Oral History of Fontaine K. Richardson

Interviewed by:
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Doug Fairbairn: I'm Doug Fairbairn. And it's June 3, 2014. So Fontaine, welcome. Delighted to have you here. Thanks for making the trip out from the East and delighted to be able to capture your story.

During these interviews, I always like to go back to the very beginning. Talk about the family life that you grew up in. Brothers, sisters, role of the parents in shaping your future direction, and so let's just talk about that. When were you born? Where were you born?

Fontaine Richardson: I was born in 1941, in Fayetteville, Arkansas, which is where my family was. I'm the third of four boys. There's 18 years difference between the oldest son and the youngest son. I tell people that I'm one of four only children. And from '41 to '46, World War II is going on, and my father was in the field artillery. And we traveled around extensively. And he finished the end of the war in Fort Sill, Lawton, Oklahoma, where they were testing some proximity fuses for the field artillery.

My father had a Ph.D. In mathematics and taught math at the University of Arkansas. So his math skills made it a natural for him to be in the field artillery and compute projectile trajectories.

Fairbairn: So he was not actually in combat.

Richardson: Not in combat.

Fairbairn: In Europe or whatever.

Richardson: But he was helping develop. And so our family moved around with him, because he went from post to post during the war. And then we settled back in Fayetteville, Arkansas in 1945, late '45 or early '46. And my father resumed teaching at the University of Arkansas. My mother was a musician. She loved playing the piano and was a church organist. Loved music. They both loved music. They sang, we all sang together as part of entertainment.

My father and his brothers grew up in Cane Hill, Arkansas, which is just southwest of Fayetteville. And pretty isolated, and they entertained themselves by singing, among other things. But all three boys had had very extensive careers. My father was youngest of three. He had a bachelor's from the University of Arkansas, masters from Harvard College, and a Ph.D. from the University of Chicago. My uncle was an M.D.

Fairbairn: So even he coming out of Arkansas quite early, had found his way to Harvard.

Richardson: Yeah, it was sort of-- the other members of the family had done as well. So growing up, there was an expectation you'd go to college. That you were expected to go to school, and behave, and do well. Do the best of your ability.

I was a medium student. I excelled at things I was interested in. Sort of didn't excel at some of the things. I had a paper route. Sold 125 papers every day, six days a week, in the afternoon. And I understood economics, because I had to go collect from the customers and pay for the papers. So cash flow--

Fairbairn: I did exactly the same thing. Only seven days a week. Sunday morning.

Richardson: Well, we were in the Bible Belt. So their blue laws existed at that time. So Sunday was a pretty quiet day. I bought a bicycle, delivered papers from my bicycle, rode around. Fayetteville is very hilly. So riding up and down, and it was a single speed bicycle, first of all. Finally I bought a three speed bike which helped.

Played trombone in the band. Played in the band through junior high school. And in high school, played on the football team. I didn't play very much football, but I was out doing that. And I got interested in school government, and was on the student council, and junior year was vice president of the student body, and senior year was president of the student body. So I learned Robert's Rules of Order and how to conduct meetings and things.

Fairbairn: How to run things.

Richardson: How to run things.

Fairbairn: Do you have any hobbies or outside activities?

Richardson: I was a ham radio operator-- there was a lot of surplus-- World War II electronic equipment, had stuff around. And one of the professors at the university took a couple of us under his wing and helped us study for the ham license exam for the novice license, and learn Morse code, and do that. And I eventually assembled a heath kit receiver, and built a home brew transmitter.

But the terrain in Northwest Arkansas and where we lived-- we sort of lived in a valley. So you could transmit all you wanted, but there wasn't anybody listening to it. Today, the 2 meter band is a far more viable thing with repeators and things. But back in the day, I had a 40-meter band antenna stretched out the back of the yard. And every time I tried to transmit, it screwed up the television. So my older brother complained bitterly.

Fairbairn: Our background is even more similar than I knew. I was also a ham radio operator. And I had some surplus World War II equipment, and built a-- I guess I built a transmitter, not from a kit, from scratch or something.

Richardson: I built the transmitter from somebody's plan. **It** used two 6146 transmitter tubes.

Fairbairn: I couldn't tell you what I used. But I still remember what it looks like. I've got still got a picture of this huge Navy receiver on my desk.

Richardson: Right. And I got interested in girls in high school. And I did reasonably well, academically. And gave a half-hearted attempt at applying to other schools. Rice University at the time was free, and so I made application to them, but didn't get in. So the obvious place to go was University of Arkansas.

I lived a half block from the campus with my father and my younger brother. My mother passed away between my sophomore and junior years. So it was the three of us at home. I started out in mathematics, and decided after one year I wanted to study and be an architect. So I spent two years studying architecture and the chairman of the department did me a big favor.

He said, "You're the most promising student I have." Oh, how's that? "Well, you're always promising. You never deliver."

So that and the fact that I was going to get married as a senior, I decided that I ought to pick something I could earn a living in and enjoy. So I brushed up my mathematics and then graduated with a bachelor of science in mathematics. My wife was studying home economics.

And being married helped concentrate your energies and spend time focusing on studies instead of other things you might be doing. At the same time, I got my first exposure to computing. There was an IBM 650 on campus in the science side of the university, not the business administration. And the 650 is vacuum tube machine. It's punch card. Its electronic accounting machine, is really what it is. But programmed that in assembly language, and did a variety of assignments for first, in a course that I took, and later, as a member of the staff.

Basically stayed with that for the two years there. And I got a bachelor's degree and a master's degree in math. At the same time, my wife graduated in home economics. So we both graduated, and got an offer for a summer job with Continental Oil Company in Ponca City, Oklahoma. And to work on their computer, an IBM 7090. They wanted help making some of the language transitions from FORTRAN II to FORTRAN IV.

Fairbairn: How did you make that connection?

Richardson: Well it's all family. So one of the people in town's wife was on the math department faculty, her son was working for Continental Oil Company. I called and I said, do you have any possibilities? And they said, sure, come on over. So I went and interviewed, and got the job. Not knowing what's next. We had applied to graduate school. The University of Arkansas did not have-- I wanted to get a Ph.D. in mathematics. And the University of Arkansas didn't have a program for that.

So we knew we would leave town, but Ponca City is the next stop, but where from there, it's up in the air. So we made application to Purdue, to University of Illinois, and whatever else, I don't remember. And my wife made application for home economics. And I made application for math.

And she got a full boat fellowship to the University of Illinois to study home economics.

Fairbairn: Fellowship to study economics.

Richardson: Home economics. Clothing and textiles. And I landed an assistantship because of the experience working on the 7090. My assistantship was in the digital computer laboratory.

Fairbairn: So what year is this now?

Richardson: 1964. So we arrived on campus and I walked into what was called the digital computer laboratory building full of computers. And it was the only ILLIAC II. It was a solid state machine. The design targets were to be competitive with the IBM 7030, the stretch computer. It probably was. It had a 52-bit wide word in order to do floating point. And it was four 13-bit word chunks for instruction set. It had 8,000 of those words in core memory. And a half megabyte of drum storage and mag tapes.

So that was it. And so I got on working on operating system stuff, and got the assignment to work on time sharing this, because in parallel, MIT was working on the Mac project to timeshare. There were time sharing effort going on using IBM 360-67s. PDP 10, Sigma 7's. So why not put one on this home built computer?

