

An Interview with  
GEORGE M. RYAN  
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Conducted by Arthur L. Norberg

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Abstract

After briefly describing his background and education, Ryan, former chairman and CEO of CADO Systems Corporation, discusses his work in the development and distribution of data processing equipment from the early 1950s through the early 1990s. He recalls work with Benson-Lehner in the early 1950s and he describes the firm's development of the computyper, a billing machine. Ryan discusses his role in the sale of the computyper to Friden and his employment by Friden. He recalls his frustration with Friden's attempts at further development of the product, his involvement in the acquisition of the Flexowriter for Friden, and his management of a branch for Friden in Los Angeles. Ryan recalls his return to Benson-Lehner from Friden in the late 1950s and the events leading to his formation of Intercontinental Systems Incorporated with Pete Taylor in the late 1960s. Ryan describes ISI's distribution and development of data processing equipment and his philosophy for the management of engineering and sales at ISI. Ryan recalls his idea to develop a computer for small businesses and describes his role in the partnership that became CADO Systems Corporation in 1976. He discusses the development of the computer by Jim Ferguson and Bob Thorne, his strategy of marketing the computer to small businesses and government offices, CADO's rapid growth, and the creation of additional product lines. Ryan concludes the interview by summarizing his activities since leaving CADO in 1983.

GEORGE M. RYAN INTERVIEW

DATE: 10 June 1993

INTERVIEWER: Arthur L. Norberg

LOCATION: Los Angeles, CA

NORBERG: George, can we start with Wisconsin days? Offer me a little bit of background about yourself: where you came from, say when you were born and where you were born and what sort of early education you had and the decision to go to college, for example.

RYAN: All right. I was born in Eau Claire, Wisconsin, not far from where you are in Minneapolis, in 1922. I went to Catholic schools there, started to, and had a falling out with one of the nuns at an early age and [laughs] walked out, and then took up public education, and had a very fine one incidently. The public schools were A-number-1. I don't know when I decided I wanted to go to college, but it was early on, I'm sure, and I told my dad about that and he shook my hand and wished me well.

NORBERG: What did your father do, George?

RYAN: He was a shop foreman for International Harvester Company in Eau Claire. You know, lower middle class. We always ate during the depression, unlike some families, but there were six children. So it was a big family and he had a big responsibility, but he carried it off nicely. I went to the University of Wisconsin, started in 1940, and as you know the war raised its ugly head and I enlisted in 1942 and the next four years, of course, were spent at Uncle Sam's call.

NORBERG: Doing what?

RYAN: Well, I started out as a buckass private, of course, because that what you did when you went in and enlisted. I had a deformed eye, always had one since early on, so they called me limited service and otherwise I'd probably would have been dead by now. When the first group went out from training camp they kept me behind and put me in

the file section at headquarters. I learned the Dewey decimal system of filing at that time. So I read everything I came across as I had to file it. One of the pieces of paper that came across was an OCS school for limited service people. Ten minutes later my application was on the desk and I got into the last class. This was at the North Dakota State College, Fargo, North Dakota, and I became a lieutenant, a 90 day wonder.

NORBERG: And where had you been doing your service? You were out here in California?

RYAN: Yes, I had been in Camp Roberts. They shipped me back to North Dakota and 90 days later I was a bright new lieutenant and they put me on a boat as a cargo officer and sent me out into the middle of the Atlantic, which wasn't very pleasant. So four years were spent in the transportation corps both in Europe and then they finally sent me to New Guinea and that wasn't too pleasant. I got a disease there and they sent me home and back into the university.

NORBERG: Okay, but let me go back a moment. When you entered the university in 1940, what had you committed yourself to study at the time? What were you interested in?

RYAN: Well, because of what I was doing in high school, I had become editor of the paper, I thought I was going to be a journalist. So I started out as a pre-journalist sort of thing, and after the war when they took up testing, aptitude testing, which wasn't available pre-war, one of the counselors somehow said, "You should be an accountant." And I had never thought about it and it hadn't entered my mind. It wasn't something that sprung to the head of the list at all. I said, "Well, if that's what it says, maybe that's true." So I entered business school and I graduated in accounting.

NORBERG: In what, 1947-48?

RYAN: 1948. I graduated with senior honors. During that period there were no graduate students. They had all been wiped out during the war, you know. That whole class of people had disappeared simply through attrition. So I

was one of the undergraduates that became a graduate assistant. I taught accounting my last year. I had a lab class like they do at the universities.

NORBERG: This was on the Madison campus?

RYAN: Yes it was. They asked me to stay to become a professor but I opted out. I wanted to do something. I wasn't sure what, but I left there then in 1948 and I interviewed every CPA firm. They all came. I was offered jobs by eight or ten outfits, I don't know for sure. I had set down conditions of employment, I said the first one that offers me reasonable employment in California I'll take. And Touche, Nevin said that they would do that so they hired me for California. I never interviewed anyone out here. The guy in Chicago interviewed me. So we piled in the car and drove across the country. Didn't know a soul.

NORBERG: You were married by this time I take it?

RYAN: Oh, yes. Married in 1942.

NORBERG: Before you went off to the camp?

RYAN: No, just after. Married three months after I went to camp. Still married to the same lady. [Laughs].

NORBERG: Yes, I know. Lovely woman. 50th anniversary just celebrated.

RYAN: Just finished. It was interesting. We arrived here in 1948. Didn't know a soul.

NORBERG: Here meaning Los Angeles?

RYAN: Los Angeles. And went to work at Touche and in six months I was a senior, doing senior work, audit work.

NORBERG: What were the classifications? When you say senior that doesn't mean anything to me because I'm not aware.

RYAN: It means in charge. When you do an audit, you have a guy in charge of it and you generally have a bunch of new young accountants out of school that do the grunt work. You know, vouch things, and add columns, and tie in totals, this type of thing. And I became a senior and was in charge of audits. I did the Twentieth Century Fox audit, for example, at a very tender age.

NORBERG: And how many people might be in such a group on average?

RYAN: Well, the last one I did, a May Department Store audit, a huge audit, I must have had six-eight-ten people working for me on that audit, plus all the employees that were available from the company, because they did a lot of the schedules and that type of thing. And then I left.

NORBERG: How long were you there?

RYAN: Just long enough to get certified.

NORBERG: Which was, six months, a year, two years?

RYAN: Two years, two years plus, and decided that I didn't want to be an accountant. Didn't want to be in public accounting. I was the second highest paid graduate in my class and I was getting \$325 a month [laughs] -- starvation wages. You couldn't live on it. Beverly worked part time, too. But that was part of the industry. You paid your dues by working for nothing in the early days.

NORBERG: When you say you didn't want to be a public accountant, what does a private accountant do?

RYAN: Oh, well, a public accountant does audits or taxes or nowadays they do management consulting, but in those days it was unheard of. I sold the first management consulting job in the history of Touche's office in Los Angeles. I'd done an audit and was surprised at the lack of knowledge of the owner of the business on his cost system -- didn't have one. So I said, "You need a cost study" and he bought it, and I did a cost study and then he hired me as controller.

NORBERG: Which company again?

RYAN: It was called Hollyvogue. They were a mens' wear manufacturer. I learned a lot there from a wonderful old man, Mr. Max Goldman. He was in his 70s at the time and was terribly, terribly successful over the years, made a fortune. Learned a lot. He taught me an awful lot about running a business. So I became controller, got involved incidently in production, advertising, and everything else. I was always reaching out.

NORBERG: How big was the company at the level you were at?

RYAN: Oh, at that level it was about, as I recall, I can't touch it for sure, but I think it was about three million bucks. It wasn't a very big company. It was a small company. Mostly women who worked at sewing machines -- cutters, sewers, packagers, and so on. But they sold all over the country. Mostly though in California, of course, out west. I decided that that was a dead end, although they tripled my pay so that was very attractive. I learned a lesson from a guy I worked with at Touche. He said, "Always go where the money is because that's where the opportunity is," which was an interesting comment I thought. At any rate, I responded to an ad in the LA Times for an electronics company.

NORBERG: This would be about what, 1955?

RYAN: This would be about . . . no it was earlier than that . . . it was 1952. They were looking for a controller and it

turned out it was Benson-Lehner. They were a little bit of a company out in west Los Angeles. George Lehner, a professor like you, from the University of California, had teamed up with Bernard Benson, who was a British engineer, and claimed credit for a number of inventions during the war, but I can't tell you that that's true or not, but he certainly had credentials and he was bright as hell. George was not involved with the company full time, but he was an investor and spent some time there. So they gave me a test -- I can't remember what it was, some sort of intelligence test and I guess I must have scored pretty well -- and they hired me pretty much on the spot as controller. It was a tiny company doing mostly government work in graphics. They built the first plotters. They called them dactylographs in those days. And they built film readers to take theodolite film, that is missile range film, and digitize it. A very, very tiny company. Six months later they made me general manager, so I was really running the company. I guess my two achievements there were to finance them because they were terribly under-financed. I got them a small business loan. That was in the early days of government guaranteed small business loans and I succeeded in acquiring one for them. A second thing I did was more interesting. They had a device at that time that they had fiddled with for a government contract. They had a Friden calculator that they had mounted copper brushes on, on the readout dials of the carriage that moved across the top of the machine coupled with some solenoids that they mounted on a Model B IBM typewriter so that as you calculated you could print out the results. It was interesting, but it didn't really serve any purpose, because people didn't work that way and it wasn't a useful machine.

NORBERG: Why not? Why wasn't it useful?

RYAN: Well, because the kind of calculations that you generally do, you calculate and write down the answers, but where you wrote them wasn't necessarily where you would have printed them. However, if you could have made it a complete machine, that is a two-way machine, so that if you typed on the typewriter and could operate the calculator from the typewriter it would be useful, because at that time there was only one billing machine in the world. It was called the Burroughs Moon-Hopkins. It was a really monstrous product. I don't know if you know it. The only way you could see what you were doing was through a mirror which was mounted under a carriage, backwards [laughs]. It sounds incredible, doesn't it? It calculated by repeat addition. It was an old, old, old machine, but it was the only billing machine in the world. So I suggested that we make this a billing machine. I put the engineers to work on

mounting a complete cover of solenoids on the calculator so that if I typed a number on the typewriter it would enter onto the two keyboards of the calculator and then the brushes, of course, would sense what the answer was and read it out. So we did that and we called it the computyper -- computing typewriter -- computyper. And it was the world's second billing machine. Well, we, of course, were simply in the middle. Here was a little bit of a company that built a box, if you will, between a big giant IBM and another not so big giant called Friden, but we held the box and that's all we had. So I convinced Benson-Lehner that that was an untenable position. We better sell it to one of the two. So I set out on a campaign to do that. I rented a booth at the big office equipment show that was held on the West Coast every year. It was in San Francisco that year and I loaded this machine in the car, rented a ten foot booth in this cavernous place up in the city square in San Francisco and took it up there. We had the last booth in the last corner. You had to work to find us. As a result of that effort, I got the Friden management over there. I got the IBM management as well, but they weren't as aggressive as the Friden people who were looking for ways to go. Well, the upshot was that we then sat down and started negotiating and I sold them the product on a very small cash up front and a royalty basis on sales, and I participated in that. It was the first money I really made in my life.

NORBERG: Can we go back a minute? What made you think of going with the electronics company? After all, it was a small firm. You were with a somewhat larger manufacturing operation, or was it larger?

RYAN: Clothing was much larger. Well, I don't know. I was always interested in things, things that worked, systems. I put in a system at Benson-Lehner, the first one that had ever been done, for example, for keeping track of cost plus fixed fee accounting. Everybody had done it a very ponderous way and I bought a big bookkeeping machine from NCR, redesigned all the forms so that when you had a labor charge, it went all through the system in one writing. I don't know. I really got turned on with doing things with machines.

NORBERG: How did it go through the system before?

RYAN: It was all manual. It had to be posted 14 different times, you see. But now I had one piece of paper and it would post onto a bill that went to the government, it would post onto a big journal sheet, and it would end up finally

on a check to the employee. The same entry would flow all the way through. NCR sold that system up and down the street afterwards. I made friends with a lot of people from NCR as a result. I liked the technology. And Benson was a very, very strong salesman. He was terrific. He was a better salesman than he was an engineer, and I think I was attracted to that, his intellect and his intelligence, because he was as bright as hell and he painted a very attractive picture. And I could see that if it was done right it could build it into something.

NORBERG: Was it only government business that they were dealing with or did they have other contracts as well?

RYAN: 100% government, either fixed price or cost plus. It was all government. It was mostly Air Force, because it was largely concerned with lofting or missile research, that type of thing. Or they wanted to plot the course of a missile, digitize it on film and then plot it. It was a very ponderous system, but remember it was the first one. Nobody else had anything like it. Unfortunately it was analog.

NORBERG: Now, this was again in the sort of early to middle 1950s.

RYAN: Early 1950s, very early -- 1952.

NORBERG: Okay, so you went there in 1952.

RYAN: And left there in 1953.

NORBERG: Oh, you were only there a year.

RYAN: Yes.

NORBERG: All right. Now, the engineers who worked for this company, how many were there and what percentage was that of the entire staff of the company?

RYAN: That was over 40 years ago, so you understand that I'm going to guess. Mostly engineers. It was a small company. Probably weren't more than 15-20 people in the company and I would say half of them were engineers, in a small shop where they fabricated things.

NORBERG: What sort of training did those engineers have then?

RYAN: Some of them were mechanical engineers and some of them were electrical.

NORBERG: So when you decided that it might be a good idea to alter this machine to make it a billing machine, did you give them any instructions other than the general outline that you just described to me and did they then come up with the technical details or was there some sort of interplay between you and them?

RYAN: Well, there really wasn't much more to do technically because the requirement was very straight forward. I just said we want to put solenoids over the entire deck and I had to be able to reach them by signal from the typewriter, and of course this is nothing more than a microswitch under the typewriter key. That's what we used were microswitches. They had already built this box in the middle which was a stepping switch made by Automatic Electric in Chicago as I recall. So it had a bunch of wires coming from the typewriter and from the calculator that met with this little programming device, which would now be a computer, of course, a little microchip, but at that time it was just simply a sequential stepping switch that would read out in sequence and would know if it had to tabulate before it printed or to place a decimal point for example before it printed, that type of thing.

NORBERG: Run by relays, I assume?

RYAN: A relay and a stepping switch. Very simple.

NORBERG: How did it differ or how was it similar, whichever is the more appropriate way to answer the question, to

the Burroughs machine?

RYAN: The Burroughs was a completely mechanical device, had no electronics in it. If I understand how it was built inside, it was a series of adding machines that calculated by repeat addition. You know, columns, and move the columns. The printing mechanism was a like an adding machine printing mechanism and it had a typewriter which was a manual typewriter hooked into the front of the machine which let you put a name and address and that type of thing on a bill. So it was totally different. This was a widely used electric typewriter, the most widely used one in the world, the IBM Model B, and now to be able to add calculating power to that was a clever, clever approach. We got good response.

NORBERG: When you say this was the first thing you participated in in ownership, how did that come about? What sort of contract did you have with the comp any that made this possible?

