

Oral History with Jim Culley, September 19, 2019
Interview by Benjamin Spohn for Hagley Museum and Library
Hologic oral histories project

Q: So, we are successfully recording. Today is September the 19th, 2019. I'm sitting down with Jim Culley, formerly of Hologic. Did I pronounce that correctly?

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A: Yes, you did.

Q: I'm Ben Spohn, Hagley's oral historian. And today we'll be talking about Jim's career in the medical imaging industry.

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A: Yes we will.

Q: So yeah, let's just start off with a little bit about you. You can tell us about your early life.

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A: Alright. I'm from the Midwest. I have a twin brother and a younger brother. My father was a motion picture producer. And we all had to decide whether we wanted to get into the motion picture industry – he owned a studio – after we graduated from college. We had two years to make up our mind. We either had to go work for the company or we had to find something else to do. And so I was born in '44, and about the time I was getting out of college, the Vietnam War was going on. And I ended up in Europe as a - running a company of soldiers in the embassy in Paris and had a great time while my twin brother ended up over in Vietnam and came out alright.

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But he ended up going the wrong way. And my younger brother ended up in Thailand. But we all ended up in marketing type jobs. Anyway, I'm in Europe and I'm two years in the army and I'm going to get out. And I decide I'll go to graduate school and that'll delay my decision on whether I had to work for my father or not. And I applied to advertising programs because it seemed like

I was going to go into marketing. And got into Michigan State and liked it. Got married, and ended up getting a PhD in marketing and thought it was a wonderful field.

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And when I got out of – my wife ended up being an attorney. She's a partner in a law firm in Wilmington. We interviewed at a number of schools and I ended up coming to Delaware. They had a great opening. They were hiring a lot of people at the time. And came in as finishing my PhD at University of Delaware. I stayed on at Delaware for 12 years and was an assistant professor, associate professor, associate dean, and I went up for full professor and was turned down. They said I was too young – wait a year or two. And we decided we would go to another university. So I took a job as a department chairman in the Midwest at the University of Northern Illinois near where my wife lived.

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And we were playing cards with some friends and they said, “Do you really want to go to the Midwest?” And we said well, we’d like to go back and see my wife’s family, but I'm not particularly interested in going. Why, do you have a better idea? And the guy said, “Well, I know somebody at DuPont and they're looking for marketing people right now.” And I said, “Let me talk to them.” So I came into DuPont and they hired me. And instead of going to be a department chair in the Midwest, they gave me leave of absence for a year and I went to work for DuPont in the corporate marketing research group. And that’s part of marketing communications. It was a new group, really some amazing people. The people in the corporate group – Paul Root [?] was the head guy, and he was a chief economist for General Motors, I think. And Jack Frye and Cathy [00:03:40] and just amazing people that basically were consultants, internal in DuPont.

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And got to deal with the different businesses. And basically, they were looking for somebody to work in the textile fiber area, and they assigned me to that. And the product that really took most of my time at DuPont – I was there about 12 years – was the carpet fiber business. And Tom McAndrew is an amazing guy. And Tom – there's a DuPont product where there really was no patent on it. The thing that was so successful about Stainmaster was the marketing of it. They

came up with this idea that if they could brand this product, even though they didn't make the product, DuPont certified Stainmaster Carpet.

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DuPont doesn't make carpet. But they'd certify the carpets that the mills made, and they'd provide the chemicals and the fiber. And to pull that off as a secret without any of the mills knowing they were going to do it overnight to launch this major ad campaign using a BBDO, wonderful ad agency, was just an amazing marketing story. But over time, the Stainmaster business kind of got very big, made a lot of money for DuPont. And then they decided, well, we'll move it down south closer to the mills. So Jim, how'd you like to move to Delton, Georgia?

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And I said no, I don't want to move to Delton, Georgia. My wife's a partner in a law firm up here. We can't leave and we like it up here. So I went over to work for the titanium dioxide business for a couple of years. And I'd given a lot of speeches for various businesses. And one of the people that heard me talk on branding and market segmentation and product positioning was Debbie Dubois. Debbie was in the DuPont photo product business. And when DuPont had been a major player in photo products, particularly x-ray film, since the 1930's. They'd bought some technology, developed some technology. But one of the things they bought was how to make an x-ray – low dose x-ray.

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And the way they did it was with screens. And a screen – what it is is the film is put between two covers, and the covers are excited by the x-ray. And they glow. And that exposes the x-ray film. So they came up with this technology, film screen technology that became very, very successful,. And in medical, DuPont ended up being much bigger than its competitors. Bigger than Kodak, bigger than Agfa, bigger than other people. And that technology had taken them a long way. But it became clear in the 1990's that film was going to go away. Think about x-ray film for a second in medical.

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You take an x-ray. It's one sheet of film. You can't make a copy of it very well. So you have one sheet of film. You have to wait, get it developed, take it to a doctor's office, he reads it, she reads it. They take the – the patient comes back next year. You're supposed to get an x-ray every year. A woman after age 40 is supposed to get a mammogram every year. Now, she goes to a different doctor. She moves to a different state. She has to get last year's image because the way they do mammography is they want to look at last year's image versus this year's image, and they want to look at the left breast versus the right breast.

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They're looking for differences between two objects. Film takes a great image, but it's expensive and it's never where you want it. How do you store it? It gets lost. Now, everybody else had gone digital in hospitals. They'd gone with MRI and CT and we digitized all of our files. But they hadn't digitized the woman's imaging side of the business. And the reason was no good way to make a detector to take large images like chest x-rays or to take mammograms. And DuPont, just like everybody else, was trying to figure out, could we make – what's the best way to make a digital detector? And General Electric was the head of DuPont. They decided they would do a coding that glowed when it got excited by an x-ray.