So we eventually got it running. There was no memory protection, so it was not the most reliable of things. So I did that. And did all my schoolwork for mathematics, and passed all the exams. Foreign language exams, the qualifying exams, and all that. I was ready to look for a thesis topic.

And the fellow I'd been working for at the laboratory, computer laboratory, said "We are going to offer a Ph.D. program in computer science. Would you be interested?" And I said, "Sign me up."

So he said, OK. I said, "How much backtracking do I have to do?" He said, "Just audit a few courses." He knew me from working with me. And knew that I had picked up a lot of stuff.

Fairbairn: You knew as much about computing as anybody at that time, probably.

Richardson: He said, "Well, audit these two things." And so I said, "OK. What about a thesis topic?" And he said, "How about using flowcharts as a programming language? And use the computer screen, the CRT, and the computer, and program that." And we were going to do it on a remote computer, and have that connected to the ILLIACII, and actually do the execution on ILLIAC II. So lots of stuff that's very commonplace today, but it was a workstation. When it was finally configured, it was about $130,000 worth in 1966 money.

The PDP-8, was a 12-bit word, machine and you had two 256 word pages that you programmed in. So programming was all in assembly language and a little contorted. So the ILLIAC II is all assembly language. So by that time, I had done three or four different assembly languages. So my theory is, once you've done one, the next ones are pretty easy.

So I did that. And made a movie of the software running, which that's what I brought here to you last fall. I stood the examination, and gave a demonstration. Of course, the demonstration crashed at the end. They passed me anyway. And I was on my way.

So--

Fairbairn: But by this time, this was what year?

Richardson: '67, '68. So I knew I was going to get out in '68, so I started interviewing-- you know, get out with a Ph.D. In computer science, and interviewing. And what I discovered is that having a Ph.D. In computer science was unusual.

Fairbairn: Yeah, that was the first thing I was gonna say, is you must have been one of very few people who had such a degree.

Richardson: I got the second one from Illinois. But mine was in software, and his was in some sort of electronic stuff.

So I got lots of interview opportunities. I interviewed in the bay area with IBM, and Control Data. I got a UNIVAC interview in Minneapolis, IBM interview in Watson research labs, Bell Laboratories, RCA labs, and the last interview I got was at Lincoln Labs. The University of Illinois hosted a conference about computing on the campus in probably late '67, early '68. Bert Sutherland came from Lincoln Labs and saw what we did. And I came up and introduced myself. And I said, "Do you have a job for me?" And he said, "Well, let me check." So he called back. And I went out and interviewed, and got a job offer from them. And it fit.

So, my wife didn't want to stay in Illinois because it was flat. And the appeal to both coasts were the differences. And we picked Massachusetts A-- because the job was the most fun job. B-- the four seasons. Living in Illinois, the seasonal variety is stark. It's hot or it's cold.

And Massachusetts had all this American history and all the things that were important. So we said, fine, we'll take that job. So I showed up in April of '68 at Lincoln Laboratories.

Fairbairn: What was Bert Sutherland doing? This is sort of a side track.

Richardson: We were all collectively working on an assignment from what was then ARPA-- Advanced Research Projects Agency-- where Larry Roberts was, and Ivan Sutherland were having been in the same laboratory, had done his thesis on the same TX2 computers. They migrated down there and worked doing the kinds of things that were magic. And they were making things happen.

And so it was a contract with Lincoln to research tools for designing electronic circuits. The belief was, turned out to be true, that the complexity of circuits was going to grow, that it would be harder and harder to design circuits, and you needed new tools, new methodologies, new ways of thinking about all this.

Fairbairn: Yeah, I knew Ivan Sutherland was there. I didn't realize that Bert was there at the same time.

Richardson: He was the group leader, and had half a dozen of us, maybe more. And he had collaborated with people from David Mann, the pattern generation people, and they we're building this pattern generator, which is a rectangle on the photo mask, And needed some data to drive that. So Bert wrote a program to basically, program the blocks, punch the paper tape, took it to David Mann down the street, and they made photo masks for fabricating integrated circuits

And in the group that I was in, they were designing circuits. They were designing ECL circuits, and were building them at Philco Ford down just outside of Philadelphia, and testing them. These were pretty state of the art. They were high speed at one microsecond loops through gates and things, which was fast for the time.

And so Bert had done that as a way of getting the first connection to David Mann. And he did an interactive program using the screen of the TX2 to sketch rectangles. And then once you build up a pattern of nested cells and things, and then punch a button, generate a tape, and that was how you made the patterns on them. And this was actually used to make patterns for the guys designing circuits.

And so I came along and he said, this is the first pancake. You always throw the first pancake out. Why don't you redo the program. And I think we called it Mask Maker.

So we did that. And this is on an interactive CRT with the power of the TX2 and all the operating system stuff, and all that stuff. I didn't write any of the programs. I had couple of-- Don Oestreicher, who you may have worked with. He was at Adams Associates and did the actual programming. But we'd say, "Here's-- what about doing it this way? What about the human interface stuff?" And built up a reasonably capable program.

And the laboratory was in the information exchange business. So we went around, we were sent around-- a group of us, and talked to all the different semiconductor companies. We visited Fairchild, we went to Texas Instruments, and A-- talked about what we were doing. And listened to what they were doing.

Fairbairn: This is 19--

Richardson: '68. Yeah. And we got a lot of interest. TI had a fledgling graphics unit effort, as did Fairchild Semiconductor, using an IBM machine. They were all IBM machines. And all fairly expensive lashups. No commonality. No software commonality. People would say, "Well how can we get your software from the TX2?"

And the answer is, well it's not going to do you any good. Because it's written in proprietary high level language on a one of a kind computer.

So and then in parallel with all this stuff, there's a sort of a euphoria going on in the Boston area about companies starting up. Lots of start up activity. Some of these ,were started up leaving Lincoln Labs. Digital Equipment being one that had left much earlier, but was quite a success story. And there were others that were leaving.

And there was a guy-- a professor by the name of Ed Roberts, who taught at the Sloan School at MIT, who came out and gave a lecture to anybody who wanted to attend at Lincoln, and talked about the success rate of startups that left Lincoln, and their success rate five years after they left. And it was 80% success rate, where people were still in business. Those are pretty good odds.

So--

Fairbairn: I've been very interested recently in the whole startup world in the '60s, what that looked like. So I'm very interested to hear your accounting of it.

Richardson: There was a company called Viatron that got funded eventually at $200 million. It was going to be a key punch replacement. In Boston, there were two other key punch replacements. Inferex and Entrex. There were a bunch of startups going on.

The four of us that would sit and have lunch. And we'd say, "Well what could we do? Why can't we go start a company?" It was me, it was Harry Lee, who's a Ph.D. from MIT. Gary Hornbuckle who had a Ph.D. from Berkeley, and Dick Spann who had a Ph.D. from MIT.

So all about the same age. All married. All with young children. All had mortgages. Yeah. You know. And so the question was, what could we do? Build a paper tape reader. Do you wanna do this? Mag tape machine, whatnot. And so the notion was that we ought to stick to our netting. We ought to do something we know about, as opposed to go out and tackling something brand new.

Harry Lee went off and spent quite a bit of time down at the Harvard Business School, in the Baker Library and did a bunch of research. And he devised a business plan. And we were going to have four products. We were going to have the design assistant, which was the graphics, and then a digital circuit simulator and analog circuit simulator, and an analog synthesis program.