RYAN: I didn't have any contract. When I negotiated to sell it to Friden -- I did that around the swimming pool of the old Jean Harlow home incidently, it was owned by a friend of mine -- the head of Friden came down and we sat around the pool one day and negotiated. So we set up a separate corporation called Computyper Corporation and that would be the corporation that would own the product. We transferred the product to Computyper Corporation out of Benson-Lehner, which was owned by two men, really, Benson and Lehner. And at that point, they gave me a small piece of it, I think 25% or something like that.

NORBERG: And they kept the other 75%?

RYAN: Yes.

NORBERG: What happened to the engineers that had worked on this ?

RYAN: They stayed there.

NORBERG: They stayed with the old company?

RYAN: With Benson, and I went with the product to Friden.

NORBERG: And did they benefit from this product at all?

RYAN: It started them on a path to becoming a hundreds of million dollar company.

NORBERG: Well, I don't mean Benson-Lehner. I'm talking about the engineers. What did they get out of it?

RYAN: They didn't get anything out of it. That was not untypical. But the invention, if there was one, it wasn't a technology per se, it was an application of technology. There was nothing really new technically there. It was solenoids which had been used before. It was brushes. It was a stepping switch. It was putting those technologies that existed together in a way that might have made it useful to someone. I wouldn't call it state of the art. Certainly it wasn't. It was an everyday good application of technology, at that time.

NORBERG: Just to finish the story of Benson-Lehner even though you went with the new company, you said that they had gone on to be a rather large million dollar company.

RYAN: Well, no, Friden. Which one were you talking about?

NORBERG: Oh, I'm sorry, I thought you meant Benson when you said that.

RYAN: No, Benson became much larger, but so did Friden as a result of us. Friden really got big. Big, in two steps that we'll cover later. Friden really grew from 25 million to 100 million.

NORBERG: Okay, but let's complete Benson so that we can then drop it.

RYAN: Okay. Benson then went on and built more product, improved what they had, and a couple of years later, two, three years later, asked me to come back with them after I'd been with Friden for some time. I don't know how you want to handle that chronology of that.

NORBERG: I'd forgotten that you went back to them.

RYAN: I worked for both companies twice.

NORBERG: Okay, so you went with the new company; you went with the new product.

RYAN: I went with the company with the new product to Friden.

NORBERG: But was that in a new division, the Computyper division?

RYAN: That simply disappeared. It was a legal structure rather than a practical one. So they simply turned over this product, the Computyper which we had made, to their own engineers to bring to market which was a terrible mistake.

NORBERG: Why?

RYAN: Well, I had a hell of a falling out about it, because I recognized that what we needed was electrical engineers to make this thing work. Certainly there was nothing mechanical about this thing that was a mystery. But instead of hiring the kind of talent that was necessary to really productize this and bring it to market, they turned it over to their chief mechanical engineer. He was a nice guy and smart, but unequipped for the job. So the result is, instead of having anything out on the market in six months, they lost over a year. It was a disaster. Total, total disaster.

NORBERG: Why was it a total disaster just because they were delayed six months, say?

RYAN: Well, they were delayed well over a year. They could have been to market quickly and taken advantage of the lead they had at the time. The result of that is that I went in shortly after I got there -- it was probably six, eight months after I joined the company -- and resigned, because I felt what they were doing was wrong. It was crazy. So they had a big meeting of all of the guys and asked me to tell them why I was leaving, so I did. And they said, "Well, you can't resign." [laughs] "Well, I don't know what you're going to call it, but I'm leaving." And they said, "Well, take a leave of absence." I said, "You can call it anything you want, but I'm leaving." And I did. We moved back to Los Angeles and I did some consulting work, public accounting.

NORBERG: I'm still not clear of a couple of things though, George, and one of them is what was going on in other companies that made this delay ultimately fatal for Friden to bring this product to market?

RYAN: It wasn't fatal. It was just costly, just terribly costly. It wasn't fatal. They probably spent a million dollars, which was a lot of money in those days, educating this guy in something he knew nothing about. They could have gone out and spent \$25,000 hiring a good guy -- less than that in those days, 40 years ago you didn't have to pay those kind of wages -- so they just spent an awful lot of money educating the man in an art that he knew nothing of. I was an impatient young guy and couldn't stand it. I just left.

NORBERG: This was taking place up in San Francisco . . .

RYAN: In San Francisco. San Leandro. They had this huge factory that made calculating machines by the score, you know. Automatic screw machines that you put in metal and plastic in one end and at the other end a calculating machine came out [laughs]. It was the damndest thing you'd ever seen. I can remember one of the incidents that happened during that time that really told you something about Benson's mind, because he was really unique. He predicted to the management of Friden that all of the functionality that was in that great big calculator that they were building -- and they were number one in the world -- would one day be available in a package no bigger than a

matchbox, and this predates the microchip by I don't know how many years.

NORBERG: Well, at least eight.

RYAN: Yes, he saw that coming. He saw it coming. Interesting?

NORBERG: Yes.

TAPE 1/SIDE 2

NORBERG: All right, so you came back to Los Angeles and you worked as a consultant. For whom? What sort of consulting jobs did you have?

RYAN: I did accounting, mostly. It was during this period that my Irish luck really stood me in good stead. I was vaguely dissatisfied with my career and thought that a graduate business degree from Harvard would be helpful. So in spite of two children and a wife to care for, I applied for admission. A prerequisite was the GSAT--a higher level scholastic achievement exam. When the results came back I had scored in the 99 1/2 percentile! Naturally, I thought that acceptance would follow automatically. I was crestfallen when the letter from Harvard said otherwise. I had been turned down--no explanation of course. As things developed it was the luckiest day of my life. I might have ended up in some Fortune 500 company somewhere on the East Coast. My old friend Charlie Ross of Touche, Ross told me at the time that it was the best thing that could have happened. He was right!

NORBERG: This would be in what, 1953-54?

RYAN: 1954, 1955, in that time frame. And during this brief stay at Friden, one of the things that I did with Larry Taylor (who was the VP of marketing up there and sort of became my mentor) while we were engineering the computer and he had come upon a company called Commercial Controls that built the Flexwriter. Do you

remember that?

NORBERG: Yes, I do.

RYAN: Punch paper tape writer. So Larry took me to New York with him on at least one occasion to meet the president of Commercial Controls (Charlie Oggsberry ?) in an effort to buy it for Friden. Larry couldn't get it past Johnson, who was the Friden president, inactive, but he was the big shareholder. So Larry and I wanted to get this thing because we saw how it would tie in with the computer very nicely, because now if we could add that calculating capability to a punch paper tape device you can see what we would have. It would be a hell of a boost up. Well, it never got through. Couldn't get it past Johnson. So when I left, they continued that effort to acquire Commercial Controls and finally pulled it off. Well, Larry called me up one day and said, "I want you to come back." I said, "Larry, I don't want to come back up to San Leandro. I have no desire to do that." He said, "Well, why don't you run Los Angeles for me?" And I said, "Larry, I've never sold anything in my life." And he said, "That's bullshit, you're a salesman." And I said, "Larry, I'm not a salesman. I'm an accountant." He said, "No, George, you're a salesman." And he kept at me and I said, "Well, Larry, if you think I'm a salesman I must be. I must really be." So I tried. I went back to Friden a second time and he made me branch manager. It was the first factory owned branch in the history of the company. You see, when they acquired Commercial Controls they acquired a branch here that was selling Flexowriters. So I became the branch manager down on Wilshire Boulevard. Of course the old calculator guys around the country that I'd known were taking bets as to how soon I would fail [laughs], and surprise of surprises I became probably one of the most successful branches in the country. Made a lot of money. And I was getting an override on the business, so the income was just staggering for me at the time. It was a lot. I was making over \$50,000 a year back in the mid-50s.

NORBERG: Amazing.

RYAN: Amazing as a branch manager. Learned a lot about marketing and selling. Had a lot of input into the factory. During that time, we built Collectidata which was a factory data collection system, and I had a lot of say in how that

product went together because the first major installation was put into Northrop here in Los Angeles. The product developers often would call me into San Leandro to meet with them to discuss with them what they should do. Another product we did was take their ten key adding machine and hook into the Flexowriter. Now that doesn't sound like anything very exciting, but remember that was 40 years ago, and there was no ten key keyboards on typewriters. So now we added the capability to not only add mathematical totals but to ten key enter onto a Flexowriter, which would print and punch tape selectively as you wished. We sold the first big installation of that to a division of Transamerica Corporation, their consumer loan division. They had bought one of the first File computers in the world. It was a great box, as big as this room. You walked inside of it to service it. It was all vacuum tubes. The application was consumer loans. They would create a reproducible master in the Flexowriter, enter loan data on the ten key keyboard, and at the end of the day they would not only have these masters, but paper tape which captured the fundamentals of that transaction. The paper tape was so voluminous that they captured it in big barrels and at the end of the day they would take this, believe it or not, barrels of paper tape and feed it into the File computer. It worked. [laughs] Unbelievable. Well, during that period I also got to know Max Palevsky.

NORBERG: Before we go to Max, can we go back to the sales agency you were running in Los Angeles? How many people did you have working for you?

RYAN: Well, not very many at the beginning; I hired them all. When I ended up, I must have had 15 people, all salespeople.

NORBERG: Yes, all salespeople. Other than the Northrop Company, which you mentioned, what other companies were these 15 people plus you selling to?

RYAN: I can't remember the names. All kinds of companies large and small. Tube Sales was a very large one. These were very, very esoteric applications for the time, because we tied in the Flexowriters to tape-to-card converters, for example. We were one of the first places in the country that really pushed that so that we could now tie our product into the IBM systems of the world. This was a hell of an achievement. And I had one salesman, John Joha, not a

very good salesman, but technically he was superb. He could make anything work. Where everyone failed, he could succeed, and he could program that damned tape-to-card machine like no one's business. So we did applications you couldn't believe and made them work.

NORBERG: Can you give me some examples, one example at least?

RYAN: I'm trying to think. This was a long time ago. Well, the one that springs to mind is this Tube Sales which was a steel wholesaler. They had to put out certificates on every shipment. The punch paper cards, not tape now, edge punched cards, were the product specification tub files that fed into the Flexowriter. You would print the shipping documents, and selectively punch data which went into a tape-to-card device and then into the data processing. It was a monstrously big system. Very, very difficult to do and he pulled it off. There were lots of others, but I can't remember them.

NORBERG: Okay, the reason I asked the question and maybe this will stimulate other reminiscences about the types of examples that I was asking about: This is the period in which major computing machines like the Univacs were now being sold to companies here in the middle 1950s, and in that case these were, at least to my knowledge, acquired by some of the aerospace companies to do design work as well as to do other kinds of work. Now, what's the niche that you people are trying to fill here with these devices? Is it merely on the business side, and, therefore, ultimately that job will be taken over by the computers and did that happen?

RYAN: Yes it did, of course. That's a whole other story, but certainly it happened. We were basically in automatic document preparation with byproduct tape going into some kind of a system, be it punch card or computer. We also sold a lot of Flexowriters to scientific computer manufacturers. I'm trying to remember the name of one here in the Valley. It's no longer in the business. They bought them as the device that sat on top of their computer. I've got a picture of it in my mind. I can see it. But their little scientific computer had a Flexowriter with it. That was the major input/output device on the computer, their scientific device. I can't remember the name.

NORBERG: Was this like Logistics or something like that?

RYAN: No, I believe it was Librascope. We sold them to aerospace companies. I can't remember the applications, but certainly at Northrop they were used in purchasing as well as the data collection system. So, yes, the computers were coming in then and they had a voracious appetite for data as you know, but paper tape certainly wasn't the way to go. We also sold them as input devices for numerically controlled machine tools. When we put in this first system at Northrop and I saw the tons of paper tape that were involved, like the one down at Transamerica as the paper tape going into that File computer, I brought the management of Friden down here and tried to convince them to go into magnetic tape.

NORBERG: Why? How did you know about magnetic tape?

RYAN: Well, I read and I saw what was happening and I said we've got to get out of paper tape and into magnetic tape. At the same time we've got to get out of this calculator business and into electronic devices. I'd met Max Palevsky out at Packard Bell. He was making a little delay line computer at that time for Packard Bell. So I asked Max, "Could you build us a very, very simple, rudimentary computing device that we could make a part of our Flexowriter so that it would calculate, add, subtract, multiply, divide; the simple multiplication and additions would give us some capability to do basic arithmetic functions, billing and that type of thing, payroll." And he said, "Yes, I could do that." All right, "Would you be willing to do it?" "Yes, we would." So I got the top dogs of Friden to come and had them meet Max out at Packard Bell and they vetoed it. They vetoed magnetic tape. They vetoed the electronic computer. So I stayed with them I don't know how much longer, I'm not clear on the dates here, maybe I can remember. During that time, Friden made me a lot of offers to go other places, to do other things, including Europe for example, which we never got together on. But I could never see myself being promoted out of heaven [laughs]. I was in it! I wasn't going to leave here. It was crazy to leave here. I was making a lot of money.

NORBERG: Did Friden take the opportunity to learn something from the sales office that you had here and establish other such offices around the country? You did say to me that was the first one that they had.

RYAN: Well, we were the first one. I set up all the systems, accounting systems, for the branch. I asked what I was to do and Larry said do whatever has to be done. That was the kind of guy he was. So they pretty much replicated whatever I did here in other offices around the country.

NORBERG: Which they then went on to establish or did they already exist?

RYAN: No, what they did, what they acquired from Commercial Controls was a very modest number of sales offices. The first one they really took over and ran was the one I managed. Then they brought those together in other cities and merged them into their dealerships, because remember, all of the Friden distribution system was comprised of dealers. None of them were factory owned, not one. That only came later as they acquired those dealers and folded them in. And the same thing happened here about a year or so after I took over the Commercial Controls section. Then we moved in and we acquired the calculator business from the dealer and it became a larger branch.

NORBERG: Something is puzzling me and that is how did Friden get any feedback from the field, the use of the machines and so on, if they didn't have any control over the people who were actually doing the servicing and so on?

RYAN: Well, they did. Remember Commercial Controls had their own service.

NORBERG: But I'm talking about before Commercial Controls, when you first went with them for example.

RYAN: Well, way back in the calculator days they had one or two people up in San Leandro that did applications on the calculator and they published little books on how you did a payroll and that type of thing. It was rudimentary but it worked. Very successful selling group. They ultimately became what I called the third strongest marketing group in America. IBM was first, NCR was second, and I always felt that Friden was number three. Very strong.

NORBERG: Now, you were running the sales office for how long?

RYAN: Well, that's what I'm trying to remember. Certainly three years, maybe longer. It's in that time frame.

NORBERG: Now, when did Benson telephone you and ask you to come back?

RYAN: At that time. Around three years . . .

NORBERG: Around 1957 roughly?

RYAN: Yes, and I'm not certain of those dates and I failed to go back and look. I got a call from Benson and they asked me to come and talk to them again. They offered me the presidency of the company. By that time it was a much bigger company.

NORBERG: What had happened to them in the meantime while you were away?

RYAN: Lots of things, mostly disasters [laughs]. They'd gone public, I think had gone back to the public market twice and had used all the funds.

NORBERG: To do what? What had they gotten the funds to do?