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That coding was cesium iodide. And DuPont decided they'd use selenium. And selenium had a lot of good properties and a lot of not so good properties. But the DuPont route ended up being the best way because DuPont, the amorphous selenium, kind of a not liquid, not solid, but kind of in an amorphous state ends up making an x-ray without involving any light, where cesium iodide kind of converted everything to light. And then the light exposed the – became a digital signal. So they call it direct radiography, being able to make an x-ray without using light.

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Anyway, that's how – so I ended up at DuPont and I ended up spinning off with the medical business because somebody heard me give a speech. By the way, the lady Debbie Dubois wanted to hire the branding manager for Intel because at that time, Intel Inside, everybody's computer

had Intel inside. And DuPont's dream was, we'll just make the detector. And everybody else will make the x-ray equipment. And so, we were trying really hard.

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We tried a million ways to get General Electric particularly to adopt our detector and let us call it Direct Radiography and put it inside your system. And they'd listen to us and they'd come and visit us every year at the big trade show. But in the meantime, all their engineers are working like mad to come up with their own detector. So along the road, it became pretty clear to us that we couldn't make this thing go if we only made the detector. We had to figure out how to make systems. And that is – initially, the thought was – DuPont had decided mammography was not big enough. We want to be in general x-ray, broken arms, chest x-rays. Besides, mammography has a whole lot of problems.

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A huge data files that have to be stored, and just a lot of complications. So DuPont said, "We'll be in chest x-rays." And the initial product line that we came up with was for chest x-rays and broken arms and that type of thing. But it became pretty darn clear that putting this very expensive detector into an emergency room to do a broken arm – the minute the gurney came flying through the room and hit that piece of equipment, it broke it. And you've got a very expensive piece of equipment destroyed. So, where else can we put this detector?

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Well, let's put it into women's imaging. Because in mammography, they need really, really good images. When you do a mammogram, that doctor is very, very skilled. A normal doctor cannot do a good job of reading and is not allowed to read mammograms. A mammogram is a very complex thing. And cancer in a mammogram is white, and so is density. So, muscles and all sorts of thing in the breast are also white. And there's a lot of women that have very dense breasts. So seeing cancer in a woman with dense breasts is not an easy thing to do. So coming up with a way, a good detector that can differentiate or allow the doctor to see the differences between cancer and all the other things that are going on, was a real feat. Okay, so anyway, that's how I got into medical. And I jumped all over the place. Let's go on with your –

Q: If I could jump backwards a little bit in time, what drew you to the marketing and advertising world?

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A: Well, I think it was my father. The neat thing about marketing and advertising is you can be creative. You don't really have to deliver the product. You just have to figure out how to communicate about the product. I tried – you know, I ended up at all the temporary, part-time jobs like everybody else did when they were going through high school and college. But the one that seemed most exciting – I had a wonderful professor, Bill Lazor at Michigan State, who was the president of the American Marketing Association. And he asked me to write a book with him starting when I was at Michigan State. And that book was really successful.

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It was the second most popular MBA textbook on marketing. And so, Bill Lazor and another guy, Charles Yang at Michigan State was in the advertising department. He was an interesting story, Dr. Yang. He was Chinese and wanted to go to Russia. And the only way you can get there is come to the United States, get a graduate degree, and then his plan was to move to Russia for some reason. And he became a high up professor in the United States. And he ended up going to Japan. He married a woman from Japan. And became a high up person in Keidanren – or, Akohoto, which is the second biggest ad agency in Japan.

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So Dr. Yang, I'm taking courses from him. And he said, "Jim, why don't you and I write an advertising game together that business school students can use?" So we, I think, wrote the first computerized game that MBA students would use to teach them about the mathematics of making advertising decisions. And then Dr. Yang started giving me all sorts of consulting jobs. I went to Japan a number of times and I did a big study for Nippon Telephone and Telegraph where they were looking at, how do Americans use the telephone and what is the future of the telephone industry going to be? And I thought that was neat.

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Mitsubishi hired me to do a study on the gas – can they put small air conditioners and heating units in American homes? Keidanren – the Japanese Chamber of Commerce hired me to do a study of public relations activities in the United States and in Great Britain to – how does the automobile industry, the phone industry, the power industry – all these major trade associates – how do they do their job? How many people do they have? What kind of budgets do they have? What kind of communication do they have? And they also hired – they did a study in France. They did it in Germany. But I did the two English speaking countries, Great Britain and the United States.

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While I'm on that tangent, interesting story – I'm over in Great Britain and I'm talking to the British Automobile Association. And the guy said, “You know, funniest thing – I'm happy to talk to you. You're an American academic. You say you're doing a study for the Japanese who are trying to get their trade associations organized. But there was someone in here a couple of weeks ago asking almost the same questions, and he was from the Japanese embassy.” And it turns out that Japan had hired their embassy people and academics to do the same study, and you know, I now got excited about research and what you needed to do to get the – they were going to get two different perspectives on what this industry is like.

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And anyway, I got very excited from people like Charles Yang and Bill Lazor getting me pumped up about marketing. But I found when I – you know, when I went to the university – first of all, how do you teach somebody about marketing? How do you teach them to be creative? How do you teach them to – you can grade a paper if they spelled the words right, if they put the hours in to research a topic. But it just wasn't that exciting. And I wanted to see if I could really do marketing on my own. And that's when the idea of moving to DuPont really became exciting. And I followed up on it.

