Oral History of Terry Johnson

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Jim Porter: Today I'm sitting here with Terry Johnson, who is one of the people who has created a lot of the history of the disk drive industry by being there at the right time and coming up with the right group of people and arriving at a lot of the right decisions. Perhaps we can start from the beginning, Terry. Where were you born? Where did you grow up and go to school and all those things?

Terry Johnson: I was born in Ogden, Utah. Interestingly, my father died when I was 15 years old. I used to spend my summers on a ranch out in Nevada. It was kind of an interesting situation with -- I kind of had two families. At any rate, when I graduated from high school in [1953], I went to one-quarter of college and then I ended up going into the Navy for four years. Basically, I was an electronics technician in the Navy. I was an enlisted man in the Navy. It's kind of a -- you're a second-class citizen, to a certain extent. So when I got out of the Navy in '58, it was like I was a very motivated college student that saw maybe an opportunity not to be a second class citizen the rest of my life. I graduated from the University of Utah in 1961 with a degree in electrical engineering. I had a job offer from Control Data and IBM. My plan was to go to UC Berkeley and get a master's degree, but I didn't realize at that time that you couldn't apply for graduate school until you graduated. At any rate, by the time I got accepted at UC Berkeley, it was like a week or two before school was to begin, and by that time I'd gone out and bought a stereo set or something and given up on that. So I ended up working for Hercules Power Company, which was an aerospace company. They kind of had a situation where they had three engineers for every two jobs. I got a real appreciation for what it was like to work in a company that was not very well run or not run on an economic basis. A year later, I actually did go to UC Berkeley and got a master's degree. After that, I got a job offer and accepted a job with IBM in San Jose. When I got to IBM in San Jose, I felt like I'd died and gone to heaven, because I knew what it was like to work for a bad company. So it was wonderful to go to work at IBM. It was a very interesting situation where I remember I'd be in there working on a Saturday [Sunday] or something like that. I'd kind of look around and I'd think, "What am I doing here? This company's got 200,000 employees. They don't even know who I am."

Porter: Your facility in San Jose was the one on Cottle Road, which was their disk drive plant?

Johnson: That's correct. Actually, I ended up working as an analog circuit designer, basically, and on various disk drive products and other things. I was there at IBM for seven years, always as an individual contributor. I didn't find out until I'd resigned that somebody disclosed to me that they'd had a job as a manager for me, that somebody wanted me as a manager and that the group I was working for figured that they couldn't really give me up. I was important to their deal. Thanks a lot, as I kind of walked out the door. What I did is -- the last job I had in IBM is we were actually working on the 3330 project. I was a very small player in a very large group that was designing circuitry for the IBM 3330.

Porter: Just a note for anyone else. The 3330, of course, was the last of the IBM disk pack drives, using a separate 14" disk pack. When it finally came out in '71, it had 100 megabytes capacity.

Johnson: Right. It turned out that about six months before I'd left IBM, it turned out that Al Shugart had taken roughly 100 people, I think, over to Memorex. I think I was the last one that left IBM to join that particular group.

Porter: I was at Memorex myself when that group arrived with Al. There were all kinds of rumbles around Memorex with various theories of how many people were involved. The theories varied from 30 people to 300 people that came with Al. This is when Al first learned about lawyers, of course.