RYAN: Well, they were building plotters, bigger and better, film readers, the same sort of things that they had always done, but not well. Benson, while he was an absolute genius, had no talent for managing technical people. He literally drove them away from the company. It was a pity because he was so bright himself, but he never mastered somehow being able to manage that talent and he had some marvelous people, incidently, in the early days. Really bright engineers, bright as hell. But they simply walked away from him. The result was that they had product that was overpriced, poorly engineered, didn't work. When they called me up and I went out to go through the plant. I

walked through it. I had the financial statements, and I figured they were lying about a million dollars on the balance sheet.

NORBERG: When you say lying, what does that mean?

RYAN: Overstated. That the assets were overstated, simply weren't there or they weren't worth what they were stated at. You get a smell when you walk through a place as to whether it's healthy or unhealthy and whether it's real or unreal, and I sensed that it was sick and in deep, deep trouble.

NORBERG: Were they expanding to other markets at that time and that's why?

RYAN: Yes, another mistake. They'd gone into the camera business, high speed theodolite cameras, for filming missile ranges, that type of thing. I suppose that Guy Heron talked them into this business on the basis that they were already reading the films with automatic film readers, why not build the cameras. Well, it's a very, very complex business. I don't know if you know much about it, but it's a monstrous task to build a high precision, high speed mechanical instrument. When I returned to the company as president, I found out that my original evaluation was wrong. It was much worse than I had figured.

NORBERG: Why did you go back? Why did you take it?

RYAN: Well, I guess I thought I was sort of at the end of my tether with Friden. I had to move to go further, and I didn't want to get back into the political machinations of a big company in San Leandro. I'd been there briefly, I knew what it was, and I didn't want to do it again. I was making a lot of money as you know. So Benson offered me a very handsome package. I guess I would have taken it even if I'd have known the truth, because it gave me a chance to run the thing myself and that's really what I wanted to do. So when I got in and took the thing apart, I found out that it was really, really in desperate shape, headed for bankruptcy, really headed for bankruptcy. And the biggest drain on this little company at the time was the camera division. It was just a disaster. I didn't know what I was going to

do. The bank was owed over a million dollars. Dick Daniels was pressing us from Security Pacific Bank. I had to get rid of that albatross from around this little company's neck. Then I discovered a very curious thing. A little company, not so little, a company called Cinerama had contracted with Benson of all companies to build a 360 degree consumer camera, 35mm, 360 degree camera. Well I said, "What the hell are you going to do with this thing?" And nobody had any answers except that Nick Resini, this madman that had bought Cinerama, wanted it. And they had contracted to build it for some -- I don't know how many thousands of dollars, 50-60-100, I don't know what the number was, it's not relevant -- but Nick was really hot on this concept of a 360 degree film. So I said, "We've got to figure out a way to sell this thing (the camera division) to Nick." [laughs] So I talked to Benson, who I told you was very clever, and I said, "Bernard, we've got to figure out a way to look at this film. Hasn't anybody ever talked to you about that?" And he said, "No, nobody's ever discussed that." I said, "There's got to be a way to look at this film." And he said, "Well, there is. There's really a very simple way to do it. We'll build an inertial platform." [laughs] So we literally built a little inertial platform out of cardboard with a little electric motor, battery operated. When you held this little viewer up to your face and you turned your head, you were looking at a 360 degree picture. As you turned the picture changed. It was lovely. It wasn't very practical, but it was lovely. All right, so now I said I've got the answer of how I'm going to sell this thing. [laughs] I took this viewer and carried it to New York to Nick Resini's office on Park Avenue. His desk was on a raised dais in his office . . . the light over him . . . a powerful stocky guy and a very, very powerful personality, one that radiated power . . .

NORBERG: Now he's the one that made the contract originally to build this?

RYAN: That's right. He's the guy that wanted it. He was a rich guy who made his money mining coal or something in China, had gone to a movie in Paris one day and saw a Cinerama film and bought the damn company. So when I got there with Ed Jessup, who was our company attorney at the time, we talked for a moment and I showed him what we had. I showed him this little viewer and he went ballistic. He just went crazy. He was ecstatic that we had solved this problem. And I took it back and I said, "Well, Nick, you know this isn't yours." And he was shocked. He says, "What do you mean it's not mine?" And I said, "It's not yours. It wasn't covered by the contract. You bought the camera. That's yours. This is ours." He literally chased me around the office [laughs]. True story [laughs]. Well,

the upshot of that was they bought the whole damn division. I unloaded it on him. There's no other way to express it. I unloaded it on him. The result was I paid off the bank -- I think he paid me a million dollars or something for the damn division and I unloaded it -- paid the bank and we were clean. Then I downsized the company to make it rational again. I had to write off everything in sight. There was nothing left, and we really had to start over again. By that time Calcomp had come in and had decimated the business for Benson. They had done it by building a stepping motor. I don't know if you remember the step motor technology. Well, the old Benson line was analog, analog to digital converters, etc. So everything they did was analog positioning and it was very expensive to build -- big plotters with a cross arm that moved on x and y axis. Calcomp came up with a very clever idea and they built and designed and owned the bloody step motors. They could increment digitally to a high degree of precision and speed on a very, very cheap basis. Well, they were destroying Benson's business, and Benson started the business but hadn't kept up technically. So the first thing I did when I saw what was happening is I went to Paris. We had a little factory over there run by Jean Mourier and it was always a class A operation. Jean was a clever engineer. So I brought Jean over and I said, "Jean, engineering is a disaster here. Everybody that had anything of value has left. We need a digital plotter and we need it now. Not two years from today." So Jean sat down and designed and built a digital plotter that got around the step motor problem. Very cleverly. We didn't have any step motors that had the precision that we needed and also had the torque that would move a drum. The way he solved it was very clever. He made three drums -- a takeup reel, supply reel, and the tiny drum on which he was going to plot was in the center. Between these three rolls or reels was a space and he placed two fans underneath those spaces and evacuated the air creating a vacuum that pulled the paper down. So now there was almost no inertia in the system. So we could take the cheapest motor you could buy and drive the system. We had a digital plotter.

NORBERG: Now let me make sure I understand the design of this, George. These three cylinders, regardless of their size, are in a row so to speak.

RYAN: They're in a row, yes. [Draws a picture.]

NORBERG: Okay, that's what I had in mind. So it's almost like a film design in many respects.

RYAN: That's right. Clever.

NORBERG: Now what was going on in Paris that this fellow was running a laboratory over there?

RYAN: No, it wasn't a lab, it was a little factory.

NORBERG: Of his own or Benson had one?

RYAN: Benson. We had one in England, one in France, and one here. That later became quite a big company. Benson France became a very large company. I tried to buy it later, but I didn't. At any rate, at that time another thing happened that's interesting in the history of this business. Oh, wait a minute. Oh, this I'm now getting mixed up. At that point then it was clear to me that we simply didn't have the resources to go on. We didn't have the money or the people to start over again because we'd been to the public trough twice -- not while I was there but before I got back -- blown the money, damn near went bankrupt. We saved it and that was my great claim to fame, I saved it from bankruptcy. So I couldn't see that we had the resources necessary to really go out and rebuild it again, bring the talent in, build product, go. But we did a number of things. I brought in some guys from San Diego that were with the first electronic plotter. What's the name of it? . . . It created characters by projecting light through a mask onto film. What was the name of that outfit? General Dynamics may have owned it. We built the second one. It was a high speed digital printer. It was a CRT tube that created printing on film. There was only one other in the world at the time, the one out of San Diego. I brought that fellow in and we started and built our own. I brought Jean over and we got a plotter going, a small digital plotter. In that same time frame, I met Max Palevsky for the second time. The man behind Benson was Leonard Sperry, who had invested a lot of money in the company. Leonard was also investing in Max Palevsky. Max came into Benson shortly after I joined the second time. He needed a place to work.

NORBERG: Max needed a place to work?

RYAN: Yes. He was starting his company. So I gave Max an office, desk, telephone, and he started Scientific Data Systems in our offices.

NORBERG: Why would you give him this space and so on? Was there some quid pro quo?

RYAN: No, no. Just to be helpful. We had space we weren't using and Sperry was behind him and he was behind Benson.

TAPE 2/SIDE 1

NORBERG: You were talking about Palevsky who was being also supported by Leonard Sperry and that you were both now in the same building.

RYAN: Briefly. That's just a little sidebar as to some of the history that I in some way participated.

NORBERG: Okay, it shows a second meeting with Palevsky now, which in this case was on a fairly regular basis since he's coming in presumably every day.

RYAN: That's right, and I invested in his company. That was my second big hit. It could have been a lot more successful, because while I kept the shares beyond the public offering, I was starting my own company again and needed capital and I sold them out just weeks before he announced the sale to Xerox [laughs]. I made a lot of money. I can't complain, but it was just about half what I would have made if I'd waited a handful of days, but you don't know those things.

NORBERG: Let's go back to when Max came into this location and was starting his own company. When was that?

RYAN: I can only guess because I've failed to make notes of dates here. Early 1960s. Very early.

NORBERG: And you were still with Benson at the time.

RYAN: I was still with Benson. I had just come back, late 1950s.

NORBERG: This was before the rescue from potential bankruptcy?

RYAN: During the same time, all during that same time frame that I'm trying to make a payroll and keep the creditors off our back. It was at that time. I bought into Benson, too, unfortunately. I never made any money on it. I made the mistake of putting money into a situation that I knew was bad, but I guess as president you do those things.

NORBERG: Was that a time before which options were provided to the president?

RYAN: I don't simply remember. I think it was but I'm not certain about that either. If I'd have gotten options it would have been easier, but I made the mistake of buying shares.

NORBERG: How much longer did you stay with Benson?

RYAN: I stayed with Benson . . . oh, one of the other things that happened during these last days in the early 1960s with Benson is that we'd gotten a product line going, were advertising in Datamation, business was stable but not great, the new small plotter was coming along and I heard about a product in Detroit called the Dura typewriter. It was an IBM typewriter with a punch paper tape reader and a punch on it. So I went back to Detroit and met the people. Dura was a company that built parts for the automotive industry -- convertible tops, mower mechanisms, and I don't know what else -- but they were a very large and prosperous OEM supplier to the Detroit infrastructure. And they had acquired this paper-tape typewriter from a fellow who turned out to be a lifelong associate, Helmut Falk. He had developed a punch and reader that mounted on the Selectric mechanism, the first ball typewriter. Well, this was a

startling development for Friden, of course.

NORBERG: Why?

RYAN: Because the Friden Flexowriter was such a monstrous old mechanical machine. It was old technology, slow, noisy, ten characters a second, ponderous, weighed a ton, was built like a truck. And here was this nice Selectric with a ball and went about twice as fast and quiet, easier to use, and nice soft electric . . . well you know the keyboard and all those features. And Falk had put a photoelectric reader on one side and a punch on the other. It sounded like a hell of a stroke. So I went back and talked with them but didn't get on too well because I had strong opinions about what they should do and those opinions didn't mesh with what they had in mind. So we essentially parted on not friendly terms after one visit. And I went back to my place in Van Nuys -- we had moved to Van Nuys at that time -- and the next thing I know we get a call from them. They want to talk to me. So I went back to Detroit again, and the result of that meeting was that they wanted me to do their international marketing for them. So I said, "Well, fine. We've got a factory in Paris and we've got one in England. That will give us a foundation and we can build a marketing structure around that." So this little company called Benson-Lehner who had no reason to be in this office machine business suddenly was in the office machine business with a marketing arrangement. I came back and said, "Now that I've got it, what am I going to do with it?" So I called this friend of mine, Pete Taylor. Pete and I had worked together in Los Angeles for Friden, his father was my mentor. Larry Taylor was the guy that said "you're a salesman" and Pete was his boy. All the time I was commuting from here to San Francisco during the early, early days of the computer, I was staying at Larry's home and indeed using Pete's room as he was away at college. I called Pete, who was at that point working for Monroe, a part of Litton, in the computer division. They had a small business computer as you will recall, and he worked for Fred Sullivan. So I said, "Pete, how would you like to take the punch paper tape typewriter and move to Europe?" And he surprised the hell out of me because I had no thought that he would ever, ever do it. He said, "I'll do it."

NORBERG: Why did you think he wouldn't do it?

RYAN: Well, because it was so outrageous to take and pick up -- I think he had one child at that time, you know, not married too long, young wife -- and to pick up and move home and house to Europe and start a new enterprise there with a tiny little company behind him was outrageous, but he did it. So we [laughs] set him up, starting an international distribution company for data products. The first product was, of course, this typewriter. Pete went over and got it established. He settled in England and we started to build a distribution arm. Now in the meantime over here, as I have told you I felt that there was no sense in pursuing this much further. We didn't have the funding. [pause] I started to look for somebody to buy Benson-Lehner, and I did find a buyer and I can't even remember the name. It was somebody from either Texas or Louisiana, United Gas Pipeline or somebody like that. Why they wanted to buy it, I'm not certain, but it had to do with seismic work that they were in. So they bought the company. I didn't stay with it. At that time then I went back to the board of Benson and said, "We, Pete and I, want to buy the Dura contract even though you won't have it when I leave because there's no need for Dura to leave it with you." And indeed there wasn't. But it wouldn't have been ethical to walk off with it because I had negotiated it while I was there. I had a fiduciary responsibility to the shareholders so we negotiated a deal and I bought this piece of paper which I could have really had for nothing and we agreed to pay them, I can't recall, out of revenues, and we did. So then Pete and I started Intercontinental Systems -- ISI. And he lived in England and

...

NORBERG: Intercontinental Systems Incorporated?

RYAN: That's right, and that was in the 1960s about the time that Max sold to Xerox.

NORBERG: Oh, that's interesting, because that's late. That's 1968 isn't it?

RYAN: No, I think it's earlier.

NORBERG: Really? [The company was actually sold to Xerox in 1969.]

RYAN: Because I lived down at the bottom of the hill here on Woodvale Road at the time. I think it was early to mid 1960s. At any rate we started out, Dura was the only product we had, and soon we were very, very large in terms of the percentage of the business that was being done at Dura. We were doing most of it. At the same time, we were having a lot of trouble with the product, technical problems. Fred Sullivan, of Kidde now, had left Litton Industries because he had a power struggle with the big guys and came in second. He left and took over Walter Kidde Company. They were in the fire extinguisher business but he built it into a multi-product, giant. It's still very big. I don't know if he's alive or dead today, but it's a huge, huge operation. But he never really lost his love of the office machine business, the old calculator machine business, and the computers, and so on. So he bought Dura. We didn't know it. So one day we wake up and Litton Industries owns Dura, and here we are with a contract simply to distribute overseas [laughs]. You never know where you're going to end up in this whole thing. I don't remember how this all came about but I used to meet Pete in New York because I lived on the West Coast and he was in London and rather than either one of us fly across the ocean or across the continent, we'd meet in New York. So we met in New York and we met Fred there sometime after he bought Dura. It was at the 21 Club. I'll never forget this as long as I live. We were giving him hell at the bar at the 21 because the product was really bad. We were having all kinds of problems. We had to rework everything we got. Pete had left. He had to go catch an airplane I think, to go back and I stayed with Fred quite late at the 21. A couple of Irishmen drinking. He finally turned to me after I was haranguing him and he said, "George, you know, why don't you buy the goddamned thing." And I looked at him and I said, "Fred, are you serious?" And he said, "Yes, I am." I said, "I'll be in your office tomorrow morning." And the next morning at 9 o'clock I showed up at his office on Avenue of the Americas or someplace and I sat down and wrote a purchase contract and they signed it. They gave me "X" months to go raise the money, I think it was four million dollars. So I sat down, Pete and I and an old friend, Jim Bell, and we worked up a business plan and started knocking on doors. And we got the Rockefellers and Payson Trask, I think they were the two principal ones, to put up four million bucks and we bought it.