The last three programs were all software running on time- share systems. All this was expected to be an advantage, because you didn't have to buy machines. You could use commercial timeshare. And but the graphics had to be on a dedicated machine. So Harry--

Fairbairn: And the graphics again, was for mask layout.

Richardson: Mask layout. Print circuit board. Mask layout.

Fairbairn: Was the principal target printed circuit board, or?

Richardson: A combination of print circuit boards and integrated circuit. And so Harry's wife was in medical school. And he went to a graduation party for her, and met Peter Grace of W.R. Grace Steamship Line. Grace's son was graduating from medical school. And Harry walked up and introduced

himself to Peter Grace and said, "I'm here to make you wealthy man." Of course Grace said, "Tell me more."

So we ended up with a face-to-face meeting with the four of us and four senior vice-presidents from W.R. Grace. Now the back story on W.R. Grace was that he kept wanting to expand and add to businesses that were in addition to his core business. So he had bought 49% of Miller Brewing in the mid '60s, with what he thought was the understanding he could buy the rest of Miller Brewing. And a family member owned 2% and wouldn't sell to Peter Grace. So he turned around and sold his interest and made three or four times his money in a very short period of time. So he knew all there was to know about venture capital.

Fairbairn: I'm particularly interested in this area. What was W.R. Grace focused on at the time?

Richardson: They were a steamship company. It's a 100-year-old-- there were chemicals. They had a chemical plant in Cambridge. They did material building products. They were one these multi-company, lots of interests. They invested in--

Fairbairn: Nothing in high-tech?

Richardson: No. We were the first and last high-tech investment they made. Our business plan called to raise $800,000 for the sixth of the company, which is a pretty rich evaluation. And so we met with the Grace people. And they went back and said that they would make a recommendation to the board to make the investment, that they were prepared to advance a $100,000 loan so we get started.

So we said, "Well, when's the board meeting?" Well it's this month. So this is in the middle of summer, June probably. And our investment didn't make the cut for that board meeting. It didn't make the cut for the next board meeting. So in November, they called and they said the board won't agree with it.

Fairbairn: Will not.

Richardson: Would not. So by that time they had advanced us $100,000 loan on our own signatures, which violated one of the rules that you're not supposed to sign up personal. And our reaction was, you don't understand. You don't get the story.

So we got an appointment and went to New York and actually had a hearing with Grace himself and some of his senior people, and told the story again. And they reconsidered., we had the $100,000 they'd

committed to us. And Mr Grace had a way to get us $300.000 for a total of $400,000 without having to go back to the board. He didn't want to do that. So we said half a loaf is better than no loaf. We'll take it.

Fairbairn: So what was $800,000 supposed to get you to?

Richardson: Profitability. For all four products.

Fairbairn: That was to be everything you needed, right?

Richardson: Right. Right. Little did we know. But by that time we'd staffed up. We had staff for all four products. We picked the IBM 1130 computer for graphics. And a storage tube-- Tektronix had just introduced the storage tube display. And we picked a local supplier that took that display and integrated it into a workstation. And then they had a tablet. So we had a tablet, a keyboard, and the tablet was the graphics interface.

And we thought the IBM 1130 made sense, because people could rent it. And so we wanted $50,000 for the software. And the terminal was another $15,000 or $20,000. So a pricey package. But less pricey than any other of the alternatives that were out there.

And then we sailed through 1969. And we said we'll go and raise the other $400,000. We'd been given this commitment. Surely we can find somebody. So Gary Hornbuckle did most of that, going up and down the streets, knocking on doors and what not.

Fairbairn: Yeah. So what was the environment there? Were there many venture capital--

Richardson: There were a half dozen. There were guys that were doing investments. We learned that they didn't invest in software companies, because the assets walk out the door every night. Never mind that Cullinane was a freestanding software company that John Cullinane founded and financed himself.. There were all sorts of reasons why they wouldn't invest in us. So.

Fairbairn: And the venture firms at that time, did they have-- were they prepared to offer anything but money?

Richardson: They wanted to be on the board. They wanted representation. None of them had expertise.

Fairbairn: They didn't have-- they were relatively new at that time, I presume. Right?

Richardson: Well American Research and Development-- AR&D-- was the granddaddy with George Doriot out of the Harvard Business School. Those guys were there. That left him, Greylock and there are all sorts of people that had-- Tucker Anthony spawned some venture guys. There were a lot of wealthy families. So there's money to be had, but we were so out of the mold in terms of clearly no experience, no business experience, and software as a principle line of business.

So we talked to-- United Shoe Manufacturing was looking to expand and get out of the shoe making equipment business. And they needed computers for that, and that was a nonstarter.

Fairbairn: I was asking because my observation from what research I had done was that these companies thought it was a way to make money, but they didn't really-- many of them anyway, AR&D was different-- but didn't really have expertise in terms of being able to--

Richardson: AR&D invested in digital equipment to make circuit boards.

Fairbairn: Because they wouldn't invest for computers because everybody was losing in computers at the time.

Richardson: Olsen had to do computers on the sly. And it apparently surprised Doriot when they actually started producing them.

Fairbairn: Because at that time, everybody was failing trying to compete with IBM, so they wouldn't buy the computer company.

Richardson: And the Digital Equipment-- all the computers at that time had no software. You literally had to write your own operating systems. And that's where the universities-- you know, graduate students pitched in and did things like that. And that's part of where SHARE came from, which was part of where the Design Automation Conference grew out of for sharing software for that era of computer.

And so we just struck out., " And so we had success finally. Harry Lee had gone to an electronic circuits conference in Cornell in the Fall of '69, and met Doctor Akiyama from Matsushita, who was a significant contributor to Matsushita in their semiconductor areas, He had a position that let him look for new things for the Company. He came to this conference to study and try and find things. And Harry made friends with him. Doctor Akiyama came through Boston on his way home, and we showed him the movie of the software running on the TX-2. We didn't yet have a demonstration. But we showed him the movie and said that we would be doing kind of thing. And he went home and said, I'm going to buy one of these. What helped him make the purchase decision was that they had an 1130 at home. So it was just a purchase-software and the display terminal.

And what I didn't learn-- I know at the time that they had to get a license from the government to export dollars. The dollars were hard currency. The government was just very tight-fisted. And so we signed a purchase agreement with them. We had an irrevocable letter of credit, so the once we shipped the stuff, we could get our money. And then they had to go through the paperwork with the Japanese government. So that was just slow.

So this is in 1970. And then in the spring of '70—we had a demonstration capability on our IBM 1130.. It was crude. It was basic. But we could show the concept. And so people could either see the lights light up or not. And our notion was you do construction of the photo mask images using the computer. Maybe you do a cell design, and then transfer it, but you don't sit and do large drawings drafting tables and then transfer it to Rubylith and all that, which was the way it was done.

We learned about being pioneers. We learned about early adopters. We learned all that stuff just by doing. And fortunately we had made a demonstration to General Electric's research group. They had a fledgling semiconductor fabrication up in Syracuse. And they saw semiconductors as a way for them, as part of the computer business, it's also way to put stuff-- electronics-- in appliances. And they made a terminal at one point, some years later, called the GE Terminet, that had 22 MOS packages in this terminal.