Johnson: It was kind of interesting when I left IBM and I went to work for Memorex. I suddenly discovered that I had fallen way behind the state of the art. At IBM, there was kind of this thing that if you're a good designer, you designed with components that came out of the blue book of components that were approved components at IBM. What I found out at Memorex was that the rest of the world was using operational amplifiers and video amplifiers and all sorts of things that I, frankly, didn't know existed. I spent, I think, the first year at Memorex kind of hunkered down trying to learn the state of the art by studying the circuitry of the products that had come before me at Memorex. My assignment at Memorex was to design the circuitry associated with the servo system. At Memorex, I found out using all of these other tools that were available in the rest of the world outside of IBM, that rather than just design one little tiny part of the circuitry associated with the servo system, I was able to do pretty much the whole thing. We had a really interesting team of people there at Memorex. It was an incredible source of people who later became founders and entrepreneurs in the disk drive industry. Norm Dion comes to mind that started Dysan. At lot of these people at Memorex, we didn't really recognize these people as going to be the founders of a tremendous industry. Norm Dion was kind of-- a lot of these people, we didn't really take very seriously. Jugi Tandon, that started Tandon Magnetics. These were -- I hate to say it, but there were a lot of us that were considered "B" players at Memorex. Of course, there was Al Shugart, who fundamentally was a big player. He started Shugart Associates and later Seagate. It was just an incredible [group of people] -- Dave Brown, who became a founder of Quantum. It was an incredible source of people *who* later spread out and became the founders of many companies in this industry. I had been there at Memorex for about two years *before* we left there, it turned out that Roy Applequist , Jim Morehouse and I went and joined a start-up that was funded by Storage Technology. The situation there was that Storage Technology had been in the tape drive business and they wanted to get in the disk drive business. They started a company called Disk Systems Corporation with a downstream arrangement, kind of an unconventional venture capital thing, where if we reached certain goals, they would exchange the Disk Systems stock for Storage Technology stock. Just as a point of reference, it turns out that Al Shugart left and formed Shugart Associates, I think about three months after Roy and I and Jim had gone to Disk Systems Corporation.

Porter: This was in about '73, wasn't it?

Johnson: I think it was probably, yeah, very early '73.

Porter: Maybe '72?

Johnson: Yeah, yeah. I was there at Memorex just about two years. At Disk Systems Corporation, a gentleman by the name of Ivan Pasha, who had been at ISS, had sold Storage Technology on a concept of what became the super disk, which was a four-spindle disk drive that had a central rotary actuator. It was kind of a gargantuan thing with, it turns out, a four-spindle, 64 disks and 128 heads. I worked on the servo electronics for that product and Roy Applequist took what started out to be kind of an impossible situation, in which the original concept *was* that they would take one ingot of aluminum and machine this whole rotor out of that. Roy did a very exotic, very low inertia rotary carriage for this device and did the pancake motor and that sort of thing. I did the electronics associated with the servo. Two years after joining this startup, it turns out that Storage Technology exercised their right to obtain the stock of our little start-up. It turned out that they moved those of us who were willing to Colorado. Roy ended up staying in the Bay area and I went off to Colorado and spent another five years at Storage Technology.

Porter: You became a Colorado guy for the rest of your life?

Johnson: It was kind of interesting. At that time, I told my wife when they moved us to Colorado, I said, "Don't get too comfortable here, because the center of gravity of the disk drive industry is in San Jose. Sooner or later, everything goes back to the center of gravity." We developed and finished the engineering and put into production the 8800. It was an incredible product for its time. It was actually an 800 megabyte drive in a period when probably the biggest disk drive at that time in the marketplace was probably like 100 megabytes going to 200 megabytes, as a precursor. Although it was a very impressive product from a capacity standpoint, it kind of violated the rule of "Keep It Simple, Stupid". When you've got 128 heads flying in one enclosure and one of those heads crashes, *well* all of them crash! It was too complex a product to be really reliable enough on a long-term basis.

Porter: But they did ship quite a few of them?

Johnson: Oh, they shipped quite a few of them. Like I say, it really kind of moved the state of the art as far as capacity forward a great deal. Once again, from a practicality standpoint, it was kind of a little overdone.

Porter: I know then they came out with some other models which only used a conventional single spindle and one actuator, didn't they?