Q: I mean, everything else sounded pretty exciting too, just thinking about – well, when would you have been in Great Britain? '70's, '80's?

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A: Well, I went to the university in '73, so it would've been – yeah, late '70's. One of my problems is I was making more money consulting than I was making as an academic. And I started saying, is this fair to the students and the university? My bread and butter was the university. But you had your summers off. And a lot of times, when you got into these consulting projects, the deadlines were pretty tight, and can I teach that class or do I find somebody else to teach? And I just found the university – I always thought I'd go back. I'd try this for a few years and go back to the university and be like Bill Lazor or Charles Yang, and I never went back. Now I actually am back at the university. I'm getting a master's degree in liberal studies taking all the courses I didn't get a chance to take when I was working on my PhD. So I think university's a great place. The question is, where did I belong?

Q: It sounds like you were very active at a time of pretty tremendous change – the continued rise of Japanese exports, and with the British car industry at a time when at least the domestic British car industry was doing pretty poorly. We have material for all sorts of –

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A: All sorts of interviews.

Q: So when you did start at DuPont, what was your official first job title?

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A: You know, you made me go and look that up. And let me see. My first title was brand – no, let's see. Senior research analyst, 1984. Senior research analyst. And then in 1996 when I left, I was the senior marketing research programs manager, which means I was responsible for all programs having to do with the flooring business at DuPont. And then in 1987, when I started the job with the DuPont spinoff, I was the direct radiography brand manager. And remember, I said Debbie Dubois had heard me give a speech. She was trying to hire the Intel Inside guy, but that wasn't going to go.

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They didn't have the money or the product to attract that kind of person. But I was local, and I was looking for a job in Delaware. That is an interesting story. I ended up always wanting to stay in Delaware. We haven't left since '73. But the business Sterling Diagnostic Imaging became Direct Radiography Corp became Hologic Inc. Hologic Inc. is in Boston and because – one of the things when you're in marketing, you tend to deal with high up people. You're dealing with the president of the company, the head of the division, the scientists. So it required me to go to Boston a lot. And so much so, I was commuting up there probably – well, before 9/11 – on the day of 9/11, I was standing in the airport in Baltimore taking my weekly plane to go to Boston. I'd go up on Monday, come home on Thursday.

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And I did that for probably 15 years. I'd spend four days a week in Boston staying at a Marriott, usually. No one thought it would last that long. They all thought they'd find somebody better or local to do my job. But you know, I'm a guy that tends to – when I get to know a business really well, I become pretty valuable to that business. I know who to talk to, what the speech is. And I became pretty valuable to the company. So they allowed me to commute for many years. And my other funny story on that commuting thing was I was a major fan of Southwest Airlines, particularly when they moved to Philadelphia and mine took directly to Boston because I could change my plane without changing penalty.

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You know, it was just easy. And Southwest Airlines said, "Gee, Jim, you're the number one flyer on Southwest Airlines out of Philadelphia. Why don't you throw out a baseball at the Philly's game when we have Southwest Appreciation Day?" And I said, "Great. I don't know much about baseball and I probably can't get a baseball across home plate. But I have an idea. We'll auction off that throwing out the baseball to somebody." And they said, "No, that's not a good idea. You have to be there, too." And I said, "Well, why don't I go find some breast cancer survivors, some women who really like baseball?"

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And so, I went to surgeon at Christiana Care who gave me a couple of names, and all three of us went out on the mound. And it was just a wonderful experience for them and a great experience for me. But that's how often I flew on Southwest Airlines.

Q: So do you know why they were originally interested in hiring the Intel Inside --?

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A: Well, the idea was to be the ingredient, to be – DuPont didn't make x-ray machines. They made x-ray film. And so, their idea was that we would be the digital detector inside just like – if you think about it, Intel Inside is a perfect example because the Intel chip is the heart of the computer. Now, they were successful in getting Dell and everybody else to use their chip and still have a brand presence. So I don't know about you. I think my computer probably says "Intel Inside" on it. It still has that chip inside and they're still a major producer in chips. But in medical, it just didn't work out. And the idea that we had to be able to be systems producers, make the whole darn thing and not just the ingredient, became clear. A guy named – they brought a guy named Tom Umbel in.

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They thought, by the way, they again could get General Electric or – Polaroid was very interested – to buy this business if they could show them it would work in a system. So Tom came in and made a deal with a company called Picker. And Picker made x-ray equipment. And we decided we would show at one of the big medical shows how this equipment worked with the digital detector inside. But over time, it just became more and more clear that the product was the whole system. And so, you know, I'll tell you what. You know, the product was not going to be general x-ray. It was going to be mammography. In the day they announced they were going to stop making chest x-ray equipment and broken arm equipment and concentrate on marketing, I thought the sky was going to fall. That's why I don't make those kind of decisions. Somebody higher up made that decision. But it was a brilliant decision and the market didn't move at all. It was a good decision.

Q: So what was it like moving up through the ranks after you'd fallen? What was the company culture like?

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A: Well, I loved DuPont. I was in a unique position in DuPont where I didn't – I'll tell you a couple of stories. Early on, one of the first months I was there – DuPont is very big on safety and very big on security. And I went home one night and I said, "Oh my god, I forgot to lock my desk and I left all these papers on top of the desk. I'm going to be fired." Here I am, a PhD, and I was sweating because I was acting like I do as an academic. Turned out it was no big thing. But every once in a while if they did do a security audit and your secret papers were on top of your desk, you would spend the next day in front of the senior vice president getting a little lecture. So it was a different culture from the university culture that I was used to. But I started off right away dealing with high up people. They gave us all a one week introduction to DuPont. Everybody. I think all new employees got it.

