John Janning
Oral History

KH: This is Kate Hagenbuch interviewing John Janning for DaytonInnovationLegacy.org. We're interviewing Mr. Janning at his laboratory [at 4656 Wilmington Pike] in Kettering Ohio, on June 4, 2010. Jack, what was school like for you, subjects, teachers, classmates, activities?

JJ: Well, school was boring to me because there was no challenge, they didn't make things interesting. It was just too much same old stuff all the time. I like diversity. The way I teach , I've taught in grade schools, colleges, high schools, and I try to make it interesting to the students, something that they want to learn.

KH: What were you dreams and goals?

JJ: I always had a dream of winning the Nobel Prize in something. I wanted to make a difference. I just didn't want to exist and waste my time on little things. I wanted to make a big difference and that has always been my dream.

KH: How did the direction of your career come about?

JJ: Well, the direction of my career came about way back in 1957 when I was working at the University of Dayton Research Lab. We were doing instrumentation of the nuclear weapons at Eniwetok Atoll and Bikini [Island]; Yucca Flats, Frenchman Flats in Nevada, and we did magnetic recording of sensors that were in specimens that were in the blast area. One of the things that we came to find out is that when the blast took off and all that pressure forced a strain gauge in one direction for a certain length of time it resulted in a DC signal going onto the magnetic tape. Well, there's no way that you can capture DC from magnetic tape, it has to be alternating, you have to have a magnetic field that's moving. I came up with a way that I can recover DC from magnetic tape and I sent it to Electronic Design and they published it. They didn't believe it either; they hired a consultant to verify it. They kept the manuscript for a year. Well the University of Dayton didn't want to give me any acknowledgement because at that time I wasn't a college graduate or anything. So I shouldn't know how to do these things. And so I went to NCR. I found out from a friend of mine who had gone over there that they were interviewing, but they weren't hiring, they were laying off. And I went over there and the next day I found out what they needed. They needed someone in electronic circuitry, pulse circuitry and I went over there the next day and I put my application in, in a whole room full of people. And the guy comes out and he said, "well, Bill Jones, we don't have anything but if we get something we'll call you. Jane Johnson, we don't have anything but if we get something we'll call you." And he came to me and he said, "we don't have anything but if we get something we'll call you." And I said, "yeah, especially in pulse circuitry, or something like that," and he says, "um, have a seat." And he got rid of everyone in the room and he called me in and he

wanted to know if I could take a test. I said yes. And he said, "We're interested in somebody with transistor experience in pulse circuitry." So I took four tests and I scored 390 out of 400. I was whisked off to three different departments for interviews, and all of them wanted me. So I had my choice. So that's how my career changed and I got into research and development at NCR.

KH: You're a self-described rebel. A high school dropout who succeeded in very technical areas of physics. How did you bridge the gaps in your knowledge?

JJ: [laughs] You know I'm glad you asked that question because we are so attuned to--Mark Twain said it best. He said, "I never let my schooling interfere with my education." To me schooling is like air travel. If you want to go to China, how do you go to China? You get on a plane, that's air travel. Ok, schooling is like air travel, and the destination is, for air travel would be China. In college it's to get a degree. But I can go to China without going in the air. I can drive to the West Coast, I can hop on a boat, and I can get to China. It's going to take me longer, but I'm going to get there, and I'm going to learn more along the way. That's so important, than to have a crash course in college for four years or whatever it takes. You see the difference between schooling and air travel, destination, education? Mark Twain had it right. You never want to let your schooling interfere with your education, and I'll tell you this, Kate. I have learned so much along the way, the hard way; the school of hard knocks can't be beat. [Readjust camera]

KH: Describe your early jobs, your very first jobs--what were your duties, working conditions, opportunities.