Johnson: And I actually became the program manager on their 8650 drive, which was basically competitive to the IBM Winchester family of products. It was an interesting product. It was, I think, 857 tracks per inch and 30 millisecond access time. It was a pretty high technology product for the time. I used to kind of jokingly say that everybody in the industry knew that you couldn't do 800 tracks per inch, but we were out in Colorado and never got the word. We just kind of blundered through and did it. After the end of that development program, I became the director of engineering for Storage's disk division. That went along pretty well for a while. Then they changed my management and it turned out that I didn't really get along with the person that I was working for. It turned out that I ended up getting put in a staff position, which usually in this industry means that's the penalty box. To make a long story short, I kind of decided that whatever I was looking for in life wasn't at Storage Tech, anymore. This was actually in about the 1980 time frame. I ended up leaving Storage Technology and it was kind of a mutual agreement. It turned out I had one telephone conversation when I resigned with my manager there. The only other person I talked to *at* the time I left was somebody from personnel when I turned in my key*s*. So they were kind of finished with me.

Porter: And you were finished with them.

Johnson: Well, yeah. I think I kind of judged that that was kind of the end of that particular era. It was kind of interesting, because after I left there, somebody that I'd worked with there had said, "Well, why don't you put something together and we'll join you?" It was kind of like I looked over my shoulder like, "You couldn't be talking to me," because starting a company never really had entered my mind. In that time frame, it turns out that Seagate had announced the ST506 product. I called up Roy Applequist, who probably I hadn't seen for about five years or something like that, and talked to him and said, "Maybe we could go down to the computer show" that was in Anaheim that year and see what was going on, and maybe we could figure out something to do. You know, something that I could do as a start-up. It turned out that Roy and I went to this show. Seagate had announced the ST506 and we went up to this suite where Al Shugart was showing the ST506 and looked at it and I was candid with Al about the fact that we were interested in starting a company in the disk drive industry. Al had told me, he said, "Well, break a leg." At the time I didn't realize that that meant good luck. I thought that maybe he was telling me to go out and hurt myself or something like that. I guess one of the things that I think maybe Al realized that there needed to be more than one vendor in that field for it to be successful. We started in my basement. I had a bunch of people at Storage Tech who were supposedly going to join me. It turned out that right at the last moment, the key person that I was going to have join me in the company, Storage Tech turned around. So on a Monday morning when this was supposed to all take place, I ended up -- and another person had cold feet, and I basically told him that if he was that nervous about it, then I didn't think it was the right thing for him to do. Anyway, on a Monday morning when we started Miniscribe, it turned out I

ended up with one non-degreed designer. If he wouldn't have shown up, probably the whole thing would have ended right there. However, now I'd lured somebody out of gainful employment, it was like, well we*'ve* got to go forward on this thing. I slowly acquired some employees and it was not an auspicious group until one time in an airport, I actually ran into John Squires, who ended up joining me. He was basically the first, what I would say, world-class player that we had at Miniscribe.

Porter: I remember your basement from visiting during that period, and I remember a pool table in the middle of the basement and your design group poised around the pool table working on a disk drive.

Johnson: Yeah. We put a 4' X 8' piece of plywood on top of the pool table. I remember one time we had a vendor from California out there. I forget whether he was *a* head or disk vendor or something like that. We were standing out in front of the house, which was down a half-mile dirt road in Colorado. He asked the question. He said, "Can you really build disk drives here in Colorado?" It was a fair question. I actually funded the company myself with some of the money I'd made out of the Disk Systems start-up for the first year myself. It turned out that we had reached the point, where I think we had been turned down by every venture capitalist in California. I kind of made the rounds. I think they made a fair assessment that we kind of had a journeyman crew, but it wasn't necessarily world class. I finally raised some money from a couple of people in Denver, one of which represented the Estee Lauder family that is in cosmetics. We raised a small amount of money from them. But actually, we got to the point where we had a prototype drive. Finally, we brought in two big venture capital firms -- J.H. Whitney and Alan Patricrof Associates from the New York area. That was kind of when we finally got the thing financed. Another thing that happened on the way, the first drive that we developed had two printed circuit boards and it was really primitive -- I remember one time Saturday I was sitting in my office -- this was after we'd moved out of the basement -- and John Squires had been down at Tandy with one of our salesman visiting them in Fort Worth. I wish I could remember his name from Tandy. But anyway, he condescendingly finally let them into his office and they had a very short meeting. He told them, he said, "You're just wasting your time and mine trying to sell this product. You've got two printed circuit boards. You're not using manganese zinc heads, you don't have an onboard microprocessor, and you don't have onboard diagnostics. You're just wasting your time and mine trying to sell this product." John came back to my office and I was sitting there on Saturday and he says, "I think we've been riding the wrong horse, Johnson." It turned out that I told John to go ahead and develop the product that had been specified to us. It turned out that he kind of went off in the back room while we tried to finish up the Miniscribe 1. He designed what became the Miniscribe 2, or the 2012. I think that was the name of it. It turned out that that was the product that kind of gave us our come-up-ins in the world. It turned out that was the product we sold to IBM for their XT computer. Miniscribe and Seagate were the first suppliers. Seagate was a much larger company than we were at that time. I think the only reason why IBM really bought this product from us is I think we were a little bit ahead of Seagate, and I think we provided the initial product that they actually shipped in the XT, they wanted to get that product shipped. I think it was our product. I think they probably had a lot of heartburn with dealing with a company as small as Miniscribe.