So we showed them and got to be excited. We went up to Syracuse and talked to the brass, and got some people really lit up about it. They said, there's only one thing. We can't buy an IBM. Well, OK. That is a problem. And six weeks later, they called and said well, we just went out of the computer business. So we can buy an IBM.

So they were among our second and third-- our first customer was Matsushita. We had a customer by the name of Western Digital down in the Los Angeles area. That name still exists. And then the guys at GE Syracuse. The GE Syracuse was the first state-side delivery, because we delivered that on an IBM 1130.

Fairbairn: At this point, did you have all the output formatting to go directly to a man, or some other--

Richardson: Just David Mann and Calcomp. You could plug a plotter in and output to that. But that was it.

Fairbairn: But everybody that was buying at that time was buying for IC design, right?

Richardson: Right. But GE was an early adopter for printed circuit boards. They went whole hog. It was a military division. And they had six Applicon systems by '73. And it was very clear that the economics were distorted by this IBM, because this IBM was $110,000 worth of computer hardware.

And at that time then you had-- Digital Equipment launched the PDP 11. And Data General launched the Nova. So prices plummeted. You can buy an OEM version of this. You could put more of your own value added around. So we decided to be in the hardware business. We sort of tiptoed into it in the sense of buying PDP 11's. And we actually had an industrial design person design for us a workstation. So you had a desk, cassette tapes here, computer screen here, keyboard and laptop. Keyboard and tablet with the computer and all the guts down here.

And that was $70,000 was our price, including the software. So some heads snapped, they started getting some attention for that. And Western Digital bought that one. It was the first guy to take delivery of one of those. We probably sold six or eight.

Fairbairn: So where were you financially at this point?

Richardson: On fumes.

Fairbairn: And you sold to Matsushita, but it sounded like you didn't get any cash out of them for some time.

Richardson: Well. We collected the cash for Matsushita in advance, when we shipped them. We cut salaries. We laid off people. We discontinued all but the graphics, so we laid off all the people that had been working on these other programs. And we kept some of the people, and put everybody to work on doing integrated circuit-- printed circuit board applications.

Fairbairn: So how far along did the other products get? The simulators and--

Richardson: We had them running. All three of those products, you could demonstrate. You'd demonstrate them with a teletype on a timeshare computer. So again, there's a leap from seeing a schematic on your drawing board to doing all that you need to do to simulate it.

Fairbairn: Enter the net list--

Richardson: Manually.

Fairbairn: And then simulate it.

Richardson: Right. So all of which was a stretch.

Fairbairn: So were you out trying to sell those products?

Richardson: Yeah. We were.

Fairbairn: And they just weren't getting traction?

Richardson: We hit the recession of '70, '71, and basically engineering departments didn't have any expense money. So buying time-shared computer time was an expense, buying software, paying for software on a rental basis was expensive. They just said no. The only place there was money was capital equipment. And at that time you could capitalize purchases of software as long as it came with hardware.

Fairbairn: So you were in the capital equipment business.

Richardson: By necessity. So we generated enough excitement in General Electric that they said-- we told them we were looking for money. And they said, "Hey, we've got a venture capital arm that's run out of corporate." And so they sent around a guy who looked at us and said, "Nah."

So we called our friends in Syracuse and we said, the answer is no. They said well, maybe he didn't ask the right way. So they called back and they came and basically envisioned a two-part investment of-- I think it was probably $200,000 and $200,000. And we all had to take salary cuts. We had the buyback agreement between the founders. We had equal shares, but we had a provision that if somebody left in the first three years, you had to sell back a certain amount. They made us extend that agreement. There were two GE people who came on the board.

And then they had a condition that we hire an accountant. Because Gary Hornbuckle, who was president, was keeping the books. And all the financial reports were run on the IBM 1130, and he was probably three or four months behind in terms of generating an income statement or balance sheet. We knew where the cash was, but--

Fairbairn: That's all that mattered at the time.

Richardson: That's right. So he had to get out of that business. We had to have somebody who had an accounting background. And one of the GE guys had an accounting background, so there was a fit there. And the expectation that there would be another tranche of money coming, and hopefully get somebody else on board.

Fairbairn: So how many people did the company--

Richardson: Probably 12, 15.

Fairbairn: So what was the biggest? What were you trying to do, four products?

Richardson: We were probably 25 or 26. And then got down to eight, was probably the lowest number. Secretary, four founders, and four early-- nine. And a sales guy we had, 10.

Fairbairn: Were these all young programmers that you hired.

Richardson: Yeah. And again, the connection with three of the-- the very personal connection between Harry Lee and two of the people that came to work on the analog stuff. And then digital-- Dick Span had supervised the thesis of Rich Diephuis doing digital stuff. And he had come to work on the digital simulator. And then Walter Anderson, who had worked with Harry Lee at MIT, came to work on the graphic stuff. And so those hires, and then Phil Carvey had worked with Harry Lee, so Harry was instrumental in getting two of the first team. Dick got one. And then we were very fortunate to find one, A guy who wanted to leave Raytheon.

And the resistance about joining a start up, particularly a start up that's clearly bumping along, was pretty high. As we sort of made progress, we had women software programmers. And they could do it because their husbands were employed. But that sort of came and went. There was a sales resistance in terms of getting people on board. Once we had the graphic stuff running, then you could get generate some excitement about, oh, you get to work on this neat, fun stuff. And you know, here's what we're doing. And this and this. So that helped. But start ups were just-- nobody understood them.

So we then started shipping the PDP 11-based system. We shipped one to Western Digital. We shipped one to General Electric in Waynesboro, Virginia. And these were hand-built.

Fairbairn: You had to rewrite all the software, right?

Richardson: Yeah. Just start over basically. But for cost reasons, we said we could only have 16 kilobytes of main memory, because eight kilobytes was $5,000 or $6,000. So you'd throw the economics out of whack. So the software guys, we all just screamed, "No. We can't do that." The answer was, do it.

So we made all fit in this-- it was 8k words, so 16 kilobytes. And it all worked. We had a hard drive, so everything was paged off that. And it was reasonably responsive. You could build some pretty interesting circuits.

And we knew we'd bump our head, and bumped our head in about a year. And basically had to go back and retrofit everything we sold with another 8 kilobytes and expand the software to give ourselves some realistic-- but we sat with that 24 kilobyte limit for about four, five, six years.

Fairbairn: 24 kilobytes. Wow.

Richardson: All assembly language. Well the operating system was tiny. Because all you had to do was manage a keyboard, manage the display, and the tablet. The real time inputs were the tablet and the keyboard. And the-- I guess it was a real time feedback for the display. So 15 or 20 words worth of operating system.

So we basically started selling that. And we got the second tranche of the GE money. And then in '74, attracted J.H. Whitney. And so that was a bigger tranche. I don't remember how much money they invested. But we were also selling stuff. So that you had extra cash in the bank, but you also had the revenue. We were pumping along break even. Nothing great shakes, but--

And about '74, '75, things started to open up for the electronics. And at the same time then, we felt that we needed to be able to address three dimensional applications. And rather than say, do drafting, which is what Computervision was doing, we made 3D models-- wire frame models of 3D things.

Fairbairn: Now this would be for totally different applications.

Richardson: Totally different. Automotive, whatever.

Fairbairn: Automotive, architectural, or whatever.