JJ: Well when I was fifteen years old I worked in an oil factory, filling oil drums and such like that, that was after school. Then I was a meter reader for the Dayton Power & Light, and then I got out of school and I got a job at the Huffman Bicycle Company where they made bicycles and stuff. I was a group leader. And then I got a job as a door-to-door bread salesman for the White Baking Company, and while I was doing that job one day one of my customers--and I've always been interested in electronics--one of my bread customers said to me, "I got this darned radio doesn't work anymore," and I says, "Oh, I can fix that. I fix radios." She said, "You do?" And I said, "sure." And I took it home and I found out what was wrong with it and I gave it back to her and she was so happy. It wasn't a couple weeks later she had a problem with her television set. "Well," I said, "what's the problem?" She said, "Well, it just keeps rolling." Well I went and got some books and I found out that when it rolls it's probably a 6SN7, a popular tube at that time. That took care of the horizontal and vertical roll. So I went out and I bought a 6SN7 and a 12SN7, which is a 12-volt version of the same thing, went over to her house and took the back off and I unplugged her 6SN7, put the new one in and it was fine. So I thought, hey, this is good y'know? So I got three dollars for a service call, and I made a couple dollars on the tube, and then word spread and I started repairing my customers' television sets. It got so, and I say--learn the hard way, there's different ways of learning--and I

ended up in the hospital from overwork. I would work ten to eleven hours a day on my bread route, come home and I'd have to go on service call, I had at one time fourteen televisions backlogged in my basement that I had to repair. And so that was one of my earlier jobs. I ended up in the hospital from overwork, and then I heard that they were looking for someone at the University of Dayton, so I went over there and I interviewed and got on as an Electronic Technician and that was fun.
KH: How did you meet Delores?

JJ: I met Delores at a dance in downtown Dayton, a University of Dayton dance. One night I saw this beautiful girl against the wall and I thought, boy, I gotta date her, I gotta take her out. And so I got up enough nerve to ask her out, and have not regretted it!

KH: How did life change then with marriage and kids as far as your work?

JJ: Well, fortunately she did all the work at home and I was just able to bring in the money from my bakery route, and then at the University of Dayton, at the research laboratory, and then later at the NCR corporation. But she did all the work at home taking care of the kids and everything. You know, when you've got seven little youngsters and you've got four of them under four at one point, why it take a lot of doing, but she's a trooper. She's a keeper.

KH: What was NCR's approach to R&D?

JJ: NCR had a pretty good approach to R&D, when I first got there you could do almost anything that you wanted. I did a lot of things. They thought, maybe some of the things I did maybe were a little bit spooky. But at one point they said to me, "we're going to classify you as an NCR Fellow, you can do anything you want, just try to make something that we can use." I'd go in there, and one of my buddies in a desk across from me used to laugh, because I'd prop my feet up and say, "well next week we've got to get busy." That was always my funny saying. But I came up with the first memory transistor at that time. I had a vacuum system there and I deposited anthrazine and used it as a phosphor-insulated gate. When the memory transistors came out that we use today, mine was referenced as prior art.

KH: What was passed down from Kettering and Desch and so on?

JJ: Enthusiasm. Desch is my old buddy. I mean, Joe and I got along so good. In fact, I made something for Joe one day and I demonstrated it to him, and he said, "That looks pretty good. Can you make it smaller?" And I said, "sure." Well, I don't know if you know the story of Joe Desch and his daughter Debbie didn't know about Joe's accomplishments until after his death. But when I met her I called her up one day and I said, "I need you to stop in my laboratory, I have something I made for your father." And I had it sitting right over on that table, and I had a date on it and I gave it to her, and she cherished that to this day. Joe was a great guy, he was a fantastic

guy. He came out to the lab one day and he wanted to know what I was working on and I thought, oh my God, this is it. I showed him, and it was how to make a thermal printing wafer for thermal printers that we have today. And he come over and I thought we was going to ball me out. And he says, "Jack," (they call me Jack, my name is John but everybody calls me Jack) he said, "Can you come in Saturday," I says "yeah." "I want you to expand on this, I like what you're doing. And besides, would you like another pump?" I said, "I'd love another pump, why? Are you going to buy me one?" He says, "I got one in my lab." I says, "Oh, no!" He said, "Come on, let's go." He took me over into his laboratory, my golly. People would give their eyeteeth to go into Joe Desch's laboratory. I went in there, Joe went make in his maze of glasswork and he said, "How about this pump, can you use it?" "My golly, Joe, that's great! I'd love that pump." He says, "It's yours." I'm very fond of Joe Desch, what can I say.

KH: Tell us a little more about Joe Desch. What do you think was his most lasting contribution?