NORBERG: Im a little confused now because you started talking about ISI and then you started talking about Dura.

RYAN: Dura was the name of the product. It was the Dura typewriter.

NORBERG: But I thought you owned that.

RYAN: No, no, we owned the distribution only for overseas. Only the distribution. We didn't own it. Then we were blindsided a little bit because here Fred Sullivan comes in and picks up the company. He knew we were involved. Pete used to work for him and I knew him well. [laughs] So he picks up this company and I think he's smarter than I am because he figured out that the problems were really insoluble, so he sold it to us. We didn't overpay for it except it was a product that needed an enormous amount of work.

NORBERG: So he did to you what you did to Nick with the . . . [laughs].

RYAN: [Laughs]. That's about it.

NORBERG: So now you have a new product that you own yourself which you were trying to distribute before. What happened next?

RYAN: We set about setting up U.S. distribution. So we set up a bunch of dealers across the country and opened up branches, the whole works. We took it up from almost zero, four million dollars or so, to \$25 million so fast it would make your head spin.

NORBERG: But you just said that the product was not very good.

RYAN: Yes, I know, but it was good enough that we were able to get enough out there that worked, that stayed. I moved the factory out of a terrible hole in Detroit, built a new factory out in Colorado and we were really growing the company. We went public. We had a lot of money, but we were unfortunately slowly eating into that money. We were doing a lot of good things, though, during that period. Unfortunately we had a base of sand. It was moving under us and we didn't realize how badly at the time and I take full responsibility for that. But we did a lot of good

things. We'd gotten to know Heinz Nixdorf very well during that period and worked with him and we got to know his chief engineer pretty well, and we hired his chief engineer away from him. That's not generally known. We brought him to America because we wanted in that punch paper tape typewriter we now had, the thing I tried to get Friden to do years before.

NORBERG: Which was?

RYAN: Computing capability in this typewriter. We didn't want a general purpose computer. We wanted a special purpose billing kind of a computer to do basic arithmetic functions. And we brought this guy over and he started to build a small, general, little computer for us on better technology than he used at Nixdorf, because the Nixdorf technology we were never impressed with. Heinz was a hell of a marketeer, however. The other thing we did was to start to develop a magnetic tape device, because it was clear to me years before that paper tape wasn't going to prevail. The third thing we did, because this was such a wonderful product from an application point of view for word processing, much better than the Flexowriter, and in many ways easier to use than the first IBM automatic typewriter, the MTST -- magnetic tape selectric typewriter. Theirs was a cartridge tape. So we were competing really with two big companies at the time. We were competing with Friden with punch paper tape Flexowriters, but that wasn't hard to beat, really wasn't, and we were competing with IBM with their MTST. We could offer with our product business applications because we could use punch paper tape out into data processing converters. IBM's MTST didn't do that. It was simply a document processor. It was at that time that I coined the phrase "word processor." It had never been used before that I knew of, and I registered it at the trademark office in Washington, DC. So if you go to Washington, DC, today and look up "word processor," you're going to find that it was filed and owned by Intercontinental Systems, coined by me. So we were very active in word processing and we refined that system to a fare-thee-well. Word processing became really the biggest part of our business, and in Germany in particular it became a science. Colleges there, universities, used to offer courses with our product. Professors wrote papers on how to use this for automatic communications. They would get a communication in their office and they would simply say, "Paragraphs six, seven, three, two, eight" and you would get a personal letter back but it was all pre-canned. Ninety-nine percent of the stuff that people put out is pretty repetitive, but they don't realize it. Word

processors in Germany appealed to their sense of order and it became a very, very large business for us. It was our most successful market in the world. So the business grew, but unfortunately didn't prosper. We were doing a lot of innovative things in technology. One of the last things was discovering a little company called Pertec, in Datamation or someplace, located here in the Valley. I got on a plane and came down to see Hal Kurth, the founder.

NORBERG: Came down? Where were you?

RYAN: San Francisco. We had moved back to San Francisco again. And I met Hal Kurth, Stu Mabon and Eric Dunston. They were in a little tin shack out here in the Valley and I said, "Look, we need a very low cost digital tape recorder." As you know in those days the tape machines they were building were, what, 14" reels, reel-to-reel. Big, big machines. I said, "There's a hell of a market, Hal. We need them but not only us. The world needs a very small tape recorder at about half the price or less than you're charging for these things," because they were in the thousands and thousands of dollars in those days. They were huge. They were expensive. They were very precise mechanisms and cost a lot to build. He threw me out, he said, "Come on, get out of here. We're not going to do that. There's no market for it and you can't do it anyway for those prices." I wouldn't let up. I kept coming back at him and coming back at him and finally he said, "All right, we'll do it then." He had no firm deal from me because I couldn't give him one. I said, "We'll take some but you're going to sell a bundle of this stuff. It's going to change your whole company," and it did. It made Pertec.

NORBERG: What year are we talking about, George?

RYAN: It's got to be in the late 1960s.

NORBERG: Was ISI founded in 1964 or 1968?

RYAN: It was 1963-64. I'd have to go look it up.

NORBERG: 1964 I think was what was on your resume.

RYAN: This was 1968-69, so just a few years later, in that time frame. But as you know, this Pertec story then, that tape device formed the basis of their key-to-tape machine and launched them into a major, major company in the business and they became huge, and it was all based on that little mini tape deck. Hal Kurth will confirm that.

NORBERG: I guess I don't understand the technology well enough here to understand, because when I think of a tape recorder I'm thinking of the one we're using here and I don't think of any transitions between reel-to-reel stuff which we used to use for this purpose 20 years ago. So I'm a little uncertain about what the transition here is that you're talking about. What is the transition you're talking about?

RYAN: Well, at that time there were two kinds of tape recorders. There were the little audio things that Phillips put out and there was the big 14" reel-to-reel tape recorders that were sold into the data processing business.

NORBERG: For magnetic tape recording of data, not audio?

RYAN: Yes, these were data recorders, and they had built a nice little business but it wasn't going rapidly and once they developed the mini tape deck it just took off like a . . . just shot through the roof, became huge, very, very successful.

NORBERG: Do you know what sort of technical problems there were to going from the large 14" down to a mini deck?

RYAN: No, I can't. I'm not an engineer as you know, so I can't tell you. But all I know is that they fought me for months before they finally agreed to do it, said it was impossible. I wanted the moon and it wasn't going to be done, but they did it and it changed their whole lives.

NORBERG: Did you have any interest in this at all?

RYAN: Unfortunately, no. I should have. I didn't . . . Let's see . . . Was there something else that happened at this time . . .

NORBERG: I want to go back to Dura again because I don't think that story is fully told yet. Back at the time that you had this conversation with Fred Sullivan about it, he wanted to sell you the product. Did you just take the product as sold and continue to market that or were there some developments in between getting the product now of your own and selling it? You talked about the German engineer coming to work for you to build a computer, but that's separate from this development.

RYAN: We had him in San Francisco in the Bay Area there building that development and then we had another group working on magnetic tape and that's why I went to see my friend Kurth because I wanted a digital recorder for a typewriter or typewriter-like device. Small business computer if you want to call it that, because I couldn't mount 14" reels on a tiny, tiny little computer. We were constantly trying to improve the product, because it simply wasn't very reliable. We were getting them back not quite as fast as we shipped them out, but fast enough that it was painful as hell. It was costing us an arm and a leg, and in the last six month period before we finally sold the company, I think I put in a hundred engineering changes to try to stem the problems, but we simply didn't have the horses, and I was running the place so I've got to be responsible. I simply didn't pull it off. Pete Taylor knew the guy that was running Itel or knew somebody that did. Itel, as you know, was a big computer leasing company that had spread out into a lot of other things. They owned a printer company, and a disk drive company, in addition to the leasing. It had become a huge, huge operation, just giant. They expressed interest in buying us, a share exchange, and that finally came to be. It happened. They put their own guy in there to run it. They put our technical problems with their engineers of the disk business, they were high powered people but they couldn't solve them. So they ultimately sold the bones of that product to a young man that I'd hired off the street, out of college here in Los Angeles that had worked for me all during that interim period. His name was Farouk Arjani, from India, a superb guy. He came to work for me as a junior salesman and followed me to ISI and then he bought the remains, and built it into

a company called ARTEC and that became the word processor for Pitney Bowes. He sold it for about ten million dollars. So he solved the problems, and changed the technology some, but he built it and became very, very wealthy from it.

NORBERG: Now when he solved the problems had any new technology developed that made that possible by that time?

RYAN: Well, he switched over, I think, to magnetics of course. The other part of this little story . . . Two other stories developed here at the same time. Over here was this little German guy we had developing this computer. Because Peter wouldn't support him, he went back to Germany and built a small business computer business on what he was doing for us, and until recently was still going. Quite successful, not giant, because he wasn't much of a marketeer, but he had a good technical background. Our engineering department had a magnetic tape development. Peter sold that to Xerox along with that printer company in the Bay Area that Intel owned. What was the name of it? Diablo! It competed with the Ball technology. Intel owned it. He put those things together, sold it to Xerox, and I believe the first Xerox word processor really came out of ISI. Interesting?

NORBERG: Did he sell that at the same time as they purchased Palevsky's company or was this later?

RYAN: Oh, no. This is much later. Much, much later.

NORBERG: What was the size of ISI over time? Let's start at the beginning and go over time.

RYAN: Zero. And by the time we sold it, it was about 25 million.

NORBERG: And what about personnel? Just the two of you at the beginning.

RYAN: Two people, yes. We had lots of people. We had a factory full of them. We had sales offices all over the

country and we had distributors all over the world. It was a nice little operation.

NORBERG: Well, I was trying to find out the rough number of people because I wanted to find out what it took to run such a company in the 1960s. That's a period in which quite a number of firms like Hewlett Packard and others were beginning to grow as well in rather substantial ways, not quite on the computer market yet but certainly on numerically controlled instruments and various kinds of control instruments, not necessarily numerically, but control instruments to service different kinds of industries. So what companies like Hewlett Packard are doing seem to be selling to . . . I don't know the right words here that I'm searching for, George, but they are selling to companies which are using the Hewlett Packard products to make another product. But you're not doing that. You're making a product to sell to an end user. Now, we were talking about the time when you were a sales representative to Friden and selling to firms here in the Los Angeles basin. What sort of companies was ISI selling to?

RYAN: The same ones.

NORBERG: The same ones. So you were competing now with Friden and others.

RYAN: Absolutely. IBM, Friden. We were competing head on, and we used to take them on in our advertising . . . one other little sidebar in the history of the data processing business: before we bought Dura -- or ISI bought Dura -- the second product that we acquired for distribution was Mohawk Data Sciences, and that was an interesting . . . again I had read about this little company and went up to Mohawk near Utica, New York, and met with the principals. We convinced them that we were the company to set up their international distribution and we were competing with Friden, incidently, who wanted it, NCR and others, and how we got it I'm not quite certain.

NORBERG: Why did everybody want the company, do you think?

RYAN: No, they wanted distribution rights to this key-to-tape device. Remember theirs was the first key-to-tape device. It simply dropped the tape into a bin.

TAPE 2/SIDE 2

NORBERG: Well, this was like the File computer business wasn't it, where all the tape was being dumped into a barrel?

RYAN: Yes, except that's the way their key-to-tape worked.

NORBERG: They were still using that same sort of technology then?

RYAN: Because there was no take-up on it. And that's the product that built Pertec, because they went on to compete against that product. They came out with a later version of that key-to-tape and as I knew something about it, I was involved in that decision.

NORBERG: But key-to-tape in that sense was key to magnetic tape rather than paper tape.

RYAN: Right. Key to magnetic tape. Mohawk started the business. They were the first ones in it. Johnson came out of Remington Rand, Univac, whatever it was. He started that company and built it into a very, very big enterprise as you know.

NORBERG: I want to make sure that I understand what you're telling me, though. The Mohawk was also to magnetic tape, not to paper.

RYAN: It was a magnetic tape device.

NORBERG: So Mohawk and Pertec were competitors.

RYAN: They became competitors, yes. It was an incestuous business. We set up that whole thing for Mohawk overseas. We used to have conventions of the dealers in Monte Carlo because by that time we had headquartered in Monte Carlo and I used to travel there about six times a year. Our contract was expiring, we'd had a wonderful business going, really wonderful.

NORBERG: What contract was expiring?

RYAN: Distribution contract with Mohawk. We had Art come over with Dick Rifenberg his sidekick and we introduced them to all the dealers and we had a big convention, huge convention in Monte Carlo. Very successful. And the next thing you know we got canceled and they took the whole thing over. Thanks very much.

NORBERG: Who took it over?

RYAN: Mohawk. They just cut our throats. They didn't have to renew, but . . .

NORBERG: Let me go back again. I want to pick up another thread that you threw out there. You convinced Pertec to go into this business of the key to magnetic [tape]?

RYAN: No, no. I convinced them to build the mini tape deck and that lead them into the key-to-tape business. (This was much later.)

NORBERG: How did Mohawk get into that business then?

RYAN: They didn't have a tape drive on their's, remember? It was quite a different thing. All they had was a little mechanism that transported half inch magnetic digital tape through a head so that if you hit an A they were able to . . . I don't know if they recorded and stored 80 columns or what, I'm not certain, I can't remember now, but I think what you did was you keyed in the entire record, the 80 columns, and then it would write on tape and just drop it into a bin.

So there wasn't a transport mechanism involved with a positioning read/write that you need in a complete digital system. It was simply a write system. There was no reading.

NORBERG: Were there other competitors besides Pertec and Mohawk?

RYAN: Not at the time. No, Mohawk was the first. It was the only one.

NORBERG: And then Pertec gets into the business with a different system. So they provide an advanced technology basically.

RYAN: That's right. Then later on, of course, the key-to-disk people came in, IBM included, but that's another story. Another thing we did at the time in ISI that didn't work is that on the other side we learned of the world's first electronic calculator being built by Montecentini Edison in Rome. So Pete and I went down there and began a very long and absolutely hilarious chase for this thing because everybody was after it -- Friden, NCR. They all wanted the U.S. rights to this damn thing. I wished they'd gotten it [laughs]. But we got it. Two guys, with no resources, convinced one of the largest industrial concerns in Italy, even today, to give us the distribution rights, and more than that, to consign the goods.

NORBERG: Now what does that mean, George?