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But I remember part of the tour, you go to the DuPont boardroom, which was one of the high floors of the DuPont building downtown. Not the top floor because if somebody decided to launch a mortar into the DuPont building, they didn't want to wipe out the boardroom. So it was down, several levels down. And it was a very impressive room. And I remember the guide saying, "For most of you, this is probably going to be the last time you see this boardroom. But we wanted you to see where the decisions are made in the DuPont company." And I don't think I ever did get back to that boardroom, but I did make a lot of presentations for people in there, like Tom McAndrews, who had to go to the board to get them to give us millions of dollars to support this launch of an ad campaign when we weren't even going to make the product when we made Stainmaster carpet. And he pulled it off and they did give him money.

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And for a long time, people thought of DuPont as the carpet company. Not the chemical company, not all these wonderful technologies that they had worked so hard to make, but as a carpet company. But while I'm just on this tangent, you know, DuPont – medical products and

photo products was a good business for DuPont. They were making reasonable returns with that business. But through no fault of theirs, something happened with some stockholders that caused them to have to sell something. And that story's an interesting story. The Seagram's had wanted to buy Conoco for some reason. And they ended up where DuPont bought Conoco. And all of a sudden, one of the largest stockholders in DuPont was Seagram's, the liquor company.

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And when Edgar Bronfmann Jr., the son of the founder of Seagram's got into the business, got old enough to be high enough up, he wanted to buy Universal Studios. And to buy Universal Studios, which would be far more exciting than a chemical company, they had – DuPont had to sell something to have the money to buy that stock back. And so they sold three medical businesses. I think the only one they kept was New England Nuclear, which was the radioisotope business. But they had a blood analysis business, which now is owned by Siemens, and they had the x-ray business which was the business I was in. And you know, they had invested in digital x-ray and they were close to getting FDA approval. But that product had a long, long way to go before it would be a commercial product.

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The guys that were working on that product, really classic researchers. Denny Lee and [00:28:13]. And every day, they'd come in with a new version of the product. Well, at some point you have to say done, enough, it's going to look like this, it's going to be this big, we're going to sell it. Anyway, the product when it spun off was not a commercial product. But it was enough of a product, close enough to a commercial product that they could show it to GE and Polaroid and Kodak and others and try and get them to buy it. But you know, remember I said they spun it off. The name of the company then was Sterling Diagnostic Imaging. And they called Sterling Diagnostic Image one, because silver, sterling silver, is used in film.

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It seemed like a good name at the time, and it was a bunch of people who had bought other DuPont spinoff businesses. And they moved their corporate office down to Greenville. Is that in South Carolina? South Carolina, I think. And the detector side, the digital stuff stayed up here

because DuPont had built these clean rooms. Clean rooms to make these digital detectors. You can't have a hair off your head fall on one of these detectors. You can't have dead pixels or rows of dead pixels. You have to have an environment. They actually ended up building these class one clean rooms in Glasgow, Delaware. So that stayed up here. Agfa came along and bought the film business thinking that x-ray film was going to be around for a long time and they wanted to be in the US market.

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So they ended up buying the Sterling Diagnostic whole DuPont film business. But for some reason – I think this was a big mistake on Agfa's part. They could've had, for a small amount of money – they didn't want the digital detector business. So for several months, there was nobody buying it and they were going to shut it down. And I'm sitting there with Tom Umbel and Bill Carew [?] and Lothar Jeromin and Denny Lee, four or five of us, thinking, can we buy it? Can we go to the bank and get money and buy it? And we didn't get very far, but we had several meetings where we were saying, you know, what'll happen if nobody buys it?

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And we had people visiting us and listening to our story, but not saying "I want it." And Hologic, this company in Boston founded by an amazing guy, Jay Stein, David Ellenbogen, Jack Cumming, and Pam Cumming – but particularly Jay and David had developed other businesses very successfully. They were high tech people and they got into – David and Jay had got into bomb detecting with x-rays, and they sold that business off. And they had a lot of money, a lot of cash. And they ran into some employees and said, "How's it going?" And the employees said, "Not so well. We haven't been able to find a good job since you guys sold off the bomb detection business."

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And Jay Stein said, "I've got an idea. Why don't we do x-rays – digital x-rays?" First of all, he said, "Why don't we do bone density testing? Why don't we figure out how to tell people whether they have a bone density problem or not using x-rays?" And they developed a system even though there was no cure, there was no way of stopping – if you had bone density problem,

they could say, "Have a nice day. You have a bone density problem." That means you're more likely to get broken bones. It's going to be a serious problem. Have a nice day. But then Fosamex came along, a drug that could do something about it. It could solve bone density problems. So they really owned the bone density business. They had a lot of cash.

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And the stockholders were saying, "You guys have a lot of cash. You own your buildings. You're a niche business. You're in women's imaging. What else are you going to do?" So this company we've never heard of, the Hexologic, comes down here and looks at this business that DuPont had. And I don't know if the guys thought about it on the first day, but certainly within the first year or two, they said, "This is perfect for us. We will take this thing and move it from general x-ray and move it into mammography." And they went and they bought a company called LowRad, for low radiation. They bought a company that was very big in women's imaging using x-rays.