Richardson: Whatever. And again, it's a leap. It's one step, one bridge too far. It's you know, if you had to do it over, you'd do drafting, because that was the money application.

Fairbairn: So what was the competition at this point?

Richardson: So Computervision, they started about the same time, but they did not focus on-- they had three products they started with. One which was a tester for integrated circuits. One was a photo mask imager for printed circuit boards. And one was the Interact.. It was a big board that you digitized something and pushed a button, and it replotted back.. And that was connected to a time shared computer.

So we kind of were the existence proof for them and for Calma, in showing what you could do with a mini computer connected to a graphics display. Calma was selling digitizers. And again, digitizers into the integrated circuit market, where you make a drawing of the photo mask, and then you digitize the polygons, and output that to a tape. And the notion of oh, you might need to fix an error. So that all fed into that.

Fairbairn: So as I remember, the digitizers were popular because they didn't have to sit somebody interactively before this $60,000, $70,000 workstation, right? So they could do their hand drawing, and digitize it, and get an electronic form that way.

Richardson: But you see, all the workflow methods in the late '60s, where you make the drawing, and then you transcribe it to Rubylith. You cut Rubylith and the peel it. You transfer a layer at a time. And that was done manually.

Fairbairn: How exactly was that--

Richardson: Basically you lay the drawing-- you make a scale drawing, lay the Rubylith on top of it. And use an Exacto knife and cut either the red or white out. So that's the methodology they were using. And there are guys that said, "I don't need automation."

Fairbairn: But Calma at least solved the Rubylith problem.

Richardson: Well Calcomp solved it. Because they had a Rubylith cutter, knife for the ploter. So they had a flatbed. And you hang a tape and drive this knife around. And you could cut the Rubylith. And then you could peel it. You still had to peel it. And so the Calma guys came from Calcomp. And they did the digitizer, and then they could see that connection. But they didn't offer a display system until well after we were out there with a display.

Fairbairn: But that still was an easier adoption path.

Richardson: Right.

Fairbairn: Because it sort of fit in their methodology.

Richardson: That's the way we've been doing it always. And it's just a slight wrinkle. Instead of, hey, here's a dramatically new way.

But then we ventured into 3D and started doing that. And got a big sale with General Motors, which was an early sale there. But again, a pioneering kind of sale. We weren't doing drawings, you weren't drafting. You were conceiving of objects that were the database.

And in parallel with all this, we had the VLSI, we had the Moore's law breathing down our necks. And we used 16 bits to represent positions on the integrated circuit. And that's fine until the circuits get beyond a certain size. You need something larger.

So we had to bridge the hurdle to go from 16 to 32. And we did that with a completely redo,. This time we did it in Fortran using an PDP 1135. And the competition in the integrated circuit world was Calma. And their claim to fame is their display rate was faster than ours. And we could never figure out why. But it was.

So we attached a graphics processor to the PDP 11, with the notion of being able to drive the storage tube-- by that time we had a 17-inch storage tube from Tektronix. And it was a little bit better. And then we got into TVs, monochrome TVs and color TV, so that transition from storage to refresh to color refresh happened in the mid to late '70s. And the color workstations were more expensive. And we got a big order from Intel. And that sort of helped.

Fairbairn: Intel had been a Calma customer, right?

Richardson: Yeah. Right along. And they still were. The guys up in Oregon, Bill Lattin was instrumental in making a decision, and making it work. And thank God for customers, because we had some of those patient-- demanding, but worked with you. They had a better sense of the struggles we were having than we did. How early we were and what the issues were. They were all smarter than we were.

Fairbairn: So did you continue with 3D stuff? You said you made a big sale to General Motors.

Richardson: And others. Big pitch to Boeing. It was a big shootout between Computervision and Boeing for the 757, 767 design. Boeing had a disastrous ECO problem with the 747 in terms of changes and keeping track of changes. And they had a corporate goal of reducing that. And they wanted CAD software. And so it was between us and Computervision. And Computervision had licensed their software from Dave Albert's company, the Hanratty software. And so they had it in quote, Fortran. Ours was still all machine language, and that was one of the deciding factors why Boeing went with Computervision rather than us.

And we struggled with management issues. So the founders-- Harry Lee left in '73, '74. And then Dick Span left in '76. The company was struggling. And our board of directors decided they needed a new CEO. And so they replaced Gary Hornbuckle in '78.

Fairbairn: So who were-- you talk about the founders, but what were their respective roles?

Richardson: So I was always in charge of what we called the design assistant. The graphics. I wore a lot of hats, as you do in a startup. But my job was to make that go forward. And Dick Span was to supervise the digital circuit simulation. And Harry Lee was to supervise the two analog products. And then Gary was boss.

And when we had to downsize, then Harry Lee-- this was in '70, '71-- Harry Lee went to Chicago to set up a sales office and sell the product, the graphics product. And then Dick Span took one of the Bill Maclean with him to be an application engineer and came to the Bay Area to sell the graphics. So we had an office in Menlo Park.

This was early enough that we rented the time on an 1130 near our office, until we could get our machine on the PDP 11 up and running and available for demonstrating. And benchmarks were just the name of the game. Because our background had been in ECL, nobody believed you could design MOS circuits. They're just rectangles. So show me the MOS circuits.

OK. So you had to do benchmarks for everybody to prove that you could do an MOS circuit. And so that's why we had to have somebody on the West coast. We could travel with the IBM 1130 software, because you could go and rent a machine somewhere. And take the terminal and go. But once you have the PDP 11, then people had to come to see it. So that's why we had demonstration in the Bay Area, and people come down to do all sorts of benchmarks and things.

Fairbairn: So you clearly had significant market education work to do upfront.

Richardson: Right.

Fairbairn: When did that become obviously much easier? Was it sort of a gradual change?

Richardson: Very gradual. Very gradual. It took major adoption by General Electric in a facility. By Intel in a facility. Intel outfitted three or four different sites with the VLSI second generation IC stuff, and were committed to making it work, and did make it work.

Fairbairn: And so tell me about the growth and what the next steps were.

Richardson: We sort of grew in fits and starts. I mean, we were able to keep bumping along at break even. But we didn't have any extra money to spend on anything. And when we did get money, we end up spending it on kind of-- we got some money, and then we invested in a color inkjet plotter. We licensed technology from Arthur D. Little who knew Hellmuth Hertz. a relative of an electricity pioneer where we get the name for electrical frequency – Hertz.

And it was a drum printer. And the notion was you could print proofs of your integrated circuit. Well that's true. But you have to generate a magnetic tape. And you had to rasterize all this data that you basically kept in vector form and then rasterize it. And you tried to do that in a PD 11 with 24 kilobytes, and shoehorn that in with everything else, just was a non-starter. So we never got that. It's an obvious connection. And you say, why the hell didn't you do it? Well, you had to have a dedicated PDP 11 to do it, you could. It was just that big a problem.

Fairbairn: So is this a good time to sort of look back? Or do you want to sort of continue on.

Richardson: Let's get through to the IPO and all that stuff.

So I talked about Harry leaving in the '73, '74 time frame. Dick Span left in '76. The new CEO came in '78. And Gary Hornbuckle left. You know, we don't need two CEO's.

Fairbairn: So you said the board sort of forced him out. Was the board actively involved? Did it offer any good guidance, or just things are going bad. We need a new CEO?