Porter: They probably wanted two sources, too. In case one of you hit some problems.

Johnson: You bet. That gave us our come-up-ins. Based upon that contract, we were able to do an IPO and raise some capital to get to the next step. That was the good news. The bad news was that about -- it may have been about six months after we started shipping and it was announced that we were dealing with IBM, IBM decided to cut back their order with us. It turned out that I was in California when the company received this news. I had not talked to the people in the home office. It was before the time of cell phones and that. By the time I talked to them the next morning, it turned out that they had suspended trading in the stock until we could get the information out to the marketplace that IBM had cut back this order. The bad news, as a venture capitalist, well anyway, when we finally opened up the stock, the stock had fallen to about 50% of its previous, day before value. I remember I talked to a venture capitalist after that. He says, "Well Johnson, you never get a second chance to make a first impression." Our first impression in the market was suspended trading and IBM cuts back order and all that sort of thing. It was part of the adventure of being a small company in this disk drive industry.

Porter: But you survived for quite a few years beyond that.

Johnson: Yeah. We lived beyond that. I think IBM probably was a lot more careful in the way they treated very small vendors after that. They were pretty careful about how they did it, because they were a big key effort [so large and we were so small]. We basically went on to have a pretty successful run of that particular product. Of course, the whole industry was -- when we originally brought out or announced this 10 megabyte disk drive, it was interesting, because a lot of people said, "Do you really need 10 megabytes?" These desktop computers had gone from floppy disks before the XT, to like ten times the capacity with the five megabyte drives. Did they really need 10 megabytes? The issue was that at that time, desktop computers were used basically for word processing and spreadsheet work. You could work a long time and not really fill up a floppy with your data and that sort of thing. It was an interesting time in the business. Obviously, as time has shown, there turns out to be an insatiable appetite for storage. I think that one of the things, if you just look at the computer industry as a whole, back in those days it turned out that if you looked at a computer floor of normal -- a big computer floor, it turned out that probably at least 30% and maybe 40% of the floor space were disk drives. Another big section was tape drives. One of the interesting things about the disk drive industry is that in a computer, it's possible that the disk drive is the most expensive or the biggest investment single item in a computer system. We hear a lot about microprocessors and we hear a lot about the Silicon Valley and computer chips, but it turns out that basically this area in San Jose was the birthplace of disk drives. It turns out that that's a very, very significant part of the computer industry, which I think is kind of understated. We continued on at Miniscribe and we went through the full height products and then the half height, 5¼" products. Then we went to -- we did one of the first 3½" disk products. It was kind of an interesting thing that some people would say, "Well why did this progression take place?" There was always an appetite for faster access times and higher capacities. It wasn't really rocket science to be in marketing in this disk drive industry.