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And they put the DuPont detector into that LowRad system, and now they were in the business of making mammography equipment with this amazing technology that DuPont had developed. And that guy, this guy Jack Cumming – David Ellenbogen was the marketing guy and Jay Stein was the technical genius. Jay Stein is still there. He's got to be as old as I am or older, and he still comes in almost every day with some new invention. And for a while, he was running the company. When David Ellenbogen died, Jay took over the company for a short time. But he didn't want to run the company. He wanted to be a scientist. So he found people like Jack Cumming.

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And Jack was a guy in the industry who did a lot of financial analysis. He was selling a database where he could tell you who's buying how much equipment, what prices are getting. And they hired Jack to go out and help them find a business that they could buy. And Jack's wife, Pam Cumming – Jack pulled me aside early on and said, "Hey Jim, Pam's in marketing and you're in marketing. You're commuting from Delaware. I'm going to put my wife in charge of the

marketing. She's going to be the vice president of marketing. You're going to work for her. You okay with that?" I said, "Jack, I love this business. I'll do it." And Pam was a wonderful person. I'd be happy to work for Pam. And I worked for Pam Cumming for many years. When finally they got rid of Jack, they hired him as president two times.

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He made a lot of money, and they kicked him out the second time and Pam had to go because she was Jack's wife. So Pam – I can't believe it, but Pam goofed around doing worthwhile things, but ended up going to work for General Electric, our competitor. Or actually, Siemens. I think she's working with Siemens now in marketing. I think she's trying to prove to the world that she can do it again. She can take this Siemens technology and make it, you know, the best technology in the world. So Pam's back working. Jack never did go back to work after that other than some small consulting jobs. Anyway, amazing people. Okay, so let's see. Where are we? Go ahead.

Q: We've kind of gone a little all over the place, but that's fine. Well, how did the culture at DuPont shift over the time and before – you know, this is before we get into Hologic.

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A: Well DuPont was going through – when I got there was not too many years before they started the major downsizing. Fibers had really taken them. When you think of this 200 year old company and what products got them to what point, they were at the point where these great brand names, Dacron and Orlon and nylon and Antron and Tyvek – were mature products. And you can continue to try and tweak them and find a new edge. But what are you going to do for the next hundred years, was the question. And the company was going through a stockholder – the major stockholders were really beating up the company to find something else. And they went through, well, do we want to be in the pharmaceutical business?

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Do we want to be in the electronic business? Do we want to partner with somebody else? How are we going to get there? Invent it on their own. So there was a lot of changes in leadership.

And I went through three downsizings where you came in one day and they said, “Boy, do we have a deal for you. People who have been here at least ten years can leave and take this much pay with them. We’re going to cut this many people.” And it became pretty clear to people like me that you know, DuPont doesn’t really know where they're going to go with it. They're too big. They're in too many businesses. Even a wonderful thing like medical imaging and mammography wasn’t going to move the needle that much when you're as big as DuPont was.

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So they'd be buying companies and selling companies. It was a lot of change. I’ll give you an example. Something DuPont did that I didn’t think was a good idea. Jim Kearns was in charge of – was the vice president of fibers, wonderful guy. And his son, Jim Kearns, married a lady, Linda [00:37:33], became Linda Kearns. And Linda Kearns was in corporate marketing research with me. But Jim’s dad had the idea that we really want people to be team players and get into bonding and work together and scientists will be working with the marketing people and working with the production people. And so, he went out to Pecos River, New Mexico and went through a course, a teambuilding course where they had to rappel down lines and they had to climb walls.

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And the thought that would be wonderful to take the entire company through. So he built these teambuilding things at all of his plant sites. They put the one for year down in the Remington Farms, which is a beautiful land that they own down in the Chesapeake. When they owned Remington Arms, they used to take good customers down to Remington Farms. But anyway, we all had to go down and do that. And it was a scary thing. They made you do things that you didn’t think you could do. They wanted to show you that you could do it, and you had to do it with your peers. I remember one, you had to climb a – you were strapped in. They had ropes on you and all. But you had to climb a telephone pole. And they had a pie plate type thing with one bolt that swiveled on top. You had to get up on that plate and turn 360 degrees and then jump off.

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So you climb a telephone pole, get up on top of this plate, and jump off. And they took videos of this. I still have that video. And it was the scariest thing I've ever done in my life. But you know,

I did it. I just didn't think DuPont ought to be mucking with people's minds doing that kind of stuff. But that was kind of the culture at the time. The safety culture, the teambuilding thing, they were going through a lot of changes.

Q: I'm not sure where to go from there. Well, okay. So, do you think that your time in the textile fiber business and then with the titanium dioxide had any bearing on your work in medical imaging?

[00:39:41]

A: Well clearly, I had written a lot, both as an academic and in DuPont with market segmentation and branding and market research. I will tell you, in my field I was never very good at statistics. I remember at the university, I had to teach a course on statistics, and I think I had taken a course on statistics for the first time about a year before. I mean, I was really not very good at it. But marketing research – we and DuPont – you wouldn't think of DuPont as being big in that area. But they came up with some amazing ways of analyzing markets. And the way they permanently did it back then was focus groups where they'd bring 12 people into a room and talk about a product. And there'd be a one way mirror, and behind the mirror you'd be tape recording.