Richardson: Things are going bad. One of the Grace guys just had done chapter and verse of missed milestone after missed milestone, you know, financial milestones. And said to his colleagues on the board, "It's clear this is what's going on. We need to make a change." They picked up a guy--

Fairbairn: You want to take a break?

Richardson: Yeah. I just have a cramp.

Fairbairn: Yeah. Go ahead. Stop.

Richardson: So the board reviewed the performance of the team, and said we need something new. And one of the board members had been investor and director in a company called Entrex that was close by and made software and hardware for key-to-disk. And they had been bought by Nixdorf, and the CEO had left that and was available. So it was an obvious fit. He got interviewed by the directors. He showed up in April of '78, and then started to realize how much of a mess he'd stepped into, and brought in a number of people he worked with-- people he could count on personally that he'd worked with at Entrex. And he brought in a VP of Marketing by the name of Dave-- the CEO's name was Don Fedderson, and Dave Barber was the VP of marketing.

And he basically energized and did a great job of sort of picking up the reins and selling the products we had. And at that point, we started to really start to take off, because he recruited a sales team. And we had in place energy and drive behind selling what we had. And Dave did a marvelous job of managing that and making it happen. And Don as CEO gets some credit for all that.

And then they brought in a guy as chief financial officer, again from Entrex. A number of people came over-- software developers-- came over from Entrex. And I was still nominally in charge of software development. And these guys looked at the application. And they said, this can't be that hard. They were used to moving text strings around. I said, "Well, why don't you try it?"

And they did. They just thought I was being an old fogey, and stuck in my ways. And they tried some ambitious things, and kind of ran afoul of their own-- they basically launched the idea of a brand new product that does everything you've always done and more, without the integrated circuits. The integrated circuits got separated, and we kept going with existing products. And that's what paid the bills.

And so to do printed circuit boards, and 3D designs, and all that stuff, you need something new, something different.

Fairbairn: So that's what they launched off into.

Richardson: Right. And it captured a lot of people's attention. The company went public in 1980. Very heady evaluation. It helped that, General Electric owned a portion of the company. We teed up to go public, and GE came to the company a week before the IPO and said, we'd like to acquire you. So we had to pull the IPO. And the answer was thanks, but no thanks. So the IPO comes back at a much higher price.

And then they had to figure out how to get General Electric out of the company, because clearly they were going to buy Calma, because that was the only other game in town. So they bought Calma after that.

And so public security, quarterly earnings, all that stuff. I was fired, basically, after the IPO was in the summer of '80, and I was told to pack my bags in November of '80, and left there.

Fairbairn: So alright. So let's now look back and so, what were the lessons learned? What was the--

Richardson: The lessons learned-- the second system is a generic problem across industry. And it was a huge problem. This notion of replicating everything. I mean, we'd done it in the integrated circuit world because we had gone from assembly language to Fortran. And because the application is straightforward. And we sort of knew where the bottlenecks were. You could replicate the functionality, and do what needed to be done in a pretty well-defined course.

But if you're going to try and do something similar for printed circuit boards, for drafting, for all these applications that are much broader, you're pushing a big snowball uphill. And there are companies around the valley, out there that have tried to do a second system.

Fairbairn: So second system, you're calling what they tried to do.

Richardson: What they came in and tried to do.

Fairbairn: The transition from like the 1130, you had to rewrite all the software to go on the PDP 11, but you didn't make the mistake of trying to over-enhance it. You just sort of moved it.

Richardson: It took us three years or longer to implement. I wrote a specification for what the software was to do. And it took us about three years to get it implemented. I mean, they wanted to see circles on the screen for printed circuit boards. That's a pretty unreasonable thing. We showed them squares and said, imagine the circle. Which they did for a while. And then we got around to doing circles.

So it's the second system problem and scope creep. You know, specifications change, things get added, things blur. You can never get it nailed down. And I think some of that-- I was gone, so I only know from hearsay.

Fairbairn: But going back to the time when you were just starting up the company. First you started with four products. And it sounded like in the end, it was one product that really carried the water.

Richardson: That's right. Very quickly.

Fairbairn: And so you're over-ambitious. Do you think you were--

Richardson: I think naive in not knowing what would sell.

Fairbairn: In terms of understanding how difficult the adoption process would be.

Richardson: That was a huge thing. Right.

Fairbairn: If it was so cool, why wouldn't they just take it?

Richardson: Right. Right. And you're just up against guys that have been doing things a way, and you're saying, change. And harsh language to follow.

Fairbairn: Familiar with all these problems.

Richardson: Well you know, there are all sorts of guys subsequently who have the same sort of issue. I mean, every time somebody's tried to introduce a programming language to do circuit design, oh, I guess that's what Synopsis did with Synthesis.

Fairbairn: But they were very clever in the sense that they first introduced it as a logic optimizer, not as a synthesizer. So you could draw your logic and then input it. And says, oh it made it better. And you could immediately see what the benefit was.

Richardson: So they thought about the adoption problem.

Fairbairn: I don't know whether they thought about the adoption problem, or they just got lucky and did the first obvious thing. But the result was that people could buy the product and get value out of it before they had to trust it to create things from whole cloth. And the other major problem in terms of adoption was that you had to enter it in some language. And so the Verilog coming along was a huge advantage to them.

So I think they got lucky on some of that. May have been some wisdom mixed in with the luck.

Richardson: Hey, you always claim as wisdom what works.

Fairbairn: Take luck any day, right?

Richardson: I mean, I think on that luck aspect, we were very fortunate in the customers that picked us and chose to stay with us, and work through thick and thin. Part of that is we were very supportive-- the GE people at Syracuse called because one of the stylus's for one of the tablets had broken. And they called on a Friday afternoon. And I said, "Well, the only way we can get one there is I'll drive one out to you. So I jumped in the car and drove 320 miles to Syracuse and delivered it. And they're back in business.

That kind involvement of the founders, and the personal commitments helped with that interface. And there are still customers that I talk to, people who bought from us 40 years ago that I still talk to.

Fairbairn: So what was your vision for the future of the company. You originally had these other products and then narrowed it down.

Richardson: Right. I really thought the software had longer legs. I really kind of bought into the software vision of this thing extending across applications and doing more things. And other people were wanting more. And that was very naive in the early days, because nobody else was doing it. And this issue of the software assets walk out. You don't have anything on the balance sheet that represents the investments you've made in software.

But I wanted to have a big drafting table that was a CRT. Something that you could work on and visualize stuff, and interact with it. And we're there now.

Fairbairn: So in your view, you were in the graphics business. You were not in the IC design business.

Richardson: We were in the applications for graphics.

Fairbairn: So you didn't go looking for what eventually Daisy Mentor Valid pursued in terms of design capture.

Richardson: Our argument was we have a database. And you can interface that database and do design rules, you can do all sorts of things off of the database we've got. And that solves some of the purchase objectives. People saying, well how do we get at what's in there? One of the purchasing objections was, what do we do if you go out of business?

How are we going to protect ourselves with your software? So we had to put escrow agreements and put software up. How do we get at the database? How do we use the database for rules check? Or this or that? And the answer was always to come through the database rather than us trying to integrate like Daisy Mentor Valid did later.

Fairbairn: So in retrospect, what path would you have followed?