There was always this insatiable appetite for more capacity and faster access time. Interestingly, when we did our first 3½" drive, we actually had been working with IBM, and IBM was very interested in this product. It turned out that we did not execute to our schedule that we'd provided them. Finally, they kind of went away. It turned out that it took a long time for the 3½" business to get really going in the disk drive industry. I like to point out that it wasn't because these large companies like IBM didn't want it, it was that the product was not available. There was an insatiable urge to more capacity and smaller size. It's a matter of execution.

Porter: It could be pointed out that one of the ways that capacity could be produced at a better cost in those days was to use the larger disk, because you had more space on a disk. So you could use fewer disks and heads to get a given capacity than you could on a 3½". Therefore, you could have a better price. I might point out also that when you saw that first drive demonstration in 1980 by the first maker of a 5¼" hard disk drive, of Seagate as it later was called, you were starting out with one company, but the next year there were 17 companies announcing 5¼". Then the year after that, there were 30 and at the peak, it got up to, in 1984, 34 companies. But coming up behind them, of course, the first of the 3½" drives was announced in 1983 and then by 1985, there were 33 companies making 5¼". Now suddenly, 18 companies doing 3½". So you could see that the trend was rapidly moving that way and, of course, 5¼" hard drives and 3½" both stayed in production for quite a few years before 5¼" finally went away. They had a lot of momentum as a result of everything that had happened. But you did start doing 3½" drives at that company that you founded, didn't you?

Johnson: That's right. It was a regular progression up through there. We actually at some point also got away from using the rack and pinion and we basically started to do voice coil actuator drives. Kind of an interesting point, just contextually. When we did this 8650 drive at Storage Technology prior to my starting into this 5¼" industry, we actually had an 857 track per inch drive. It turned out that when we went into this 5¼" business, it turned out that we took a step backwards. I forget whether it was -- I think it was around 200 tracks per inch, or maybe it was 400. So one of the things is that in a way, we repackaged technology into these smaller form factors. The state of the art in large drives was way advanced to what was in this area. Ultimately, we did put voice coil actuators into these 5¼" things and then we upped the capacity and decreased the access time. There was this continuous flow forward. Anyway, in about 1984, it turned out that I think that the company had pretty much outgrown me and I had a feeling like the board had kind of lost confidence in me. I wasn't about to stick around until after the band went home, so it turned out that I resigned from Miniscribe and left the company. About three months after I left the company, it turns out that John Squires left also. I called up John and I said, "Well John, you made me a lot of money and if you would like to start a company, I'll give you a hand." One thing led to another and John -- this time, rather than in my basement, it was in my guest house that John started a company which was called Co-Data at the time. As Jim has mentioned, there was a lot of disk drive companies out there in the world. We ended up going to COMDEX, John and I, and we ran into this venture capitalist from J.H. Whitney whose name was Russ Planitzer at COMDEX. He told me, he says, "Johnson," he says, "there are not going to be any more disk drive companies." Obviously, there were

plenty of disk drive companies out there already at that time. What was interesting is I had a lot of respect for Russ and I thought very possibly he could be right that maybe there would not be any more disk drive companies. In thinking about it at that time, I thought, "What could we do to prove Russ wrong?" What I came up with is that maybe we could get Finis Conner into this activity. Finis --

Porter: We hadn't mentioned before, but Finis, of course, was the co-founder of what became Seagate Technology with Al Shugart and they were the first ones to ship that 5¼" hard drive.

Johnson: Right. Finis, he was an incredible marketing guy. I remember going out to Texas. We were in a little company down in Texas. People down there talked about Finis like if they ever got married again, he was going to be their best man. How he bamboozled all of these people out there in the boondocks to think that he was their candidate to be their best man was kind of indicative of the fact that he was a formidable guy to try to sell against. In the meantime, he had left Seagate. I think he'd been involved in a couple of other activities which hadn't really netted very much. So I looked at it, he was kind of like on his third bounce. At any rate, John and I went down to Palm Springs and visited Finis. It turned out that Finis came up to Longmont to the guest house. He decided that he liked what John had developed there. Finis basically came into the company and he wanted his name on the door. That was something that John and I certainly were not interested in. So it turned out that Co-Data became Conner Peripherals and when Finis came in the front door, so to speak, that I went out the back door. I really didn't have any activity in that company beyond that point. It became one of the fastest growing, I think the fastest growing company in American History at that time.