JJ: Well, I think his lasting contribution was efforts toward Enigma, you know we lost 213 ships in the first three months of '42 off the east coast, and Joe's dedication, his perseverance. A lot of people don't know the things that he invented. For example, the thyratron, the gas tube which is a fantastic invention. But people just skirt that away as nothing. Joe was a great guy, a very humble guy. Tough. I remember when I first went to NCR my manager had me make a light amplifier. And I built this light amplifier up, and I said, "as you turn this knob there's an amplification and this gets lighter and so forth. But anyway, I said, "but we could do this, Joe would never know the difference." And my manager said, "don't you ever get it in the back of your mind that you're going to pull the wool over Joe Desch's eyes. You play straight with Joe Desch, because this guy is smart." And I learned a lesson right there, you don't play games with the big guy. He knows what's going on.

KH: What changed at NCR by the time you left?

JJ: By the time I left things changed because, when I first started there it was like other companies. Inventors would come up with something and the boss would get his name on the patent, and that's what happened with the thermal printing. I invented the thermal printing wafer that's used around the world today and the boss got his name on the patent and I got no credit for it. When I left NCR that had changed. Now you must put the right inventor's name on the patent, you must not play games, and of course, every company did it. It wasn't just NCR. It was just standard operating procedure. The other thing that changed at NCR is that when I started there as an electronic technician in 1958, I ended as the highest-level senior consulting engineer in the company. Highest paid, highest-level possible achievable. To me that meant a lot. Another thing that changed is my boss called me in one day, he said, "shut the door." I says, "uh-oh." He said, "sit down," I thought, "oh, this is it." He threw an envelope across the table, I said, "what's this?" He said, "that's for doing

a darn good job," and I opened it up and there's a check for several thousands of dollars. He said, "but you can't tell anybody." Next year, same thing. Another check. Next year, another check. Can't tell anybody, I didn't know companies did that. Finally he says, "If everybody worked as hard as you did we wouldn't have any problems." So the thing that I try to get across to the youngsters today is, when you get a job, don't see how little you can do, see how much you can do. Cream rises to the top, and there's no way you can keep it from rising to the top. The problem with a lot of children today, they want instant recognition. They do something today, they want it on their paycheck Friday. It doesn't work that way. It may happen ten years from now, fifteen, twenty years from now. But it'll happen. And so, that's how I see things.

KH: Compare teamwork at NCR vs. solo work on your own.

JJ: That's a good question. We have to work in teams, and sometimes solo work is good. I was on a team to make the first plasma display. We used to have plasma displays in supermarkets with those orange numbers, and on the gas pumps, that said $12.42 and stuff like that--it was orange numbers. That was all plasma. When we first started to do that, it had to be solo, because I had a vacuum system at home, and I go home and do these things, and then come in and the team would work on it together. NCR did not have the equipment to do it at that time. Not taking anything away from NCR, it was just, in my home laboratory, I was always trying to be ahead of the times. How does teamwork compare with solo? I think sometimes you need some solos in there. On the LCD for example, we had a display, which was made by Jim Fergason, who invented the liquid crystal display. It had rubbed alignment, and our team was looking at it, discussing about its longevity. It would only last for about a couple of weeks and then it would go to pot. I made a question, why is that? And they said, well the alignment doesn't hold up. I said, you know, I wonder if we did it da-da-da-da-da. And he looked at me like what a screwball idea that was. So I went up in the laboratory and I did it, all by my lonesome, and had success in the first hour. I told my boss I want to publish my work and he said, all right. So I published it and it was accepted for immediate publication in the Journal of Applied Physics Letters, and when it was published I heard from 50 scientists and engineers around the world applauding the discovery. A few years later watches and calculators came out using this approach. Now, this was solo, but I was still part of a team because there's always somebody in the team that has to jump out and do something that's maybe a little spooky. To make it practical. You see, when you do something significant, it's going to be different. It's not going to be--breakthroughs cannot be thought out, they have to be worked out through experiments. I lucked out.

KH: Is that the value of tinkering?

JJ: That's the value of tinkering. Tinkering, when you take things apart or you tinker with something you learn, and you learn how things work and how they don't. I

always said to a group of students at the University of Dayton, now if I ask you to design for me a switch, that's nothing but two pieces of metal coming together that makes a switch, but I'll get 50 different designs from you, and genius relies in simplicity. You can tinker around with different ways of doing it but to make it simple is, I guess I got away from your question. But you gotta tinker, you gotta play around, you gotta make things happen.

KH: You've said ideas are common, that all things are possible but not all are practical. Do people get too attached to the first ideas they have?