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And the people – you were told you were being tape recorded. Wasn't anything unethical about it. But they would tape record it and they'd watch your body language and they'd – and it seemed like the way they quantified everything in those first few years was more and more focus groups. You'd do focus groups in 12 cities. You'd do focus groups with retail store owners and with consumers who shop at Walmart. But the technology was changing. By the way – phone interviews. That was another big one. Who does phone interviews anymore? Everything is now on the computer. It's much, much harder in a way. But it's also – if you can do it now, you can get much better information. The kind of information that Google is getting and these companies are getting on your buying pattern, shopping patterns. They're way – it was a dream of marketing people to be able to get that kind of information. The question is, are you doing it ethically and

what are you doing with the information after you're having it? Are you selling it? That type of thing.

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So I was there at DuPont when a lot of that stuff was evolving. The way we did market research, the way we marketed products. What I learned in fibers was very useful for my time at when I got in medical.

Q: So can you tell me briefly what titanium dioxide – what were they using that for?

[00:42:00]

A: TIO₂? That's a whitener. So in paint, in paper, major product. It is very difficult to deal with. There were only a couple of big places in the world. I think most of our stuff came out of South America. And the plant was here in Wilmington along the Delaware River. And DuPont had figured out a way to make it – there is a product where they could make whiteners cheaper than anybody else. They had a technology that really gave them an edge. And I'd say for a long time, their titanium dioxide was the number one whitener. Whitener is in everything. Fabrics and particularly paints and paper. Huge product. I know they don't have that plant anymore. By the way, they had a brilliant idea that they'd take the leftover products from the mining operation, and it'd be perfect for gardens.

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And they'd sell it as a soil builder upper at TIO₂. And then they learned that there's a couple of things in here like – what do they call them – hard metals or something. Things that might be poisonous. That's not probably a good idea. But they were always looking for new ways to get some more money.

Q: The things you might not want to grow vegetables in. So I think that we've covered a lot of what DuPont's products were at the time that you got spun off and then purchased by Hologic. So what was Hologic doing at that time?

[00:43:35]

A: Well remember, they decided to invest – I think it was 10 million dollars, is what it cost them to buy the – what was then called Direct Radiography Corp. And they did it with some stock and they did it with some cash. And their dream was to be able to take that technology and make it into a commercial product. Medical's a difficult field to be in. You know, they were used to dealing with the FDA. But you are dealing with – your marketing is a lot more carefully done when you're in the medical field. And it was rough going. I would say that that purchase almost put the company under because it would seem like every day – we'd have a once a week business meeting. Every week, you'd hear about another problem in making that detector.

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We could not make a reliable detector. Starry Nights. One time, we had little dots everywhere. And they had a name. Every week, it was a new problem. So it was a huge learning curve to get that detector to be reliable. But they stuck with it and it became, you know, the detector. I have to tell you – talk about bad days. Let me talk about a bad day. We got the detector nailed down. It's making – we're making reliable detectors. They haven't yet gone into mammography. They're still in general radiography. And the way – think about your camera or think about x-ray film. It's a digital detector.

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It's 14 by 17 inches in size. And you take a thin film transistor. You take a piece of glass. The same thing that's in your TV, for example. And you take this TFT, and you put coatings on it. And those coatings are what do amazing things. The one coating, the selenium coating, allows x-rays to generate an electrical charge. And that is what you're recording. So they built this whole thing around a very high end TFT. They were getting it from an industry called Guardian Industries in Detroit. And Guardian Industries was in the screen door business, and they were in making these high end detectors. God knows why. They were making these detectors for all American jet fighters.

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So the pilots, when they fly, can see the display with the information right on the same window that they're looking out the window. Bill Clinton is president at the time. Guardian Industries says – by the way, our little TFT purchase from Guardian Industries – probably about two days of their year's production is how much goes into medical. They're making a whole lot of detectors or TFTs for a lot of other uses than us. So we were peanuts to Guardian Industries. But Guardian Industries was our hope. This is what we built our whole detector around, is the Guardian Industry TFT. They announced, "We're getting out of the business." Bill Clinton says it's a national emergency. You cannot get out of the business. We need these for our jet fighters. They said, "We've already closed down our clean rooms and they are contaminated. It would take us years to rebuild them. Have a nice day."

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So all of a sudden, not only does our military not have TFTs, but our little medical business, which was depending on those TFTs – we had about a six month supply. They told us, "You can have all the parts that weren't so good. We'll make you whatever we can make in the next – whatever. But basically, we're getting out of this business." So our scientists are scouring the world trying to find – we never did that again. We're now going to have more than one source of critical components. And if anything, we're going to do the critical component ourselves.

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So the selenium coating is done by Hologic. We don't depend on anybody else making it. The TFT, we still buy. Now that we learned how to make large TVs and large displays, there are a lot more people making them large enough and at the quality which you need in medical. So they have two sort of – you know, they have multiple sources of the TFT that they didn't have back in the beginning. So I don't know how I got down that road, but Guardian Industries was an interesting – have a bad day.

Q: No, it is interesting. And that leads me to another question. Since you were so dependent on displays, did you have any business dealings with the TV industry or anything like that? Over the period you were there, screen technology changed so much.

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A: Good question. You know, the doctors were used to looking at x-ray film on a light box. Now you've got to look at it on a workstation. And by the way, that workstation has to be able to display the quality that you want. Very, very hard to make workstation. So Hologic – we didn't want to do it, but there wasn't anybody else making workstations. So we had to go figure out how to make a workstation that could display these images and convince the hospitals to buy these high-end displays. And there wasn't any standards on how to store the image, how to label the image, how to display the image and which way they'd come up. So this whole – it's called DICOM. In the medical industry, they have a whole standard for how to treat these images and security and getting rid of patient names and all that kind of stuff.