Richardson: Well I think that if wishes were fishes, you would have not spent some of the money we raised, on the distractions that and used it instead to enhance, keep going forward with the software solutions would have worked better. But you can't go back, because you're sitting there and you don't really know how many more of these workstations you're going to sell. Because everybody talks about Moore's law, and yeah. But is it really going to happen?

And the proliferation of the having engineers sit with one or two or three workstations on their desk and doing designs, as they do today, you're crazy if you tried to convince somebody that's the way it was going to be.

Fairbairn: So just to complete the story, what eventually became of Applicon? You had left in--

Richardson: I left in '81. It was public, was acquired by Schlumberger in '82, the French oil services company. They had a grand vision for being a presence in the electronic business. They bought Fairchild. They bought a company up in Ann Arbor, Michigan called MDSI, which interfaced machine tools. They eventually merged MDSI and Applicon together. And then Fedderson left at some point in there. And they brought in some people. And then they basically sold it to the Graff brothers, who were sort of liquidators. And then they sold it to somebody else. And I don't know where it is now. It's a long time.

Fairbairn: Long time ago. So what was your next step?

Richardson: I sort of decompressed. Decompressed. I had young teenage children at that point, and wanted to see them, and was pretty beat up emotionally.

So I said, I'll be a consultant. I'll hang up a consulting shingle. And did some stuff for a guy down in Washington, DC that was much more graphics oriented. And the people at Mentor-- Tom and Jerry-- knew of me through their venture capital connection, also through a guy by the name of Mike Cronin who was at Computervision. And because they'd approached Mike about wanting him to be involved as an adviser in their startup. And so they called me, and they said, "Would you consider doing this?" And I said, "Sure." And went out and talked to them. We struck it up, and so I was an adviser to the team until their public offering. And they asked me to join their board.

Fairbairn: So you started in--

Richardson: '81.

Fairbairn: '81, oh. So right away. Right when they were starting up.

Richardson: Yeah. Very quickly after their startup. And then joined their board at the IPO time. They had a three-man board up until then, and they expanded it to five people.

I think I wasn't tainted as being a venture capitalist. They had two venture capitalists and Bob Schroeder who had been at Daisy Printer Company, Diablo, I think. And he was sort of the other rational person-- the non-VC. And I was a non-VC.

And that was just a wonderful ride. I mean, it had some pretty scary moments. And they encountered this second system problem.

Fairbairn: Yeah, I was about to say, did you, having gone through some of that yourself--

Richardson: No. I just go, you know. And I really wasn't as helpful as I could have should have. Because it was so-- the enthusiasm for doing the second system, and the need was so obvious.

And I tried to convince them way early to build our own hardware like Daisy Valid had done. And Tom just said, no. They were stuck on the Apollo because the venture capitalists who had invested in Mentor were also investors in Apollo. And thank God that Hewlett Packard bought Apollo, because that gave Mentor a place to go at that time. And then they're on I guess, mostly SUN workstations now. Little bit of everything. And Wally's been there 20 years.

Fairbairn: Yeah, it's been a long time, hasn't it? In my conversation with them about the whole 8.0, the second system thing. It's clear they had to do it. The biggest mistake that they acknowledge was trying to do a new database at the same time--

Richardson: Right.

Fairbairn: Was what killed them.

Richardson: Doing everything.

Fairbairn: They had to make the transition to another workstation. They had to rewrite it. And that was fine. But they should have just kept the same database, as opposed to-- that was sort of the Achilles Heel that really screwed things up.

Richardson: And it was a new and improved database.

Fairbairn: Yeah, exactly. Always is.

Richardson: Yeah. But they had scope creep, just unbelievably. And you do that when it's late. I mean, you're desperate to get sales, and you're selling futures. I mean, we sold futures all the way along.

Fairbairn: Futures have to be brighter and brighter.

Richardson: Yeah. And the new accounting rules are such, that we couldn't have existed. Because we were always selling something that was going to be delivered three, six, three years from now. You never could have recognized the revenue for that-- no matter what you were paid for. You couldn't recognize the revenue until it came.

Fairbairn: And so what about your MIT involvement?

Richardson: While I was at Applicon I worked Dave Gossard with the mechanical engineering department at MIT. We put on a conference at one point-- a CAD-CAM conference that was under the aegis of MIT. After I left Applicon, we did a second one of those that I was more involved with. I had some sort of adjunct professor title, or something. It was sort of a hunting license.

And what I realized about myself is that I have a speed that's different than the academician.

Fairbairn: The academic speed.

Richardson: And that's part of what led me out of Lincoln Laboratories is that I want to get things done. I'm in a hurry about lots of stuff. And it gets me in trouble, but some of the stuff gets done, and it turns out to be pretty good.

And the guys at Mentor had a wonderfully strong sense of urgency. They demonstrated their product at the first DAC that had exhibitors down at Florida.

Fairbairn: And they acknowledged that it was pretty--

Richardson: Hairy.

Fairbairn: Lashed together.

Richardson: Right. And they worked several sleepless nights to get there. But that's how you get stuff, do it. A friend of mind, at Applicon was a mainstay in terms of getting the 3D system started, and was really a solid citizen. He came out to the Bay Area. He was out here to sell Applicon systems. He sold IC systems to Intel. And then he did a startup. And his founding premise was, you only had to work a 40 hour week for CAD/CAM startup. And I said, "OK."

And I don't think it panned out.

Fairbairn: Good luck with that.

Richardson: Good luck with that. Didn't work. And he's back. He works for Mathsoft now. And he's been back there for quite some length of time. So he's fine.

Fairbairn: So you've also been involved in some private investments and venture capital kind of work?

Richardson: I have. I was in a formal venture capital fund in '83 and '84. I joined in '83 a firm local to Boston, called East Tech Management Company. And we raised the total of about $35 billion over three funds. And the notion was local to Boston, early stage investments, hands-on value-added kind of thing.

And that's tough ground to plow. I mean, having lived through a startup, you know. And you think, well it's all sorts of things I learned. But it's all new learning for everybody else. I invested in a company called Banyan Systems. It was a network company that eventually got acquired.

Fairbairn: Yeah, they did well, didn't they?

Richardson: They did well for awhile. They got beat by Ray Noorda. Novell is the name of the company. And it isn't the product, it's how you position the product and what it is. It's the marketing. It's the insight behind how this goes in the users. I mean, I'm forever wanting to skip 10 years ahead of time.

I privately invested in another inkjet company in 1981, made smaller inkjet printers, color printers. And just hopelessly way too early. It's color everywhere now. But that took a long period of time.

We used to sell the Tektronix storage tubes. And they said, "What about color?" I said, "You can have any color you want. As long as it's green." Just like Henry Ford.

Fairbairn: Just like Henry Ford. Exactly. So what would you-- sounds like you've had some involvement there with the East coast. I mean, is there any difference, any way that you would compare some of the East coast venture firms that you have been familiar with versus some of the West coast ones?

Richardson: Well it's not original to me, but the East Coast and West Coast are dramatically different. So if you go back 30, 40 years of time, think about Digital Equipment, IBM, Computervision, Prime, Wang. All very proprietary companies. They built everything. They used to talk about Tektronix up in Portland is making their own screws. They were vertically integrated for everything.

You come to the valley, and everybody has got all this supplier network they've developed. There's relationships. In the Valley you have all this relative freedom of information and experience that gets passed around and shared that just doesn't happen on the East Coast.

