty of obstacles in starting and building the company and developing the products and the organization and so on. Over time I was finding some of our severest obstacles had nothing to do with the reality of what it takes but I was running into this trap.

ROSS: They weren't technological problems?

DRAKE: No.

ROSS: They were political.

DRAKE: They were political. Well, we can go through a range, "Well, that's not bad we'll get through that." Then you find another one; then you find that something got dramatically changed with no notice and no understanding, like the tax thing. You start out, invest your money, and others do, and you expect a certain kind of reward given a certain kind of performance based on what the rules are, and you find two, three years into it somebody just changed the rules. And where are you then? You're mad. That really caused us trouble. We reached a point where we had outgrown our initial plant and we had rented space in some adjoining buildings. There were five buildings at that point, which is okay. But you reach a point where that's not a good answer anymore and it caused us to stop then and to decide what we were going to do. And all we were going to do was bring it all back together again. And that meant committing to build a new plant, to accommodate what we were and what we expected to do in a reasonable job for the next ten years or whatever it was. Then the question was, "Where?" I was really ticked at what had happened

here. I really felt frustrated that somehow it happened that way. I think I would talk to people down there. That was the first time I'd ever done that, I never had an interface personally before with people in government particularly, certainly not legislative people. Gee, it was this cocky, dumb, arrogant, bad thing; and you see and you know what it's doing to do to you and you get that kind of a...It's a bad feeling. Obviously, it's an overreaction and it hit right on a nerve and so on. So we thought long and hard. We really went through a conscious decision making process. I was all set to get to go, move, face that, and we started to think about where.

ROSS: Place me in time here again. Where?

DRAKE: Well, it was the year preceding building this plant; we've been here for five years now I guess, so that would be roughly in there somewhere. So we thought it through and still wanted to live here. I'm really a stubborn person and in some ways I hate to lose, I hate to get beaten, defeated is a better way to put it. I hope I don't get great joy out of banging my head against the wall either. So, for whatever reasons, we came to the conclusion that we would consciously decide to stay, build our new plant here, and as a part of the totally committed part of the company effort. It's the only way you can explain doing that, unless you just got great faith, that we would try our level best to explain how it works and try to be an advocate and a constructive force. We knew how these people had forgotten, "Let's remind them," cause nobody in their right mind sets about to do what was happening as a result of a whole haystack full of individual actions. Without exception those things started with somebody's idea of something of good effect and the effect that that wasn't what was happening was not because somebody was trying to destroy but they were trying to do other things and didn't understand the cumulative effects.

ROSS: Now you institutionalized this advocacy within but also without, outside of Data Card.

DRAKE: So that's how it started. And as a result of that I know how to go talk to people at the Capitol. I know where it is. I've been encouraged by feelings of progress, so much so, that I'm excited by the potential to be effective in fixing this, as one person to be effective in helping fix it. And as a result of going at it this way and the fact that I think we do know what's required, it's not some damn theory, it's a very specific, I think, relevant experience. And I

have a great belief that the nation will be well served if it gets its act together a little better than has been the trend. So if you feel that way and you start to be encouraged by learning that if you try you can have an effect. The magnitude of the problem is so enormous, that you know it's limitless from a practical standpoint. It can consume everything there is times something never. We are beginning then to look for ways to be more effective and to broaden exposure and to learn more about the other facets of the society that we don't know anything about. Well, that leads then to a broader view of things. I wouldn't have had the discretion to do this if this company had flunked. You have to start with some resource or you don't have any way to influence anybody and probably shouldn't. So we had that going for us. We had a case kind of a basis to get attention and to be credible and to share, and for an understanding. A big part of this so far has been aimed, quite sharply aimed, at trying to fix it, and that means specific regulatory mistakes and specific tax mistakes, very rifle-shot.

But along with that, you start to think about it and maybe understand better, you start to try... You start to think of things that are not only going to get it back like it was in the good old days and get back to break even, but start to think about what could you do. What are some ideas that would make it even better than it was before. And we're into that area now with things like the Minnesota Cooperation Office and the Seed Capital Company and Project Wellspring. These are very innovative, "It wasn't like this before," resource ideas that I think had great promise and they're exciting conceptually. The process of going from concept to reality I think is what an awful lot of this is all about. It's a lot of fun, and it's very rewarding. So obviously these kinds of ideas and activities are full of that.

The University Regents' role is probably the single most non-company related experience I've ever had and I'm really new at it, fascinated by it. I think I'm going to be just a super regent and these things tie in very well with where I am in my stage in life. I have never aspired to just quit and play golf and by the same token I do aspire to not have the world running me all the time, so that's just a terrifically good balance from my personal standpoint. I'm very fortunate about that.

The next stage of that, kind of a very definitive one, that I will look for in July when I cease being chairman of the company here and start to draw pension (my 60th birthday is in May) and I'll continue here as a director. I've very



carefully, over the last couple of years, become involved as a director and sometimes as an investor in a very diverse list of companies which are fascinating and are fun. And some of them are in the mold of things very much like what I've done before, and that's a very direct kind of a transference. Others are areas I just never had anything in -- the First Trust Company, for example, what the hell do I know about that? But I'm not there for that reason. They have a good reason for wanting me there, I feel very comfortable with that. In the meantime I'm learning; I'm seeing another segment of economic activity that I've never been exposed to before and I'm enjoying that. I'm on the board of the Kahler Corporation, I don't know anything about hotel management. But what I do know about is that company basically was very stable, staid, rock of Gibraltar that really didn't perform well if somebody really put the test on return on assets. They don't owe money, they're not going to go broke, they pay their dividends, but it's not... To my way of thinking, somehow, a public corporation needs to perform better. No matter whether you have to or not, you just... you can't... shouldn't be very comfortable... Obviously other people there were thinking somewhere along the same lines. So I think the reason I'm there, and where I'm starting to function, is to help the Kahler Corporation think of itself in a more ambitious, more competitive, more contemporary way - thoughtfully, and it's not some hot rock to the moon, and that's starting to happen and so it's fun.

ROSS: You reminded me of a big question I have for you. You said it goes beyond getting a return on your investment. Something that I'm interested in getting your reaction on is whether there was a point at which the computer industry began to look more like other industries. Hidden in that is an assumption that in the beginning it was dissimilar.

DRAKE: Parts of it do of course, but it's such a dynamic, it doesn't. Let's see...

ROSS: The other way of asking this is, What's so unique about it? Why study the computer industry?

DRAKE: Yes, and it's because it's... I think it's because it's very important. It affects everybody. You can approach it from a sociological basis if you want to, or economically, which we've talked most about, it's unparalleled, and gives every prospect of continuing to be that way. If anything it's maybe even accelerating still. So it's an industry, then,

parts of which have achieved substantial maturity, but even there you can't...It's not like a foundry used to be, or anything that would be with it. The rate of change in basic technology is so rapid, it's so dynamic, that this constant opportunity for new ideas, new activity, for growth, are a part of, fundamentally a part of this circumstance which has these characteristics. So it's just as true today as it ever was, maybe a little more so, great opportunity for productive, effective human endeavor and several different kinds of rewards that are exceptional, much better than many of the alternatives. I wouldn't any more today want to work for a Honeywell or a 3M or a Univac, or a Control Data than I decided a long time ago. But the jobs in those places are quite different than they were a long time ago. They just wouldn't happen to be my cup of tea at this point in my life, and I've found a better recipe; it's more fun.

ROSS: Thank you very much.

END OF INTERVIEW