JJ: Yes they do, they fall in love, that's the problem. You never want to fall in love with the first idea you come up with. The biggest problem today when people come up with something, they want somebody else to do it. They want somebody else to make it, and all they want to do is cash the checks. It doesn't work that way. You can't just come up an idea and expect somebody else to do it, you gotta do it yourself, and what happens when you do it yourself, it never ends up the way you originally thought. I always say, ideas are like bellybuttons, everybody's got one. Whenever you come up with something, and you do it yourself, and you make it happen, like Nicholas Murray Butler said, there's a few people in this world that make things happen, there's a larger number that watch things happen, but the overwhelming majority doesn't know what's happening. They just don't make things happen. When you do you will find out, hmm, I thought it would do this and it did this. And now you may run across a solution looking for another problem. See, we're so attuned to coming up with solutions for problems, but we don't ever think about coming up with solutions looking for a problem. When the laser was invented it was a solution looking for a problem. Lord knows we've got all kinds of problems for it today. But it was a solution, at that time, looking for a problem. And that's the value of tinkering, is we may come up with something, that's the value of making our ideas happen, we may come up with something that will take us down another path. These are things that you can't find in a book.

Let me expand on this if you'll let me. My boss came to me one day and he said, "We're going to hire another person. You're a very creative person," and I said, "Thank you," and he said, "How do I find a creative person when I interview?" I said, "That's simple." "Well, what's the answer?" I said, "Ok, about one of out fifty will be creative. You bring them in and you talk to them and you say, now, we're working on this project and we want to do da-da-da-da-da, something that hasn't been done before. How would you approach the problem?" 49 out of 50 will say, well, the first thing I'd do is do a literature search and see what's been done. The creative guy will say, well, I would just jump in and do what I think might work, and if I get stuck then I'll see where I went wrong. If you go look through the literature 49 out of 50 times, the literature is going to bias you, it's going to take you down a path. Whereas if you don't go to the literature you're going to find out on your own some valuable things, it's like taking that trip to China by driving and taking the boat. You're going to find out all kinds of things along the way. You see what I mean? That to me is education.

That to me is development. When you can find solutions looking for problems, and you might end up find a solution to the problem you started out with. Anyway, you see how I get off on a tangent?

KH: That was wonderful. Do you ever think a literature search is important to do?

JJ: Of course, sometimes. As long as you don't let it sway you, as long as you're bullheaded like me and you've got your mind made up and you just look at that for kicks. But I'm not going to pay attention to it because I don't believe it.

KH: I think for the Wright Brothers a literature search told them what didn't work and kept them from wasting their time and risking their lives doing things that had already been tried and failed.

JJ: Right. There's nothing set in stone, every case is different. But in general I want somebody that will use the skills they've acquired on their journey to China and put those to work first.

KH: If a person has a lot of ideas, how do they narrow it down?

JJ: That's a good one. Everybody has a lot of ideas, but like I say, ideas are like bellybuttons, everybody's got one. What you do is you decide that you'll work on one of them, and you'll invest in it to your means. Keep in mind that a lot of people with a lot if ideas want others to do the investment. They say, well I can't afford it. Baloney. They've got a cell phone, they've got cable TV, they've got a brand new car, they go to movies all the time, they rent tapes. Look, the higher the risk, the higher the reward. If you don't take risks, there's no reward. You can't ask somebody else to do this and all you want to do is cash the checks, it doesn't work that way. You pick an idea and you try to make it happen. And if it's too expensive, take one of your other ideas. But do something, don't just sit there and expect somebody else to do it. They'll say, you know I had that idea two years ago and somebody come out with it. How many times have you heard that? You all have heard that. "I had that idea, I didn't do anything with it." Tough, you've got to make things happen. Keep in mind that, without risk there's no reward. I think Teddy Roosevelt said it best, he said, "far better it is to dare mighty things, to win glorious triumphs even though checkered by failure than to take rank with those poor spirits who neither enjoy much nor suffer much, because they live in that grey twilight, that knows not victory nor defeat." They're they one that go down the middle of the road, they don't want to stick their neck out, you know? Behold the turtle; he only makes progress when he sticks his neck out.

[Retake of 'Theodore Roosevelt said it best']

KH: At JLJ Inc. you invent for hire and also invent your own ideas. What's the difference?