And I think the venture guys in the East tend to be doing other kinds of deals now. And the West Coast guys-- although I say that. The activity in New York City, the activity in Boston, has picked back up. They're all sorts of deals being done. It's typically by the younger members of younger firms. Some of the older established firms are doing deals, but it's the new guys that have had a hot hand and are doing stuff.

And I just walked away 15 years ago, and just said, you know, it ain't for me. I can't add any value. I'm out of date. I think the deck is stacked against individual investors because you've got all these angel funds that are around, and people putting small amounts of money to work. And some of those pay off very handsomely, and a lot of them just end up going nowhere.

Fairbairn: Yeah, they're very difficult these days. I was in one as well. And it's become a more ruthless business. It's so easy to get--

Richardson: Overbid.

Fairbairn: Well, overbid, or washed out in the next round, unless you have money to continue to play. You know, the pay to play thing. And people bringing money in later are--

Richardson: Just don't care.

Fairbairn: Just don't care.

Richardson: They are being rude. I know it.

Fairbairn: So do you have any observation on-- this sort of diverts from the main thing, but given you've sort of lived through this, I'm curious as to your observation in terms of during the '60s and early '70s, there was a lot of startup activity, a lot around minicomputers and so forth. I observed that every one of the minicomputer companies went away, except for Digital-- well Digital did go away. Hewlett Packard and IBM sort of existed before and after. But every company that was started to be a minicomputer company went away.

Richardson: Right.

Fairbairn: And do you have any observation as to why the Boston area didn't sort of renew itself in that regard?

Richardson: They couldn’t step up to eating their children. That the stuff that the competitive guy at Harvard Business School talks about, why well-managed companies fail is that you've got to just be relentless about working on what your customer needs. Never mind what you've got and what you're selling. But how can you do something for the customer that he doesn't-- you know, the new stuff. I mean, think about the disk drive progression. And that was all done on the West Coast by startups. Jesse Aweida's company up in Boulder went to the wayside. And they tried to venture into tapes and whatnot.

So I think there's this-- you know Polaroid is a classic example of a company that couldn't figure out how to-- and Eastman Kodak in Rochester, the same thing. It's just the margins on the existing businesses are so great. And some whipper snapper comes in and says, "We're going to start selling this stuff at instead of a 75% gross margin, we're gonna sell it for 25% gross margin. Then get out of here. Right?

But that's what's happening. Our son's in the internet retail business. They sell underwear. He and his partner, they sell men's and women's underwear on the internet. 14 years now. They're doing great. They're doing fabulously. They've got $100 million dollars in revenue.

But it's just a business that just like, you have to keep working on every single cent, you know, what's the cost of freight, what's the cost of packaging. It's all this stuff that they have to-- they're in New Jersey.

Fairbairn: Civic involvement?

Richardson: Yeah, I agreed to go on a couple of boards. One was a hospital board. In 2000. And again, I'm an optimist. And I thought, boy the time is right for changes to happen in health care. And this is a regional community hospital. They ought to be able to make some things change, and make things better. Boy was I wrong. And I was on there for eight years.

And then in town, in the town of Carlisle, which is a town of 5,000 people that's very rural. We're out near Concord, Lexington, out that way. And it's a land conservation-- bunch of tree huggers-- so they basically raise money and buy land. Figure out to get land conserved as opposed to building houses and whatnot. I was treasurer for that for 15 years. And that's done. I don't pick up my phone have to call, and explain to somebody why I'm going to vote against their interest. Life's too short at this point.

Fairbairn: So what do you find yourself doing these days?

Richardson: I'm into family history and family stuff. We've got about 20,000 photographs that I have scanned and captured. I've got another 10,000 to go. 10,000 or 12,000. So I've done all that with the belief that I can somehow be able to organize it. And I'm now facing up to the issue of this grand scheme of having a database and a Wikipedia, and all this sort of stuff is A-- a lot of work to do, and then a lot of work to maintain once you've done it. So I've changed strategies, and I'm into making photo books, photo albums. And having physical books that you can give the kids and grandkids, and say, "Here's your family history." And with pictures and annotation and stuff. And it's a start. I mean I'm not very far along. I've done a couple books, but they're very hard to do well. And I want to do them well.

I've got one that's hopefully will be printed this week. We've got a family reunion coming up in July, and I want something to be able to take, to show and whatnot.

Fairbairn: Yeah, I've been involved in some similar things. And the whole issue in the museum and everybody faces is, the digital storage-- and this is not exactly what you're talking about-- but digital storage, everybody thinks of it as a blessing.

Richardson: It ain't.

Fairbairn: I think that is a problem that really needs to be solved.

Richardson: Well, it's getting worse because of the cloud stuff.

Fairbairn: Right. And there's just no editing. I mean it just goes, and you get 20,000. You don't need 20,000. There are some good ones in there. And before, we were forced to edit. And I also gathered a lot of old family photographs. I have some from the late 19th century. And back then, they took one photograph at a wedding. Today people take thousands of photographs at a wedding.

Richardson: We double the world's population of photographs every year now. It's just staggering.

Fairbairn: And so just dealing with that volume, and it's one thing, well, how do you store it all. The second it, why do you store it? The editing is the problem. What are the few photographs out of those thousands that you really want to store and treasure.

Richardson: And then you go to the complexity of dealing with movies. We've got a bunch of home movies that are now digitized and in the computer, and we've done some editing of those. But OK, so where do you show it? Do you put it on YouTube? What's the issue of privacy around that? How do you protect that?

I've got family members that just won't let me even think about putting on YouTube because of privacy. So they're just gonna sit in the disk somewhere until we--

So there'll be some books. They may or may not. The book software we've-- the one we're about to finish, we did with iPhoto. And you do it the Apple way, or you don't do it. And we've bumped our heads. And so we're using Lightroom with the book. And I'm more comfortable having it on my computer than doing it in the cloud. We've done a couple of books with Snapfish and Shutterfly and people like that. And that's serviceable. But you can't get in and sort of do the level of control.

And you know, but there are lots of people who are thinking about this, and worried about it at this level.

Fairbairn: Let's wrap things up here.

Richardson: OK.

Fairbairn: You want-- we often ask at the end, people who have sort of been through all these major transitions in technology. Where do you think the opportunities are today in terms of in the technology space, what would you--

Richardson: I think getting the best education you can get. You know, the math skills and technical skills are just the way it is. And you've got to stay current. You've got to keep working on things. You can't go

into retirement at age 28. You've gotta keep developing new skills and thinking about-- whether it's thinking about a new job somewhere else, or a job within the company you're working in. You've got to constantly be out there. And if you don't, you're just going to get left behind.

Fairbairn: You can't prepare for one career. You have to be prepared to kind of renew yourself constantly

Richardson: Yeah. The one career thing-- I'm not one of them, but my older two brothers spent-- my oldest brother spent 45 years working for Shell Oil Company. And the other one spent 40 years working for Pfizer. And neither me nor my younger brother have that kind of work history.

And nobody can talk. The reality is, the companies aren't investing in doing all the training. You graduate in my cohort of people, there were guys hired into the GE management training program. You spent two years being trained by GE, and you were moved around. And they can't afford to do that now, Because you do that, then you go somewhere else.

Fairbairn: OK.

END OF INTERVIEW