Porter: I believe in its first year of shipments, it hit $103,000,000, which at the time, was an all-time high in one year.

Johnson: Yeah. I'm not sure that that still doesn't hold as the fastest-growing -- well, with the Googles and that of the world today, that's probably not true anymore. At any rate, it became a fantastic success and I think that Finis and John Squires were -- Finis from the marketing and sales standpoint and being able to raise capital, and John Squires from the standpoint of engineering, were an incredible team. As far as I was concerned, I was out of that particular company, and I kind of got out of their way. They did just fine without me.

Porter: The engineering stayed there in Longmont, Colorado, courtesy of John.

Johnson: Right.

Porter: And the company headquarters was, of course, in the San Jose area.

Johnson: Right.

Porter: And manufacturing ended up, of course, in Southeast Asia.

Johnson: Right. After that, I did one more start-up. It was called PrairieTek.

Porter: Let's hold right there and go to the new tape and so you can talk about that.

Porter: Okay Terry, before we actually go on to what happened with PrairieTek, the start-up phase at Co-Data, I know you weren't actively still involved but you had some observations I know of how they really got started.

Johnson: Yeah it was basically what became Conner Peripherals. John Squires had basically developed a disk drive like one I had never seen before and I'm not sure the industry had ever seen anything like this before. It was totally microprocessor-centered. For instance, the servo system, everything was controlled with the microprocessor. There were really no analog circuits except for a D to A converter kind at that output that controlled the voice coil actuator but it was an extremely interesting thing. John was an incredible microcoder who basically set up kind of a matrix of microcode basically and very economically done but in a way it turned out that Conner was able to introduce product after product in a very rapid basis, and John just would change the parameters in a table and so they had this whirlwind of development of new products that I think just baffled the whole industry basically and it was just an incredibly small development team, and the fact that they became this fastest growing company in American history was basically jointly attributable to Finis working with Compaq and doing wonderful things basically from the standpoint of financing and marketing and John doing incredible things in the area of the engineering of the drive and they used embedded servo. I'm not positive whether they were the first. I mean, the concept of an embedded servo has been around for a long time, and they may not have been the first but they certainly were a key player in that area and so it was an incredible success story that was borne out of that situation and I'd like to think that I played a little part of it, at least in kind of being there at the birth anyway.

Porter: You were an investor who was smiling while most of this was happening, I guess.

Johnson: Yeah. That was true. So at any rate, I moved on and basically funded another start-up in my guesthouse this time. So there's one for the basement and two for the guesthouse. I have always believed that there were applications for smaller drives and so we started a company called PrairieTek, which did a 2½ inch drive.

Porter: The first one to ever do that, right?

Johnson: Well actually Seagate very quickly got on the bandwagon and became active in it. It was kind of interesting. Sometimes you get awards and there's certain things that happened in life that you kind of look back at and you think did you really deserve that or not? But anyway, it turned and associated with that 2½ inch drive, well it turns out that Finis Conner, and I shared "Person of the Year" award from PC Magazine on the basis of the introduction of the 2½ inch drive. Well the one reason why I'm a little hesitant to mention this is because it turned out that PrairieTek was really not a successful venture and basically ended up folding without ever doing an IPO or really becoming a major player in the marketplace.

Porter: Why was that?