RYAN: We didn't have to buy anything. We walked away with a contract -- don't ask me to explain this whole thing, it was a circus -- as it turned out it wasn't a good deal for either side because the product, while it was exciting to look at, functionally was lacking, and the chief engineer was absolutely inflexible in terms of making improvements in the product. It was the world's first electronic calculator. It was about the size of an old Friden. It was about 15" wide and about that high. It wasn't as heavy as the mechanical device, of course, but it has a Nixie tube display and a lot of electronics inside. But functionally it didn't offer that much more and it was over twice the price of a rotary calculator. So it didn't sell. It simply didn't sell, and it disappeared. It not only didn't work for us here in America, it

didn't work anywhere and they weren't successful. The guy that founded it though turned out to be extremely successful. His name was Massimo Rinaldi and he went on to found his own computer company. He built all the off track betting machines, later sold that to Olivetti, and is now on the board at Olivetti and one of the big shareholders.

NORBERG: What did it do to ISI though, the fact that you got this distribution contract with the Italians?

RYAN: It didn't do anything to us. It didn't hurt us.

NORBERG: Neither positive or negative, I take it?

RYAN: No, because I didn't have any real exposure to it you see. But I felt badly about it because it simply didn't work.

NORBERG: How about exposure in the sense of loss of good will, if you sell a product that doesn't work too well?

RYAN: Well, no, it worked. The product worked. It didn't fail. It just functionally didn't do enough to sell. When I said didn't work, I should have said it wasn't a truly marketable product, because it didn't provide enough functionality to the user to be sensible to make that investment. It was quiet and that was about it. And it was fast. But you still had to write down the answers and it didn't do it very well.

NORBERG: Even in the late 1960s you still had to write down the answers. Was this typical?

RYAN: Yes. Absolutely. By that time, of course, IBM had a billing machine out -- it was the Card-A-Type. I think that's what they called it. Feed cards in, you'd have a big deck of cards and it would calculate an invoice or whatever. Very expensive device. I don't know how successful it was.

NORBERG: Going to trade shows continually? What were they like in the 1960s? You mentioned one in the 1950s.

What were they like in the 1960s?

RYAN: They were the same. They got bigger and better, exciting to go to. We were constantly looking for new technology, new things that we could market or acquire. So it was a very exciting time for us and we had some hits and some misses. Neither Pete nor I were, of course, engineers. He was a born and bred salesman and I came to that later, so I was more conservative.

NORBERG: How many people did you rely on for the engineering knowledge? You mentioned the German person from Nixdorf's operation that came over. Who else did you rely on for this?

RYAN: When we acquired Dura, of course, we acquired the entire engineering department and then we augmented that. I'm trying to think how big an engineering department we had. Certainly there must have been 15-20 people in it up in San Francisco. The factory was in Colorado, but all the engineering was right in the Bay Area.

NORBERG: And you were still living up there?

RYAN: Oh, yes.

NORBERG: What was the advantage of keeping the engineering separate from manufacturing? Why not put them together?

RYAN: Well, you couldn't get the engineers to move to a small place in Colorado is the answer. I'm on the board of a company now that has a factory in Riverton, Wyoming. You can't get technical people to go there, simply can't get them to go.

NORBERG: Do other firms have the same problem? I think of Hewlett Packard in Colorado, for example.

RYAN: It's not the same as a little town. Riverton is not the same.

NORBERG: I see, okay, so if you're out of Denver in Loveland it's okay.

RYAN: We were in Greeley, Colorado up in the middle of nowhere.

NORBERG: George, can you reflect for a few minutes about your interaction with the engineering people? How did this happen? I mean, did you meet with them regularly? Did you go into the laboratory? Tell me a little bit about that.

RYAN: Yes, I can. I don't know what to tell you. All I know is that I did.

NORBERG: Why did you then? What was the point of going into the laboratory?

RYAN: Because I was always pushing them, I guess.

NORBERG: In what way?

RYAN: To get done what I wanted done.

NORBERG: How did you determine what you wanted done?

RYAN: Well, I don't know. It wasn't as formal as it is today. In those days in small companies we simply decided the features or functions or products we wanted and then we sat down and wrote down what those were and turned engineering loose to do it. It was not as formal as even small companies are today. Not as formal, quite informal. We'd simply write a spec for what we wanted. Sometimes we probably didn't even write it. We'd say, "We need to do this" and the engineers would do it. For example when we did the computer, there was nothing ever written.

NORBERG: Okay, but that's the 1950s. We're now ten years later or more and engineering people are presumably differently trained -- I won't say better trained, but certainly differently trained as they're coming out of programs in various colleges and universities. Companies themselves as you pointed out are becoming more formal and therefore the kind of people they hire have a different formality about the way they do things, too, and that's on the one side, that's inside the company. Now when you go outside the company, where's the information coming from? Is it coming from any field offices or are you out there getting it yourself?

RYAN: Salesmen or sales managers are constantly pushing for one thing or another, always.

NORBERG: And how did this occur within ISI? Did you have regular sales meetings?

RYAN: Oh, yes. We set up sales clubs patterned pretty much after the old Friden idea.

NORBERG: Which was?

RYAN: There were annual conventions, quotas, free trips, where the company really replaces the church, becomes the central part of the salesman's life. That was the way IBM and NCR and Friden built their sales organizations, and we did the same because we were brought up in that culture. So we set up annual conventions, rewarded the successful people with free trips to some exotic spot and at that point we'd have sales presentations and product introductions, and a lot of hellraising along with it, of course.

NORBERG: How did quotas get set?

RYAN: Oh, I don't know. I can't remember that. We knew what we wanted to do in a particular area and at a particular time and we set what we thought was a reasonable quota based on the number of salesmen.

NORBERG: How did you determine that? On the basis of your manufacturing capability? On the basis of a perceived market? On the basis of planning?

RYAN: Perceived market, and what we had to do to cut the nut, to make a profit.

NORBERG: What was the manufacturing capability? How many machines could you put out a year, say in the middle 1960s or something like that?

RYAN: Of the typewriters?

NORBERG: Yes.

RYAN: Well, we were putting out, I don't know . . . let's say the average price was \$3000 or \$4000 dollars. We were putting out \$25 million dollars worth. How many is that? It's a lot.

NORBERG: Well, 100,000 a year? 10,000 a year, I guess.

RYAN: It's a lot. If we get \$25 million, if they sold for \$1,000, it would be 25,000 so it must have been about one-third of that, about 8,000 machines.

NORBERG: About 8,000 to 10,000.

RYAN: That's about right as I recall, about 600, 700 machines a month.

NORBERG: That's what I was after, 600 or 700 a month. So with a 20 day/month work period, you had to put out a lot of them. If a salesman exceeded his quota in a given year, would that become the quota for the following year?

RYAN: Oh, I don't remember.

NORBERG: I'm trying to compare it with the larger firms like IBM obviously, where we do know something about how these things were set and so on because they talk about it a lot.

RYAN: Well, I didn't personally do all those things either. I had a VP of marketing that ran that and I don't recall how we did it. But we really screwed it up.

NORBERG: How?

RYAN: We didn't solve the technical problems at Dura. We solved every other problem. Product planning, new ideas, hitting the market, knowing what the market needed and so on, we were way, way ahead of our time, but we couldn't make the damn machine work. I couldn't solve it and it cost us the company, and it's a pity because I'm sure it couldn't miss being a major, major company, couldn't miss. Because we were right in the office products environment, and all the word processor companies that came after us -- think about the size of some of those operations -- that business was ours. I invented the word. So my big mistake was, after we failed to solve the technical problems, was not starting instantly again with a new product. I should have started over with key-to-disk.

NORBERG: But you didn't do that.

RYAN: My dauber was down, you know. It was a tough thing to do, to build this thing from nothing. It was going full steam and then to not be able to solve that damn product problem was a very tough psychological thing to overcome. So my dauber was down for about a year or so. I was depressed. And it was a mistake. I should have picked myself up by my bootstraps and just said, "Hey, this is too good a business. Let's go get it." And it was. It was huge.

NORBERG: So what did you do then?

RYAN: Well, I came back to Los Angeles and Hal Kurth called me.

NORBERG: Did you leave the company?

RYAN: Yes, I left the company, because they put the wrong guy in to run it, and Hal Kurth called me and asked me to come and be his assistant. By now they were building this small tape and they were setting out to make a key-to-tape device with Bob Kleist running that end of it. I became Kurth's righthand guy. I proposed to Kurth that we do what later became the Cado, but couldn't get his attention on it.

NORBERG: Let's leave that for tomorrow. Let me just finish with Kurth and what was going on inside Perdec at the time.

RYAN: A revolution.

NORBERG: It was?

RYAN: Oh, yes.

NORBERG: Of what kind?

RYAN: Well, the company had succeeded just beyond all expectations based on this little tape drive I'd convinced them to build. Everybody in it, of course, was rich on paper including Hal Kurth, who was a very bright . . . he's one of the brightest minds I'd ever met in my life, technically. He's just startlingly bright. Well, Hal was suddenly transformed from a very solid conservative engineering environment to a very fast moving, high toned, lots of money environment, and he got carried away. He started taking up with the lady next door, divorced his wife, married the neighbor, moved into a mansion in Bel Air. His co-founders didn't think he was paying enough attention to

business, so they began a revolt, a palace revolt. I got caught in the middle even though I wasn't a participant in terms of ownership or anything. I sided with Hal, because to me he was the only rational guy to run the company. He's really an incredible, incredible mind. At any rate, the upshot was that he lost and I stayed in there briefly and they brought in Ryal Poppa. At that time, Ryal was there just a very short time, and my back was starting to act up. I'd had a ski accident about three years before that and my back was giving me lots of trouble so I went into the hospital. I had no idea I was going to have surgery. The doctor came in and examined me and he said, "You should have that thing fixed." So I had surgery.

NORBERG: When was this?

RYAN: About 22 years ago. 1971, about then. Hal's out of the company and Ryal Poppa is running it. Just before that something else happened that I've got to tell you about, because it shows you how opportunities are missed in business. As I mentioned earlier, I'd known Heinz Nixdorf quite well over the years. Heinz was buying a lot of OEM equipment to go into his computers, tape drives and so on, things that Pertec built. We weren't doing any business with him. At the same time, I had a sense, just smelled, that his distributor in America was not going to cut it. It was the old Victor adding machine company in Chicago that was distributing the Nixdorf line here in America. So I went to Germany, called on Heinz and I said, "Mr. Nixdorf, I just have a sneaking suspicion that you're going to get rid of Victor and I want you to consider Pertec and let me tell you why." So I said, "This is just to be a perfect marriage. You buy into Pertec, "X" percent for "X" dollars, you put the distribution of your product there, you buy all of our peripherals to go into the entire line, and we'll have ourselves the makings of a hell of a company." He liked it. So he came to America -- and he was always on the go at very high speed and that's probably why he dropped over of a heart attack at such a tender age -- so I got him together with Hal Kurth. I even rented a jet because he had to be in San Francisco for a meeting and they didn't really have time to talk, so I said, "Hal, what we'll do is lease a jet and put you and Heinz on that jet and you'll get to sit down and talk with him." The mistake I made was not going. Nothing happened. Of course, the next step was he did can Victor and started his own distribution here and became quite successful. But that could have been a magnificent marriage between those two companies and it never came off because these guys simply didn't communicate.

NORBERG: Back to the other serendipitous event, you're in the hospital having surgery and Kurth is having these problems with the factory.

RYAN: That's right. Actually, he's out now. He's been kicked out, poor guy, and Ryal Poppa takes over. That's sort of the end of that chapter because at that time the surgery was so badly done that I was literally on my back for a year. It was during that time that I started to read everything in sight about what was going on in the world of electronics, The Electronic News, Datamation. Read about the microchip just emerging, floppy disks, line printers, and so on, and I conceived the business plan for Cado.

NORBERG: Okay, we'll pick up with that tomorrow.

DATE: 11 JUNE 1993

TAPE 3/SIDE 1

NORBERG: George, just as we left our meeting yesterday you mentioned that you had your first bout with back difficulties and that caused you to be on your back in bed for up to a year and you had been reading a good deal during that time. George, what is it you were reading during that year? Do you recall any of the details?

RYAN: Yes. I remember Electronic News, of course, and Datamation, publications of that type to try to keep informed as to what was happening technically in the field. I read about the new Bell terminal. They called it the Model 40 teletype. It was their first CRT and line printer to replace the old teletype. As you know, teletype was owned by and a part of AT&T. At the same time, about that time frame, the floppy disk came into being, but it wasn't used as a storage media. It was used initially by IBM as a key-to-disk device, because number 1, it wasn't fast enough nor was it reliable enough to store data, or at least it was not regarded as such. And at the same time, of course, we had the very beginnings of the microprocessor.

NORBERG: So what year would this be, 1974?

RYAN: About 1973 if my memory is correct. So putting all of those elements together while laying on my back having a Scotch [laughs] through a straw -- Beverly had to buy these bent straws for me -- because I literally had to stay on my back. The pain was enormous and it continued that way for 20 years unfortunately. I conceived of first making the Bell system smart, because I knew that by law at that time AT&T was precluded from adding any smarts to anything they had. They were simply restricted to the communications industry. So I thought wouldn't it be a nice way to start a business if we could essentially make a version of the old Card-A-Type, if you will, with the Bell terminal. Since they couldn't sell it maybe we could build a business there, and ultimately I foresaw at that time that Bell would be in the computer business. It had to happen. Communications and computers had to come together. So my thought was if I could build a rational kind of a business I could sell it to the telephone company. That would be my exit. So I sat down and wrote a plan to do that, to use the floppy to store basic data -- names, addresses, part numbers, whatever items, much like you would on a punch card or a punch taped -- and that you would also use that same media to record selective output that would go to a computer. The third element, of course, was the little microchip which would do basic data handling and arithmetic functions. It wasn't very complicated but it would be a step forward for Bell or Bell users and it would allow us to build a company.

NORBERG: What would it entail to build this company? I mean, what was the company actually going to do?

RYAN: The company was going to build a box, if you will, that would interface to the Bell peripherals -- the printer and the CRT. They called it the Model 40. It was built like a bloody truck. Very expensive, well put together like everything Bell ever did, and we were simply going to be an add-on to that device. We were going to be a peripheral to the peripheral, if you will. So I sat down and I wrote a business plan along those lines. My first line of the business plan was to ultimately sell to the Bell Company, and the next step was to find somebody that could technically do what I had in my head. So I put out feelers among friends and it didn't take long. I got an immediate response from a friend down in the South Bay area that said he knew exactly the man to do the software. His name

was Jim Ferguson. So I met Jim and we talked. I told him what I had in mind. He liked it very much, was very excited about it and was convinced he could do this very, very quickly and very easily. He had been the architect behind the Northrop small business computer. So he was certainly qualified and could talk rationally about what had to be done. At that point nobody had used a microprocessor as a computer. They had used it as logic replacement in designs. There was no operating system per se on a microprocessor so far as we knew in the world. So we set out to do something that hadn't been done. Now in order to do some of these things we had to change the way we looked at floppies as well. When we put this thing together in a rudimentary way -- oh, we had to have a hardware man, of course, to design the circuitry for us and that was easier for me to come by because Bob Thorne had worked with me at Pertec and I knew him to be a very, very competent designer. So I got Bob together with Jim and the three of us became very enthused about this whole thing and they were prepared to go forward. Neither of them had money and I didn't have a whole lot at that time. I had lost a lot of my wealth, but I was able to finance it month to month out of my own pocket.