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And we as a company had to figure out how to do that and how to make these workstations and these archives to store these images. Now, I think still Hologic is one of the largest workstation displays in women's imaging because it's so specialized that no one else can jump in or has jumped in. So it was an interesting problem.

Q: Yeah, I mean, that must've felt very tense in your early days. At least what we can get as consumers with plasma screens, I'm thinking those early screens, if you weren't looking at it from exactly the right angle, you couldn't see everything. And to have that happen with something as important as a mammogram boggles the mind a little.

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A: It does boggle the mind. That's why you had these guys like Jay Stein, PhD from MIT, Andy Smith, PhD from MIT. You had some pretty heavy duty people. By the way, let me mention, I'm excited about medical. I loved DuPont, I loved Stainmaster. Great. I loved every product I worked with there. I really had a wonderful time. But my wife's father is a doctor. My wife's grandmother is a doctor back when women were not doctors. My wife's three brothers are doctors. Having me move into medical moved my prestige up in the family from selling carpet, which by the way, when you're selling carpet to carpet retailers, that's not much different than a used car salesman. I mean, it's not a high-end field.

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But medical, you're making major differences in people's lives. You're making changes that will impact thousands of imaging centers and millions of women. I pulled some numbers knowing you were going to get into this. So just think of this: in the United States in mammography, just mammography, there are 20,769 systems to make mammograms in the United States. That's not counting VA Hospitals. But everything else – so that's how many, 20,769. And 12,833 of them right now do 2D imaging only, and 7,905 – so about two thirds are still doing 2D, and 7,905, 8,000 are doing 3D. And nobody – less than several dozen are doing film. Film has gone away. So what's this 2D 3D thing? Think about this.

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When you do an x-ray of a breast, a 2D image – you're shooting one image. They actually do two, you do from the top down and from the side. But you're basically getting two images of each breast. You're having four images total. That's what a normal 2D mammogram is. The doctor says it's very useful because I can see everything all at once and I can see it from two directions. But then when you say, "Yeah, but is that micro-calcification – why is – is that in a line or is that touching something else?" You really need to look at the breast in slices. You need to look at it layer by layer by layer. So the idea of doing a mammogram – low dose. You can't be exposing women to more radiation. You can't be doing all these images. You got to figure out a way to be able to look at the breast in very thin slices.

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Now think of the poor doctor. Think of the information they have. They don't have four images. They got probably well over 100 slices they can look through on each breast. That's what a 3D mammogram is. So a normal doctor might read a typical mammogram in a couple of minutes. Now is this going to make them 20 minutes? Because if it's 20 minutes to read that image, they're not going to do it. Why is x-ray film so big in mammography, looking for breast cancer screen? Because it's a screening tool. It's a very quick way – you could do an MRI, but that would take hours and it would take much more expensive equipment, and there's no way.

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You want a system right now that you can go out and get a quick read once a year of whether there's something I need to worry about. You want to find that cancer before it becomes a lump or before it becomes painful. Why do you want to find that cancer when it's small, early? Because you can treat it when it's earlier. For society and for the woman, it's a lot less painful, stressful, expensive to treat breast cancer if you can find out about it earlier. You want to have a system that doesn't have a lot of false positives. In other words, one of the problems with some of the other MRIs is it'll say, look at this, look at this, look at this. And you say, oh my god. I want something that says just look at this one thing, maybe.

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And x-ray film does that. So x-ray film – you'd like it to go away because it's a radiating device and any amount of radiation is probably – I would like to eliminate it. But can you do it with other devices any better? And we haven't found a way yet. While I'm on it, in Europe the way they do mammography – they believe that every woman should be able to get a mammogram easy. And parts of Germany – some of the states in Germany, there has to be mammography equipment within an easy bike ride. Like, ten miles of every woman. In this country, we let doctors decide where to put the mammograms.

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There are certain states and areas of this country where a woman might have to travel two or three hundred miles to get a mammogram. And that's really sad. But that's the way our medical system is based in this country. But you know, we don't use mobile coaches here very much. Very little. Way too expensive to put that kind of good equipment in a coach. So our way of doing mammography is quite a bit different than in Europe and other parts of the world. While I'm at that, Europe, particularly Europe, particularly Germany, France – France jumped on the computed radiography, CR, as a way to do mammography. And that was a plate that they could expose over and over and over. And you take an image, take it to a reader, get the digital image, erase it, go back, and use the plate again. That was computed radiography.

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That was an early technology. And the French government gave a lot of money to developing that, getting hospitals to put that in. It's turned out now CR is not a very good technology, doesn't find as many cancers, misses a lot of cancers. But I guess where I'm going with that is Europe was always more – ahead of the game. And you could get your stuff approved in Europe much quicker than you could in the US. One of the first adopters of our digital mammography was Thailand. The very first, by the way, adopter. What country in the world is the very first people to put in digital mammography systems? Mexico. Because Vincente Fox's wife wanted to do something for the women in Mexico.

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And she went and bought, I don't know, 20 of our systems and spread them around Mexico. They were the first country in the world to offer digital mammography. In Thailand, the queen of Thailand said, "I'm going to build a hospital. I'm going to have the best equipment I can possibly have in it. And I'm going to let – if anybody in Thailand can get to that hospital, we will treat them." Probably at no expense if they had no money. And she put in one of our detectors in their hospital. It's an amazing ride to have these people wanting to do something good for people and realizing that this technology would make a difference.

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So the neat thing about being a marketing guy is you get to deal with these kinds of people and work with them and how – the lady in Thailand, the queen of Thailand, the Thai Airlines ran their cover story on their airline magazine about the queen's hospital and how it was the best place in the world to get a mammogram. So, neat story.