JJ: I'll give you a good example. A few years back about 1993 I'm guessing, there was an article in the Dayton Daily News about me and my inventions and so forth as an invent-for-hire company, and a fellow called me from the other end of town, David Wise, and he wanted me to work on a new way to make sound. He said, I see you've got all these inventions that you do, and he said, you know the birds make sound, the bugs make sound, and I think there ought to be another way to make sound other than the way it's done today. And I would like for you to work on this if you would. I'll pay you this much money a month, how much do you want? And I told him, he said all right, so we signed a contract and I started working on a new way to make sound. Well, I came up with a new way to make sound. It was a real little thin film loudspeaker but then you say how do I get my own ideas into it, I had to put my idea into it to make it happen. After about six months he didn't want me to work on it any more. So then I pursued it on my own, got patents on it. Where I can have a thin foil with a spiral etched into it of copper and I just put a magnet up close to it and when I put the output of a radio where a speaker would go it gets pretty loud. I've got it up to 110 Db already. But this is my own idea, injected into something for somebody else. That's what I call invent-for-hire.

KH: In some respect the person who hires you is providing you with problems.

JJ: That's correct, he hired me for a problem.

KH: And you may not be aware of all the problems out there.

JJ: That's exactly right, and he's paying me for it, and he gets the patents and everything goes in his name if he wants it. I had another case where Airstack (?) Chemical Company wanted me for developing a privacy window, a window that's all cloudy and put electric signal to it and it gets clear. I worked for them and made some of those for them.

KH: What are you proudest of?

JJ: I think I'm probably proudest of my LCD and the thermal printing, because it is everywhere. No matter where you go you're going to see LCD. I didn't invent the LCD, Jim Fergason did. I perfected it. I made it possible for large-scale production. Thermal printing is what I did in 1961. A fellow I worked with had smeared this chemical on a piece of paper and he noticed that when it got hot it turned black, and he showed it to my boss. My boss took a wire and he put a battery to it, and of course the wire got hot and he put it down on the paper and he make a mark and he said, by golly, Jack you keep saying I should do this with a thin film instead of a wire, you show me how this should be done. And so I took the bull by the horns and I made it happen. Over here in my laboratory I have the very first wafers that I made, I can show them to you.

KH: What are current uses of thermal printers that we all know?

JJ: First on it was for fax machines, that's the first use of it. Right now it's for your cash register receipts, when you go to the grocery store or any store and you buy something, on that shiny paper? That's what it's for, and interestingly, a couple of years ago, right before my eyes went out, I got this macular degeneration, I had come up with a new way of doing thermal printing, a real slick way, and I got a hold of NCR and they expressed an interest and they purchased the rights to it. If my eyes would not have failed me I would be working on it for color. Because it lends itself for color thermal printing, where you can actually do a color photograph or you cash register receipt can be indifferent colors. A big gap of almost 40 years between the different thermal printing inventions.

KH: Were there certain key incidents in your life?

JJ: Certain key incidents, yes. For example, in the liquid crystal display, when I asked my buddies, why is that display un-uniform in contrast? And they told me because of the alignment. Jim Fergason, the inventor of the liquid crystal display, would cause the liquid crystals to be oriented in a particular direction by taking the glass plates that are coated with a transparent conductor, and he'd rub 100 times in one direction on this plate and on the opposing plate he's rub it this way [perpendicular] 100 times. And then he'd put the liquid crystals in between them, I can show you some, put them together and put polarizers on, and if you don't have this rubbing uniform, or if water would get in, the contrast would be non-uniform. And so what I did was I came up with a way that you didn't have to do this rubbing in the back room with your monkey hat on. I put it in the vacuum system, the glass plate with a conductor on it, and down here I would have a little crucible with some glass in it, silicon monoxide, and I'd heat it up and I'd evaporate it up here at an angle of 45 degrees. The molecules would come up and hit that surface and skate a little bit and that cause that "this." [Rubbing motion] And the contrast was unbelievable. Even today, 2010, it is still used when very high contrast, nondestructible LCDs are to be made, because it is undestructible. You can take it up to 500 degrees centigrade, won't hurt it a bit. That's melting point of glass.

KH: Would you like to show us some of your things?

JJ: I would love to show you some things.

[Janning gives tour of lab where video and still images are taken]

--End of interview--