Johnson: Because we didn't execute. It was very, very simple and a lot of people will say that maybe Seagate did us in or whatever. There's various ways that that could be told, but we had a very good time lead on going to market with that product, but very candidly we did not execute and it's been kind of my opinion that everybody worries about the competitors and about this and that and the other. I like to think that we have met the enemy and it is us, and if we don't solve somebody's problem or execute, then basically we will not be around, and in that particular case, we basically were our own demise, and after that I didn't do anymore start-ups and I like to tell a story about an old Japanese adage that I think applies to this situation. It goes something to the effect that "sometimes miracles happen and if they happen once, they very often happen twice, and if they happen twice, they always happen three times. But they never happen four times." So when people ask me why I don't do anymore start-ups or anything, my pat answer is, "Well, I used up my three miracles."

Porter: In the case of PrairieTek, the customers with the 2½ inch hard disk drive, were basically the makers of laptop or the notebook computers.

Johnson: Right. Right.

Porter: And system manufacturers, of course, always are concerned with having a significant enough manufacturer whom they can count on for their production schedules. You didn't have very much critical mass at PrairieTek at that point, did you? Relatively small?

Johnson: Well, once again, we had interested customers. I'm one of these people that believes there's always an insatiable urge or drive for not only smaller but also higher-capacity drives, and we see today that the 2½ inch disk drive is a big factor in the world today, and if we would've executed in a timely fashion, there were people there that were willing to use it. Turns out that the notebook computer business and the computer business in general is such a tremendously competitive place that these computer makers are always looking for some edge, some ability to get something smaller or better or more compact or higher capacity.

Porter: Or a better price.

Johnson: For a better price to sell their product. We were in a wonderful place. I think the bottom line is that we were in the right place at the right time and we had a fantastic ride in this industry and basically the story goes on. You can say today how many disk drives does, for instance, Seagate ship a month now? It's an incredible number. I know that Seagate, for instance, is the largest. The last time I heard anyway, they were the largest motor manufacturer in the world, and all of these different records. So it is an incredible business with incredible opportunities and we just had the wonderful good fortune of being in the right place at the right time.

Porter: Since the days of PrairieTek, I know you've been a close observer of the disk drive industry. Is it true you have not been then involved with any other manufacturer?

Johnson: Yeah, that's been it. There's been some people out there that have continued to be active. Once again, it's just a very exciting place. One thing in retrospect too, I said earlier when I told my wife that the center of the disk drive industry was in California or in San Jose and not to get too comfortable, but I like to think that we moved the center of gravity, at least the engineering part of the disk drive industry, a little bit to Colorado, at least for a period of time, and it turns out that Maxtor acquired Miniscribe and then it turns out that Seagate acquired Conner Peripherals and they both had large development labs in Longmont in Colorado just north of Boulder, where basically we started these things, and then interesting was just recently, it turned out that Seagate acquired Maxtor. So fundamentally, Colorado has played a role in this disk drive industry and the fact that Storage Technology funded Disk Systems Corporation out here in California and moved some disk drive people to Colorado I think actually is kind of an interesting thing, that it was kind of a pivotal point in the history of this industry.

Porter: So I don't hear any regrets about having been involved in this industry.

Johnson: Like I say, we were very, very lucky. Somebody might say that we were all talented. You know, there was a pool of talent at this Memorex with all the companies that got started out of there, but also there was absolutely no question that this was an industry that was just absolutely pregnant with opportunity, and it goes on today. I see other possible areas of innovation and everything as this industry goes forward, although with these goliath companies it's obviously tougher to break in but today in Longmont there's basically some of the people that we had at PrairieTek had started Cornice, which is another start-up out there in that area, and once again they're pioneering another very small disk product area. A wonderful place to have been, and an incredible industry.

Porter: Thank you very much for your observations, Terry. It's delightful to hear of somebody who's made such a large contribution and enjoyed it while he was doing it.

Johnson: Well, Jim, you've been a great reporter in this particular industry and you've been a very, very key part of this as well and I appreciate everything you've done, and I appreciate the opportunity to be here at the Computer History Museum and see when a little tiny incremental part of all of this has been a factor in this massive, beautiful thing that has happened in this area.

Porter: Thank you very much.

END OF INTERVIEW