NORBERG: Now were these men getting a piece of the action as far as salaries and so on?

RYAN: Yes, they were. They were the only ones getting paid. In fact, Bob was the only one getting paid for a long time because he didn't have any money and Jim and I worked without income and I literally paid Bob's salary in those early days. So we started this activity in about 1973. We started putting together the plan and designing hardware and software, looking for supplies that we were going use, that type of thing. We went through a number of microprocessors looking at which one we were going to use.

NORBERG: Did you intend to build this yourself or just assemble it?

RYAN: Well, I guess you'd say we were going to assemble it, because there was nothing to build in terms of fabrication. Much like electronics are put together today. We'd stuff boards and do the checkout and do all of the design. It was our product but we certainly bought all the elements.

NORBERG: Who was in the microprocessor business at the time? Anybody besides Intel?

RYAN: Oh, yes. One we came very close to taking was North American, and thank God we didn't [laughs].

NORBERG: Why?

RYAN: Well, it would have been a blind alley. We picked wisely and I don't take any credit for that, incidently. By that time I had recruited John Moser, who had been with Computer Machinery Corporation, a key-to-disk company. If you'll recall, a very successful company in the business I didn't follow up on when I left my previous company. John had been a part of that activity and I think before that had been a part of Max Palevsky's company. He was a very, very bright guy, very solid. And I wanted a guy to really be an operating man in the company. I didn't feel that after my last experience that I was the guy that should be doing that so I brought in John Moser. John and I and Jim and Bob then were the nucleus of this little company called Cado. I was still funding it myself and we rewrote the business plan and John and I sort of hit the road trying to get venture capital. It was a very, very difficult time. It was in the early 1970s and we were in a depression, if you will recall. You couldn't give away gold bricks. Nobody wanted to invest in anything. Nobody. So it was a very, very difficult start for us. We did get a prototype put together though, and this is an interesting part of it. One of the things we had to figure out was how we were going to sell the bloody thing once we got it put together, and I turned to my old associates from my Friden days. Friden by that time had grown enormously, gone into the computer business, and had been acquired by Singer and later had literally been destroyed by Singer. It was a huge company, very successful, very broad line of products, and Singer's management just literally drove it into the ground. Well, the Friden people scattered, and as I told you it was my judgement that theirs was probably the third best marketing company in the country. And a lot of those young guys -- because they were younger than I, most of them -- had become dealers for Phillips Computers under the leadership of one of the ex-sales managers from Friden. So when I found out that this organization was sort of in place I said, "Ah, that's where I'm going to go. I'm going to steal those people." They had a ledger card computer, a visible records computer, that is it was one step up from the old accounting machine. Instead of being a mechanical device, it was a mechanical-cum-electronics device. It had visible records -- you would insert ledger cards in through the

front feed platen, it would record the transaction, and it would compute, but output was a ledger card. There was no input or output other than the keyboard and the cards. And very successful, incidently, very successful company, and a very successful sales organization.

NORBERG: What was the name of the company again, George?

RYAN: Phillips. Phillips product, but the guys that ran their own sales companies were federated loosely under a name called Benchmark. They didn't all use the name Benchmark, but many did. So there was a group of them around the country and they had designs on becoming sort of a national organization of their own.

NORBERG: Who were these people, by name?

RYAN: There were many. Let me think if I can think of names now, it's been so damn long. Sam Virdin, Houston, Wolf in Philadelphia, Larry Finch, San Francisco . . . they were scattered all over the country. Joe Bayer in Seattle. We had a group of them. Chicago. They were all in the major cities with one degree of success or another. So this was a ready made organization sitting there waiting to be taken over, I felt.

NORBERG: Taken over and not just contracted with?

RYAN: No, contracted with but taken over in the sense of getting their loyalties away from their present supplier and transferred to me. I was one of the first people in the computer business that said you should use VARs except the word VAR didn't exist at the time -- value added reseller. Well, I said we should have dealers -- we called them distributors. One of the great problems in raising capital for the company was that venture capitalists couldn't understand that. They said, "If you don't control your own sales, you're going nowhere." And I said, "That's the last thing you want to control, because the profits you make there are an illusion. They're not there and as soon as you own that branch you'll find that one out because I've been on both ends of that one before." But it was very, very difficult to convince venturers that that was the way to go. But we stuck with our guns and said we're not going

to own anything, we're just going to build product and sell it through distributors or dealers, which were later on called VARs by the industry. The first time I met with these people as a group (I had a friend inside the group that was telling me where they were having their meetings from time to time) was in Los Angeles. So we pulled together a demo, Jim and I, and took it to this meeting, and as soon as their meeting broke up I had them come into a demo at a hotel down near the airport. Well, they really liked it. They really loved this thing with a floppy disk and a CRT because their product didn't have anything like it, of course. But they pointed out that it had a shortcoming and a very vital one. They said, "You've got to really add a compiler to this thing." We had sort of a straight set of application oriented instructions. A salesman could program it. It was that simple. Much like an old IBM or Friden machine. So they said, "Why don't you just add a compiler to this thing and make it a full blown business computer." Jim said, "We can do that." Nobody had ever done that for a microchip but he said we'll do it. So we went back to the shop and Jim literally built a complete computing system around that microchip. Nobody, as far as I know -- and you probably know better than I -- had ever done that before. So we took, I think it was the 8008, and built a complete operating system. The reason it worked so well is unlike most computers that were built then and are still being built today, we started with what we wanted to do and worked backwards into the computer. It was absolutely different than people do today or even did then. They'd build a computer and then the people that had to use it had to figure out how to make it bend to their wishes.

NORBERG: What sort of things would the user be doing with it connected to a telephone system?

RYAN: This was going to be now aimed at the small businessman, small business computing. That is, taking care of his perpetual inventories, receivables, payables, payroll, general ledger. In other words, a complete accounting system for small business, because that was the thrust of the sales organization that I'd put my fingers on and we said we'll do what they want because they're the guys that are going to have to go make this thing work. So I give them full credit for that. They looked at it and they said if it's missing this piece.

NORBERG: Do you remember what sort of acquaintances Ferguson had in knowing about software and knowing about compilers, and so on? You mentioned you think he was with Palevsky at one point.

RYAN: No, no. That was John Moser. Jim Ferguson had been the chief architect at Northrop Computer and Northrop had built a computer based on the operating system of his own design. At any rate, Jim really understands computing. He also happened to be Scottish.

NORBERG: Is that relevant [laughs]?

RYAN: As it turned out for us, it was, because he was very frugal in everything he did. He never, never wasted resources. So here we were with a chip that was very limited in resources, with a floppy that wasn't really an acceptable kind of a medium, and he turned those resources into gold simply because he looked at it very critically at every stage. We started applications, then, and worked backwards. What he did was design a computer and operating system based on its use, which was general purpose business accounting, not scientific. So we weren't a scientific device. And word processing, that's another thing.

NORBERG: Okay, so this is a slightly different market than the original business plan, isn't it?

RYAN: The original business plan got altered. We hadn't even built that machine. We had only a prototype. So the business plan got altered because when I got a group of about 20 guys in this room that day and they saw what we were doing, while they liked it very much, they suggested that we change directions. I give them full credit for that. It wasn't me. But I give myself credit for listening because they were out in the field and they had a better feel at that point than I did. Jim then sat down to design the system with Bob and out of that came our first product, and it was absolutely unique. Let me tell you some of the things we did technically. I may not explain them the way an engineer would, but I've asked Jim to give me some notes and I've written these things down, so please bear with me. As I said, I think we were the first company in the country and perhaps the world to build a full operating system on a microchip. We took the Intel chip and built an operating system around it, full compiler, interpreter, the whole works. The language that Jim used was a sort of a Basic, a modified Basic, and the language itself became the operating system so it was extremely efficient. Everything worked on one byte sub-routines. Today we talk about RISC

computers -- reduced instruction set computers. I think if we looked back and we applied the same terminology to things, we would say we had the first RISC computer, because it had a very small list of instructions that did a lot. They were one byte sub-routines. It was a very, very clever design that Jim pulled off. The second thing that he did was -- because we wanted to make it multi-tasking, we hadn't yet done multi-user -- he put in base register addressing -- this was an IBM term -- and what it allowed him to do was with a single byte switch users and give them the same set of addresses and the hardware would interpret what that meant and move the instructions. With a single byte. Faster than hell. One byte did the whole damn thing so we could expand indefinitely incidently and that's the way it worked. The third thing we did was use the floppy as a computer storage device. Again, nobody had done that because it wasn't reliable and it wasn't fast. It wasn't fast. It was as slow as hell. But how did he do it? He was so clever. The first thing he did was use a hashing algorithm to store data, so that he stored the address on the track with the data. So, number 1, you cut down the disk accesses from multiple to one. If you entered an address on the terminal it instantly went to the correct track. Instantly. If the track didn't exist or if the address didn't exist, you knew it instantly. It would tell you that record didn't exist. If it existed, it read it instantly. It was faster than an IBM 32, and this was a floppy! So we were beating a hard disk system in speed and performance, simply because of the way he hashed to the track and stored the data and the address on the same track.

NORBERG: How large were these floppies?

RYAN: Have to look at a picture. I think they were eight inches. I can't remember the capacity, but it was about 300K. That was a lot of data for a small business, and we put two in every system and later went to three and four. We had two-three-four floppies in some systems.

NORBERG: And how did that slow the system down, with multiple [floppies]?

RYAN: It didn't. That's the clever part of this whole design. It never slowed it down. Because we were hashing to a track it only went to that track, you see. The second thing he did to make the floppy more useful -- because remember it was rather small in terms of capacity -- is that he used variable length records. So now instead of staying

with a record that was 80 or 128 characters long (512 bytes), he said it's as long as it is. If it's a record that's four characters long, or if it's a record of 40 characters, he just dropped everything else. Sector boundaries were totally ignored in our systems. We didn't have them. Unique. We were able to compress onto a floppy as much data as you got onto a hard disk! Numbers were also stored in binary form, saving space and making them machine readable. We could not have used floppies without compression as their initial capacity was just too limited.

NORBERG: What does this mean for a small business that's trying to do billing and inventory and so on where the record is going to have multiple fields in it? I mean the buyer's name, the product, the price, the use.

RYAN: No, those are all separate records. The name and address is one record. The product and price another record, and so on. Those are all records, but they were variable length. We could stretch them or compress them in any way we wanted, but one thing, we never used up one byte of data space that we didn't need to use. The result was enormous efficiency. And the second thing, of course, with the hashing system and putting the address on the track so we never had to search twice. There was only one disk access in our system, not two or three. Faster than hell. We took this kind of klutzy floppy and turned it into a piece of gold. It really worked. We found out that it was extremely reliable. We had found a problem in the disk controller that we got from Shugart. We discovered it and fixed it. He'd been shipping the damn things to people, but because they weren't using them for computers, nobody had found it. We did. So the disk became a very, very important aspect of our system. We eliminated disk accesses. We more than quadrupled the capacity of the disk. We sped up the whole process by going directly to the track, and we had single byte shifting between users. The other thing that we did was to program in overlays. Remember, the whole machine had 4K memory. Now today you can't think of anything in 40K or 400K because they're profligate with their use of memory. I've always felt that it was deliberate on the part of the manufacturers. They just want to use up hardware. They don't give a damn about efficiency or anything else. They only care about selling you pieces of hardware.

NORBERG: That's where the money is.

RYAN: That's where the money is. So we started up, and again Jim being Scottish, packed everything into 4K -- 2K RAM, 2K ROM. They said, "How can you build a business computer in 4K?" He did, and he did it because he allowed the programs to be written in 256 byte overlays. So the programmer was disciplined. At first it was a little difficult for our people to get used to this because they were used to writing a complete program and then debugging it. Well, now you wrote 256 bytes and then you wrote another 256 bytes. Actually it was easier to debug because you had such a much smaller piece to work with. He did another very clever thing. Since we didn't have a lot of memory to work with, only 16 bit addressability on the machine, he stored the overlays on the floppy. When you called up the application, the system would call in 16 overlays at a time. So any one user could have 16 overlays in memory. The machine knew enough that it monitored what was happening with the applications and would only keep those overlays in memory that were being used. This technique was later used by VAX and was akin to what was later termed "structured programming."

NORBERG: But did it always have 16 overlays?

RYAN: No, only one at the outset. If it had to go get another it would eliminate the one that wasn't being used and bring it in. Clever as hell. So at any given time, again with very few disk accesses, it didn't slow the machine from doing what it was supposed to be doing. The user wasn't aware that any of this was ever happening. It was transparent to him. So the machine was extremely efficient, extremely fast, and it outperformed the IBM System 32, which was a monstrous single user product at the time, and our major competitor. The men that get all the credit for this are Jim Ferguson who had the clever, clever technical approach, and Bob Thorne who translated that into hardware. Over on my wall you'll see the first computer. That's the whole bloody thing.

NORBERG: It looks like about a foot square.

RYAN: That's about it. That was it, and it built the company. Once we had the product we took it to the dealers. Because it was only hooked to the AT&T device, prospects often felt that they were buying from AT&T [laughs] because all they saw was this big printer and CRT and the little box underneath was hardly visible.

NORBERG: George, why did it have to be connected to the AT&T system at all? It would seem like it would be free standing now.

RYAN: It was. I'll get to that later. Remember, the basic idea was to ride the back of AT&T, fill a niche that they couldn't fill for themselves by law, and ultimately to sell to them. I never lost track of that concept.

NORBERG: But that suggested that information was going to be coming over the telephone line.

RYAN: Not necessarily.

NORBERG: Then I don't see why it would need to be connected to AT&T at all.

RYAN: No, it was only connected to AT&T's product. It wasn't connected to their line. You could use it as a communication terminal because it was basically a teletype. It was either a 5 bit or 8 bit teletype. But the fact is that they were rarely used that way, although they could be. That was inherent in the product. But remember the ability to communicate with those products at that time was simply on a teletype line. So it wasn't communications in terms of what we know today or even ten years ago.

TAPE 3/SIDE 2

RYAN: So we started. We acquired financing April 1, 1976. Up until that time we had run it as a partnership.

NORBERG: Where did the financing come from?

RYAN: Wells Fargo. Wells Fargo stepped up to the plate, the first one.

NORBERG: What did they require as collateral for this?

RYAN: No collateral, just simply equity. We didn't raise a whole lot of money at that time, but we never had to raise more either. That's the curious part. We became profitable instantly.

NORBERG: So did Wells Fargo have a percentage of the company?

RYAN: Oh, yes. I can't remember the numbers but I have them all in the records. Of course, there were other investors along with them. Our new mayor in Los Angeles, Dick Riordan, was an investor. He's a friend. Dick's law firm represented us. Joe Carbone, who was a partner of Dick's at the time, had been counsel for Max Palevsky's company, and John knew him of course.

NORBERG: Very interesting.

RYAN: Yes. Well, I think some of the first venture money Dick Riordan made in his life was Cado. He went on to do the same thing many, many times and made over 100 million dollars. Interesting [laughs]. Okay, what was the next thing?

NORBERG: So now you've got these dealers who have taken this on . . .

RYAN: Well, we've not got them all, because they don't all fall over in a heap. I personally built the sales organization. I went out and knocked on doors and chased these guys and twisted their arm until I got them in my camp, because a lot of them simply didn't want to change. They were comfortable and they were making money. Why invest more in some new strange device in a company that's pretty small and God knows what will happen. They were being backed, of course, by a very large company called Phillips, so they didn't want to jump out of that comfortable bed into an uncomfortable one. So it took me a long time. It took two years of lots of hard work and a lot of travel just hammering on these people, going to dealer shows constantly showing our wares and trying to get

them excited enough to make the move. We didn't ask them to drop Phillips at all. We just simply asked them to take this on.

NORBERG: But you did say earlier that you wanted them to shift their loyalties to you.

RYAN: Of course, but that wasn't going to happen in one fell swoop. It was going to take time. I had to get my nose in the tent first and once having done that then I could slowly take them away. We would overwhelm them with product and they would simply not have the resources to do anything except with us. That's at least what I hoped. That's what happened ultimately, but it took a lot of work to get there.

NORBERG: Now, how did Cado expand? I know through sales, but what's the pattern of expansion here?

RYAN: We started in 1976, shipping our first machines in June of 1976. I don't remember what the volume was but it wasn't very much, but it was profitable. Within two years we had come out with a multi-user, multi-tasking device. Again Jim and Bob did this very, very quickly. Didn't change the operating system, nothing. We simply built a slightly larger version. It was still a single board and now we had a 16K memory, and in that 16K we ran four applications simultaneously with no degradation! Well, in 1976 we did a couple of million dollars probably. By 1977 we had doubled to five million, in 1978 almost 14 million, 1979 30 million, 1980 50 million. We were among the fastest growing public companies in the country. In fact, we were listed by Inc. 100 in the top half dozen companies. In Southern California, we were number one in the fastest growth area in 1980 I believe. In the State of California, we were always among the fastest growing companies in the State. We were always among the fastest growing small companies in the country.

NORBERG: In 1980 what was the number again?

RYAN: In 1980 we were up to 50 million dollars and made over four million profit.

NORBERG: So about 10%.

RYAN: Yes. Unbelievable profits. But we were profitable from the beginning.

NORBERG: Now by that time, 1980, who was the principal competition? Was it still IBM?

RYAN: Oh, yes. IBM, Burroughs, NCR.

NORBERG: So they had all put out these small business machines.

RYAN: Yes, to one extent or another. Basic Four also. But nobody produced the value that we did. Nobody. At the very beginning we had started advertising, because I was always a believer. We were small and didn't have a lot of resources, so I came up with a concept of advertising in Business Week because that was largely a small businessman's magazine. I asked them to let me put in a two column inch ad, something they had never done. So I designed a little two column inch ad, it looked like a coupon, heavy dotted lines all around it. And it just said in very large type, "\$2.50 an Hour, a Full Small Business Computer with Software." And the leads that came along from that [laughs] were just unreal.

NORBERG: Now, what did "\$2.50 an Hour" mean?

RYAN: It meant if you leased this thing for three years, you could have the computer and all of the basic software for \$2.50 an hour or \$100 dollars a week -- the cost of a janitor. It was true.

NORBERG: What were the charges from places like IBM and Burroughs and so on in terms of a multiple of that, say? Three times? Four times?

RYAN: Well, no, at least twice. So this created interest. The small business computer market was bigger than any of

us realized. It was huge. The market was just beyond description, but we never realized ourselves how big it was. And in a way we were self-limited because of the way we were distributing. But that advertising campaign started us out on an advertising philosophy that stayed as long as I stayed with the company. At one time we dominated the in-flight magazines. I always took a four color, quarter page ad on the righthand lower corner on the basis that when you flipped the page you had to see the ad. The number of leads we were generating became so enormous that we had to hire an outside company to process them for us and our cost per lead dropped down to two-three-four dollars, where our competitors were paying 20-25 dollars for leads. The pity is that we produced so many that, like anything else that is free, they became valueless to our distributors. In other words, they weren't given the kind of follow up that they deserved. They used to come in in stacks and I'd go to the dealers office and I'd see these printouts from the service company just stacked up on the back of a credenza. It would just break my heart. It was like money laying there that wasn't being used. But we never stopped the advertising. It was always a very strong part of our strategy and the result was that people around the country always thought Cado was about five times its actual size, because it was so well known. They thought this was a huge company and it wasn't. It was a small company.

NORBERG: Where was the company actually located?

RYAN: In Torrance, California.

NORBERG: And all of the assembly was being done there?

RYAN: Oh yes, everything. We had a factory. The last factory we had was the old Toyota building. It was a very, very large place. That was just before we merged the company into Contel. We had, I think, around 300 odd employees and by that time our distributors had over 500 people, between service, software, and sales. At least that many. I could look these things up to be precise, but it was a pretty substantial operation worldwide. This is an annual report of 1980 and it shows the U.S. and it also shows worldwide.

NORBERG: Oh, yes four operations in Canada and in the far Pacific -- six including one in Australia, and quite a

number in Europe and in Latin America.

RYAN: About one third of our business was overseas.

NORBERG: These were distributorships, is that right?

RYAN: All distributorships, yes.

NORBERG: Well just by sort of a quick assessment of the number of asterisks in those maps it looks like 300 maybe.

RYAN: Oh, I don't think that many.

NORBERG: It looked like 100 in the United States alone. Well, maybe not.

RYAN: I haven't counted them, but it was a substantial cover. Now some of them were really successful, others were not. The top 20% did 80% of the business. We weren't any different in that respect than anyone else.

NORBERG: George, what had you learned in your earlier international distribution that was effective, let me say more effective, in Cado perhaps? How did you do it differently in the late 1970s than you did . . .

RYAN: Did it the same. When I wanted to start international operations with Cado, I went to Europe to meet Pete Taylor. Pete and I had parted when ISI was sold and he had started up a little distribution operation of his own in Europe. I took our product to the Paris business show and had Pete come up to Paris. As a result of that, we got together and he signed on to set up the European distribution for me. So we did it exactly the same way as we did before. We had some really successful people in Europe. One that comes to mind in particular, Denmark. They just dominated the legal market. We had a similar guy in New Zealand that dominated the legal market down there. Remember this was a word processor as well as a computer, a really strong word processor. Given my background,

we put that in early on. We had the capability that most word processors didn't have: of relating to data bases. So we could sort and merge and use letter writing at the same time. We could look at a file, pick up a name and address selectively, and then write a letter or document selectively. That enabled our distributor, for example, in Washington, DC, to dominate the Hill. Almost all congressmen had Cados and the reason they had them, is that we allowed them to get at their data base and produce personalized letters to send out to the poor voters. As far as I know, there might be a lot of them still there. I really don't know [laughs]. But we sold a lot of stuff.

NORBERG: I'm trying to remember. I was in Washington at that period. I was there in 1979 and stayed until 1981 when I came to the Babbage. I remember Lanier as being the big word processor for government offices at the time.

RYAN: That's right. They were. Bigger than we were. But we dominated the congressional offices. We didn't get the broad based word processor business at the secretarial level. We simply didn't compete in that area. We had a too powerful machine, so ours were in those niches that required some data base handling and Lanier didn't have that. I'd forgotten some of this data we've pulled out of how many small companies that were in the country and the size of the market, because it was never really fully touched by us or indeed anyone else, and still isn't in many ways. But there are pictures here of the assembly plant. It was a good size. So we grew it. In 1978, we introduced a four-user machine, and later on, I can't recall the year, there was tremendous pressure by our dealers to expand the use from four users. Three CRTs, for example, and a printer on-line, all doing their thing at the same moment was our total capacity. From the user's point of view there were absolutely no degradation, as it was an interrupt driven system. Because it was so fast and so efficient and it would switch between users at such a rapid pace with base register addressing, it was transparent. You could be printing a document and three other people were working keyboards and they all were not slowed down. Nobody knew it. Now that's astounding on a floppy disk based system with a single processor and a 16K memory. I challenge anybody to beat it today! This is still the best system that's around, it was so fast. Later on we became limited as some of our customers were pushing us for more stations. Four wasn't enough.

NORBERG: Could they hook another user on with an open port or were there just the four ports?

RYAN: Just the four ports and the operating system supported four users, so although we could have expanded it indefinitely, the hardware was 16K and we would have had to build a brand new piece of equipment. So the pressure became rather severe to increase this capacity. I sat down with Jim and Bob one day and said, "How are we going to do this?" Clearly, one way was to start and build a new system, an eight user system. And I suggested that while that was a good idea we should try to get something out more quickly. Why don't we just hook two Cados together - parallel processing they call it today. They didn't call it that in those days. So we built, as far as I know, the first parallel processor. We took two systems and connected them to a single data base. (By that time we were using hard disk.) We designed a monitor that controlled the disk. Now suddenly, we had two processors, eight users, and a single data base. It worked beautifully.

NORBERG: Did this take the pressure off?

RYAN: It took the immediate pressure off, because we were able to fill the needs of the customers and the unit sales became larger because the dealers were selling bigger systems. But that pressure never, never really stopped.

NORBERG: Did that expand the market somewhat differently in terms of the size of the business that you could then address?

RYAN: Oh, of course it did. Yes, we went to the larger enterprises. Cado never owned the application software. We arranged for all the basic software, the standard packages.

NORBERG: From whom?

RYAN: From a company in Minneapolis. Ann Winblad owned it, if you've heard of that name. They licensed it on a one time fee to all of our dealers. That was arranged through Joe Mooney who owned our distributor, Benchmark Systems of Minnesota. And later on as each dealer became more niche oriented, and they did, they built software for

particular industries and then that software got spread around through mutual license agreements. So today Cado or its successors are really large in, for example, doctors' offices. They must have 20,000 users today. Credit Unions are huge. Things that you don't hear much about but are dominated largely by Cado or its successors. It's still going.

NORBERG: When you say "or its successors" . . .

RYAN: Yes, Cado is still going but under another name. It's the same company. Later on in time, to finish the technical story, we started to develop what we called the Tiger, and that was a . . . I'm trying to remember if it was a 16 or 32 user system. Ultimately, we were designing a 128 user system by the time I left. So at that time the PC was just showing its head, we had to make a decision. Did we go down market or did we go up?

NORBERG: Would you clarify that? What do you mean by "did we go down or did we go up?"

RYAN: Well, did we go down market to the PC -- and thank God, I think, at least from Cado's point of view, we made the right decision. We couldn't have done what was done there. Just had the wrong environment. We decided to go up market to larger systems, because we had a base of users of tens of thousands by that time, and they were constantly pushing us for more users, for more terminals. So we made the decision to go upscale, not down scale and that was brought about partly by a massive failure on our part, on my part. Back in 1979, I thought I saw a very large market in the very, very small businessman. He had to have a system that was cheap as dirt and one that he could literally put in himself. I said, "Why don't we build our own CRT, embody the computer in it," -- much like the PCs of today, right -- "and we'll build a tutorial around the basic applications." So we hired a man that Bob knew to come in to design the CRT. Unfortunately, what should have been a very simple task turned out to be a monstrous one, and I can't tell you what happened except that we fell behind enormously. But we had started this program of building what we called the CAT - the computer aided tutor -- to go out and recruit a whole new group of dealers underneath our distributors. These were going to be the typewriter dealers, the thousands and thousands of small office equipment, copy machine dealers, and so on, to sell this product into the very, very small business market. That's what we called it, the very small business market. It was a good idea, but terribly executed. It really, really

screwed us up and I have to take full responsibility.

NORBERG: Why do you say it was terribly executed, George?

RYAN: Well, I probably jumped the gun on it. I announced it before it was a reality. [pause] We took it out to our distributors and we had to get them to sign a new contract, of course, allowing this to happen because they had exclusivity in their territories, which was always a bone of contention between us. We recruited, in a very short period of time, over 200 office equipment dealers. Just that fast, because it was a hell of an idea. And they liked it. This was really going to be something. We recruited them before we really had the product, which was a mistake, of course, looking back.

NORBERG: I'm a little confused. A couple of minutes ago you said that you had decided not to go down scale, but this sounds like going down scale to me.

RYAN: It was. This preceded our decision to go really upscale. I'm sorry I'm getting a little out of time frame here. This goes back to the 1980 time frame, when we came up with this concept of the CAT. We hired the engineers, as I told you, and we gave them the simple task of simply building a CRT really and then hooking it into the basic board that already existed. And we were going to restrict it to a two user system, that is a terminal and a printer. It had word processing in it as well, which was very, very important. We encompassed that right in the system. So here was a powerful stand alone PC, if you will, with word processing and a full set of software with tutorials. If it could be made to work, it would be an absolute home run. Well, we were about a year late in getting the terminal built, if you can believe it. What should have been a cookbook operation turned into a horrendous problem. Don't ask me why. I never understood in my life. The second thing is that the group that I contracted with in Minneapolis to write the tutorials, and the person I put in charge of that, just bombed out. So it became a disaster, a total disaster. Maybe we were trying to do something that couldn't be done, in that we didn't have at that time an interactive type of structure. Like today's PC, there's a lot of interaction between users but that's developed over a period of 20 years. At that time I was trying to make an interactive system out of something that could not do it, hence the tutorials were

very limited in use. What you really had to have was examples coming back and forth on the screen before the user and we never really pulled that off. So I was way ahead of my time and ahead of the technology perhaps that we had at our fingers. So I didn't have the software people and certainly didn't have the hardware that would have made it possible. The result was a disaster.

NORBERG: Did your people consider going to a different microprocessor chip? . . . 8008, but had you gone to the 88 by that time?

RYAN: Oh, I'm sure we had. I'm sure we'd gone up there. I can't tell you for sure because I don't know.

NORBERG: That could make some things possible. It would mean redoing the compiler, of course.

RYAN: Yes. Well, it would have been a total rewrite. I got ahead of myself. I really did. I saw this market out there for personal business computers, if you will, and I introduced it before it was ready.

NORBERG: It's in that same annual report for 1980.

RYAN: That's right. So this was one of my great screw ups. I really messed it up because I got the wrong people and I jumped the gun. I moved too fast.

NORBERG: This then was a loss for the company, but it didn't sink the company certainly.

RYAN: No, no, because we were still going strong as you can see by the numbers. So I covered it. We sort of buried the mistake. It was buried in the volume, but it was a bloody nose nonetheless, and one that I felt very badly about, because I was right. I was ahead of my time but we simply didn't have the resources necessary to do the job. If I'd stopped to think about it a little longer I probably should have realized that. But it was a hell of an idea.

NORBERG: So following that failure then you decided to go upscale.

RYAN: Yes, then we licked our wounds and started developing a large system that we called the Tiger.

NORBERG: When you say a large system, what does a large system mean here? Are we pushing up to mini computers?

RYAN: Oh, yes. We were competing fully at that time. The product that we were selling when I left, which was at the end of 1982, was a 16 user machine as I recall. We called it the Tiger, and that was the guts of the company for another two years.

NORBERG: Who would be the principal competition then? Is it now DEC?

RYAN: DEC. They had over 300 dealers around the country selling business applications and we were competing head on. It was an exciting time. The dealers became like a family. We set up a sales club called the Inner Circle early on and every year quota makers -- everybody would be brought to the convention -- quota makers came free. We paid their expenses and their wives' expenses, all transportation, everything. And we had tremendous programs, you know, presentations of new products every year, software, hardware, and lots of partying. We took them to all of the wonderful places in the world -- Scottsdale, Arizona, Palm Springs, California. At Palm Springs in 1978 we introduced the four user system and they almost tore down the building, because it just was so exciting. That was the year we shifted from Bell; we shifted away from AT&T. As you said, we didn't have to be hooked to them and we didn't. In 1978 we introduced what we called the 20/4. The old model was the 40/1 because it was the system 40 from Bell and it was a single user. In 1978, we introduced in Palm Springs the 40/4, and then after we had shown it and it created pandemonium among the dealers, we had a curtain behind the curtain and I opened up the second curtain and here was the 20/4 with a low price terminal on it and a low price printer. We had cut the price about in half, because we went to a TI printer and we went to somebody's terminal, I can't remember. The biggest mistake we ever made was to make our own terminal [laughs]. These people used to then gather annually. The last sales meeting I held as

chairman of the company, I took them all to Monte Carlo.

NORBERG: All? How many is all?

RYAN: Oh, there were hundreds of people there, and we paid the expenses for the husband and wife for the quota makers. If you don't think that turned them on in 1982 [laughs]. We flew them to Paris, took them on the high speed train, lunch in Lyon.

TAPE 4/SIDE 1

NORBERG: George, let me take you back a minute here. I think while I was playing with the tape I may have lost something in that. What is the year that you took these people all to Monte Carlo.

RYAN: The last year in which I was chairman of the company. It was Spring of 1982.

NORBERG: There are two things then that are worth noting about this period 1982. One of them is the either sale, merger, or takeover, whatever is the appropriate name for it, with Contel, and the second is your leaving. Let's take the Contel situation first. How did this come about?

RYAN: Over time, I had been in constant touch with AT&T and in some of the material that has been printed in business magazines, it talks about Bell's new flexibility and so on. This goes back to 1979.

NORBERG: This is in Business Week, July 2, 1979.

RYAN: And here's a picture of me with a Bell terminal and printer, same issue. There were many publications during that time talking about Bell's policy because instead of welcoming us into the fold, they constantly built walls, curiously enough. I never got beyond third level management at Bell. I busted my head against it. I got them to do

what they called interpositioning. They allowed somebody to hook their product between the line and themselves, and this was a big change in Bell's attitude. It really came about by the guy that beat them on that very famous modem case. I can't remember the name of it. But they constantly put up walls instead of welcoming us into the fold and helping us market in any way. They kept pushing us away, which is curious because, of course, later they found that they had to get into the computer business even though they did it the wrong way at the time. So we in 1978, after getting our head kicked in constantly by these people, we said the hell with it. We went and got another terminal and another printer and switched. And then our business really switched almost 100% out of Bell, because their product was so expensive. Our dealers just took off with the new pricing and the new product. It was better looking and the TI printer was quieter and we were able to offer better value to our users.

NORBERG: We're talking about Contel. Heading toward Contel here.

RYAN: Oh, Contel. All right. All during this period, I continued to have enormous back pain. In fact I'd go to cities and sometimes go into spasms and people would have to go get these big elastic belts for me because I simply couldn't walk. But I carried on during all of that period. At the same time I was developing another physical problem, so by 1982 I had told the board that I thought I ought to step down, because I was simply hurting. I had just lost the drive that you have to have to run an aggressive, hungry business. So I went to the board and told them this, and I said, "Now you've got to really earn your pay as directors. Who are you going to put in charge?" Al Lay had come in by that time. He was an old Pertec guy I'd hired, brought him on board as president after John left. (John Moser had left me by that time to become a venture capitalist.) So Al came in as president. He was president and I was chairman and CEO, but like John, we really broke the company into two pieces. Al ran manufacturing and engineering to a degree and accounting, and I ran marketing, product planning, and a lot of the software development. That really was my area. So we really had split the company in two. We did that under John, too, from the very beginning. I ran the marketing and he the inside, because I really liked the marketing. It was more fun. When Al came in, we continued that split. So I was running marketing still and software and hardware product planning, if you will, and Al had the rest of it. So the board made the decision -- I stayed out of it, or maybe I didn't, I don't know, but I tried to remain arm's length. I said, "You've got to make a decision if Al is the guy you want to be

president of this company. You're the board and I'm only one vote." The upshot was that they decided not to have Al as president. It broke his heart. He's a nice guy. One of the nicest guys, and smart and able.

NORBERG: Are you able to say why they didn't choose him?

RYAN: I think that they felt that he couldn't lead a marketing company. I think that was the real guts of it. Because it was a marketing company, pure and simple. It was a company driven by the market, responsive to the market, and constantly feeling the market and sensing what it needed. So in mid 1982 we started looking for a new CEO and at that point had no real designs on selling the company. There were no plans for it, but then we were approached by our bankers, our financial people in New York, and they said, "We've got a client that wants to talk to you about buying you." It was the Telephone company except it was the wrong one [laughs]. It was Contel. By that time the Bell system had been broken up and Contel had taken a position in Basic Four. They owned a piece of the company and . . . I can't remember the man's name that was running Basic Four, whatever his name was he made a very, very big mistake because he took a very antagonistic attitude against Contel owning any of his company, which was good for us and bad for him. Well, the chairman of Contel and the president flew out to see us. Their overall strategy was to build a company of communications and computing. So we were on this matrix of a big company plan. Like all the baby Bells, Contel started making the same mistakes. [laughs] But we fit in one of these little boxes on this matrix and so they came out and they liked what they saw, of course, even though 1982 was a bad year. We were having, as I recall, the country was sort of in a downturn because of Paul Volcker's very tight control of the Federal Reserve Board, interest rates were crazy, and we were having a tough time. 1982 was the first tough year we had, really, the first tough year we had. Plus we were late getting a product out -- the Tiger was late. So business was not as vibrant and profits were missing. We weren't losing a lot of money, but we weren't making a lot of money. That coupled with my illness and a decision to step down, sort of put the company in not a very strong position. It could have been better. So about this time the board hired Bill Patton as president. Bill Patton had been with a number of companies during his career. (He is now president of Unisys USA.) So Bill came in with full knowledge that the company was going to be sold, and he didn't object because the deal that I'd cut with him was so generous that he'd come out smelling like a rose in any case. So Bill came in and he was very helpful for awhile in our negotiations with Contel.

He did contribute. I can't take that away from him. But because of his efforts to protect a couple of the people he had brought in, he came near to screwing up the deal. So I went down to Atlanta and talked to the president and I said, "From now on, on anything, you deal with me." So I took over the last stages of the transaction.

NORBERG: And you were still chairman?

RYAN: I was still chairman.

NORBERG: Were you still CEO?

RYAN: Still CEO.

NORBERG: So it was easy to do then.

RYAN: It was easy to do. So I finished up the transaction with them and on January 1, 1983 they became the owners of the company, and on that day Bill Patton became CEO and I disappeared. It was all done in one day. The president of their company came out and gave a speech at the factory and presented Bill as the new CEO and wished me good luck, and that was the end of my career at Cado, although I've maintained all of my associations with the dealers since that time. They had constantly pushed me over the years to buy them out and I always refused.

NORBERG: This was to have Cado buy them out?

RYAN: Yes. That was their way to get to heaven, of course, was to liquidate their ownerships. Once I left, the floodgates opened [laughs].

NORBERG: Did Contel have their own distribution system?

RYAN: No, they had nothing. They owned Executone at the time, which was a disaster. I went on the board at Contel and I remained on the board, I think, for three years. But I was the lone dissenter unfortunately. I'd never been on the board of a big company. This was a 2 billion dollar operation. I didn't know that you should swallow your words and be a nice guy, so whenever anything came up that I knew anything about, and I certainly didn't know anything about the telephone business, but when things came up that they were going to do that I knew something about I would voice an opinion.

NORBERG: Of course, that's what you were there for I would assume.

RYAN: No, it wasn't [laughs]. That's what I thought, too, but it wasn't so. Anyway, I cast the first no vote in the history of the board -- 25 years -- and when I did that, that was the end of my term on the board.

NORBERG: Well that's interesting. That's rather shortsighted.

RYAN: Well, you have to understand how some chairmen work and Charles wasn't a guy that took kindly to people dissenting. They made horrible, horrible, horrible mistakes in areas outside the telephone company simply because they wouldn't listen and they didn't know. And they managed to lose in the period I was on the board, over 100 million dollars on just silly things that they shouldn't have bought. Loses got buried in the telephone profits which were huge. They just swept it under the rug and nobody knew it. Well, they finally woke up and later on when the management at Contel changed, they divested themselves of Cado. I called them and suggested it. I called the president and said, "Get rid of this thing. It's contrary to your culture. You don't know the business. You've lost the momentum. Get out." By that time, IBM had come out with the . . . what's the successor to the 34 and 36, became enormously successful . . . the 400. It became enormously successful. When I left, they came to me and said, "What do we do next, George?"

NORBERG: Who's they?

RYAN: The engineers at Cado. I said, "The thing to do now," and this was before the 400 existed -- absolute true statement, "go build an emulator to run 36 software. Build a computer that can emulate the 36, because of the software that's out there is it. It's just enormous, and they're going to go to dealers just like we do and you're going to have a library of stuff you can sell that you won't believe." Everybody built copies of IBM machines, big machines and little ones, but nobody ever copied the 36, nobody. And that became, how big? A multi-billion dollar business, huge. So once IBM had brought the 400 to market and was just mowing people down, I thought there was very little place for Cado and they had lost their innovative thrust. There was nobody thinking ahead.

NORBERG: Had most of the people that were with you left the company by that time?

RYAN: Some had. Bill Patton had been fired. But all of my dealers were pretty much in place working for the company now, or some of them. Some of them stayed, some of them didn't. In fact, Cado was then finally sold to one of my dealers, the most successful one.

NORBERG: And what had it become at that point, just to complete that story?

RYAN: It became a company called Versyss. It means vertical systems, I think, and my dealer in the Boston area bought it. His name was Dave Keane. He bought it for nothing. Dave died just a few months ago, unfortunately, of cancer. Dave had been a partner in our distributor in the Boston and New Hampshire area, our most single successful dealership in the world. They made tons of money selling Cado systems even though they were the last ones to sign on with me, the ones that I chased for two years. I just had to persist. I never gave up. It's a good thing for them that I didn't, because they became very wealthy men as a result of it. They not only sold their company to Contel for something like 30 million dollars, but later Dave bought it back for, I think, a million dollars down. Unreal. The company is still extant. It's called Versyss. Under Contel they bought a lot of the key dealerships and they went into much more aggressive marketing of vertical packages. They stopped manufacturing, they stopped developing product, and they switched over to buying the IBM RISC machine. So all of the software now runs on a little IBM computer, multi-user, multi-tasking, and they are about a 100 million dollar operation -- that's between hardware,

software, and service.

NORBERG: Not bad.

RYAN: Well, it's a nice size, but with Dave being ill they went wild on spending money and they've lost a lot of money in the last two years. Now they're out trying to refinance the company. But they claim -- as of this week they're talking that they'd like to get me back involved in some way and they're talking to me again about coming in again and perhaps helping refinance the company and bring in enough money to make it viable again. But it's a 100 million dollar operation. That's not peanuts. And it's mostly in software. Medical is huge, government accounting is very large. I can't tell you if they're still doing much on the Hill. I really don't know.

NORBERG: On January 1, 1983, George, what is it you thought you were going to do next?

RYAN: Well I wasn't sure. We made an abortive effort, Jim and I. We were going to build an executive workstation with a secretarial workstation hooked through telephones to an executive desk, and again our desires were greater than our reach. We wanted to build something that would allow a secretary to communicate with the boss, silently, while he was on the phone for example, and it would have all the functionality that one thinks about in PCs today except more. Things that they don't have today. For example, we'd have a menu of choices. If he was on the phone, she could communicate with this boss that says, "Mr. Jones is on the wire, number 2." And he would be given a series of choices. Tell him I'm out of town and never coming back, or wait five minutes, or whatever. And all he had to do was select one and that would instantly appear on her screen of her workstation and she could dispose of it. If she took a message, she simply typed in the phone number and it went into the file, and when he made his calls back, he called up these series of calls he had in his file, he simply touched the number and it dialed it for him. There was a complete Rolodex which now everybody's got on electronic machines, but nobody had then, and this Rolodex was very complete. It had not only names, addresses, companies, and so on, but names of wives, birthdays, favorite meals, restaurants, anything you wanted to know about that person permanently you wanted to keep -- and you could sort on it, birthdays would automatically come up on that day, before that day it would appear on that screen

automatically. It was a whole series of things for executives and their secretaries that would allow them to function more efficiently, including the fact that the terminal itself would emulate whatever computer terminal was installed in the company. A bigger undertaking than we understood. And it would be hooked to telephones as well, of course, because it had an automatic dialer. Well, it was a great idea and we really had some neat applications put together, but I didn't have the appetite, frankly. I was still not well and I never really pursued it as aggressively as it should have been. The other thing that killed it was, the PC was really coming into its own. In 1983 it started to really take off, ten years ago, and people looked at it and said, "Well, why don't you do this with the PC." Well, the fact is, that you're now just beginning to be able to do some of those things with a PC. You're just now networking PCs ten years later. You couldn't have done it with a PC then. But the people looking at it, the venturists, were completely taken with the PC, and probably rightly so. So we worked at that for a year or two and just quietly folded it away. Put in not a whole lot of money and folded it up. And since then, I'm on a few boards; working at the UCLA International Student Center with a friend of mine; DH Technology, a small technology company down in San Diego; and taking care of my kids' financial problems and my own. So that's how I keep busy.

NORBERG: Well, good. This has been very helpful, George. I appreciate the time very much.

RYAN: Everybody thought I sold too cheaply. They really did. At the last shareholders meeting when I had to get up and explain it I said, "You can't look at the absolute price. You've got to look at the relative values." Contel shares were selling for peanuts at the time, about \$16 as I recall, and we were only going to get .6 shares of their stock for one share of ours. I think Cado was about a five million share company at that point with options accelerated for Bill Patton and everyone else. So we were going to get about three million shares and everybody said, "You're giving the Goddamned company away." I said, "No, you've got to look beyond the numbers." We were given five percent of the outstanding shares of Contel. So that's the number you've got to focus on -- five percent of the outstanding shares of Contel. Think about that. Five percent of a two billion dollar company. What's that worth? 100 million? Not a bad figure. But they didn't look at it that way. They looked at it at 30 million. So my value turned out to be the correct one. Today if you extrapolate, if you just follow what happened since that time, they doubled the shares at Contel -- 1.2 suddenly -- and then sold to GTE and we got 1.27 on that transaction, so now we have about 1.5 GTE

shares and that equates to about 250 million dollars. If everybody had held their shares, every single share and never sold, they'd now have 250 million dollars worth of GTE stock [as a group]. Interesting?

NORBERG: Sure is.

[END OF INTERVIEW]