Q: Did you ever meet the queen?

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A: I didn't. But I did get to go to Thailand a few times.

Q: So it seems like with these early adopting stories, there's a strong personal connection with someone who's involved. Is that the case generally?

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A: Well, in medical, there are a lot of passionate people trying to do good. In women's imaging, there's a lot more women than men. You know, like in a women's imaging center, you never have a man as the tech doing positioning, for example. That's all women. But the doctors that have specialized in that area are often women. It's one of the highest paid fields in radiology, and radiology is one of the highest paid medical fields. So it is a very specialized industry, and there are some amazing people in it. The early – I would say all the companies, but Hologic in particular – realize we were a bomb detection business and we were a bone density business. We had to learn these people, meet these doctors, make these relationships. But our products were successful because the people believed in us and they believed in the product we worked together to develop. And MIT – Mass General Hospital invested a lot of money with General Electric for years and years and years on doing digital mammography.

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But GE never commercialized the product. And finally, Mass General said, the heck with this, and they came with Hologic. Doctor Betty Rafferty was the doctor there. And there's another doctor. I can't remember his name. Very high up. But they became big fans of Hologic because Hologic had a product and was there in Boston and would help them. And Mass General did the first digital mammograms in the United States, followed quickly by Yale and by Mayo Clinic and by all the other large hospitals who wanted to put it in. GE got approval for their digital product two years before we did. We couldn't get the FDA to approve it. Took us two years longer. But I'd say within four years – when I left, Hologic's market share worldwide in digital mammography was more than all the other producers combined. So it's more than 50% of the market.

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And in the United States, in 3D mammography, probably 90% of the systems out there are Hologic. So unlike carpet where it was a marketing story for Hologic, it was a technology story. They really had a better technology. And in the early days, some of the other big companies that had to have – you know, when you're selling to a hospital, you have to have a product lines. So

Siemens would have to sell for all the areas of the hospital. So they had to have a mammography product line if they wanted to be a full service supplier. So they were buying Hologic's detector and putting it in their system. And that lasted for a long time. But every time they did it, "We'll give you the mammo system if you'll buy our information system or if you'll buy our workstations." So Hologic's saying, why am I selling them great technology when they're giving it away, which basically means we don't get the business?

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So when we came up with the 3D mammography and got approval for that, we told Siemens they couldn't have our detectors anymore and they ended up having to make their own. But they all – everybody since GE – GE was first. But everybody since GE used selenium as the coating rather than cesium iodide. So that idea of using this particular unusual mineral that has this property that makes an x-ray glow became the industry standard. And the only question is, where are you going to get selenium and where are you going to get your detectors, and are you going to invest in clean rooms to make them? Are you going to try and buy them from somebody else?

[01:02:04]

There's another company in Boston called Analogic. They've been competitors and friends for years. The owners know each other well. Analogic tried to provide detectors to other businesses, but I don't think Analogic has been very successful in being a detector supplier.

Q: That's interesting that before you went 3D, that the technology was something that was given away as a freebie for making other purchases.

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A: Well, for Siemens, not for us. We weren't selling anything other than women's imaging equipment. We needed to get the price to cover our costs and our research and development costs. So we were pretty desperate for income. So if Siemens wants to give it away and we can get whatever the price was for the detector, we'll do it in the short run. You know, in preparation for this, I made some notes. And let me jump to something. Hologic today – just today, their last quarterly earnings, \$3.2 billion dollars is what Hologic is. Mostly, Hologic has grown recently –

I would say women's imaging now is about 45% of Hologic's total sales. And they've gotten into a number of other products. Those are all interesting stories on how that happened.

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And there are about 6,200 employees. WL Gore is 3.5 billion, 10,000 employees. But Hologic has become a very big company. And the cash cow for a lot of the growth in Hologic has been the money generated through the women's imaging business. So, you know, another statistic I thought would be interesting – one of eight in the United States, one of eight women will get breast cancer in her lifetime. It is a big problem. It varies by country. It varies by nationality. It varies by race. But overall in this country, it's one of eight.

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And about 270,000 new cases of invasive breast cancer – that means it's serious. It's going to spread. It's not going to stay localized – 270,000 cases a year in the US. And about 40,000 women will die every year in the US of breast cancer. It is a big problem. Cokie Roberts just died of breast cancer. Robin Roberts. You think of all the people who have had breast cancer. So you want to – Sheryl Crowe. Sheryl Crowe was our spokesperson for a while. Gloria Steinem, Olivia Newton John, Julia Louis-Dreyfus, Cynthia Nixon, Amy Roebuck. I'm going to tell you the Amy Roebuck story. Okay, so we didn't have to go to consumers with our story. We had to just convince hospitals and imaging centers. And by the way, imaging centers do more mammography than hospitals do because a woman wants to go to something that's spa-like near her home.

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If I go to a hospital, that's where sick people are. Hospitals have learned that lesson and they've built their women's centers usually separate from the main – go through the front door, you know, of the hospital. But you do want to do breast cancer screening, and the way to do it is you have to go to an imaging center. So you know what, we would try and provide tools to the hospitals and imaging centers so they could educate people about mammography, but we didn't have to pay the money. All we had to do was run stories and a couple of very specialized magazines to be able to reach our audience, which is the purchasing people and the doctors in the

hospital. So every year as you know in October is breast cancer awareness month. And in medical imaging, it is a big deal.

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And you're spending months getting ready for, what are we going to do this breast cancer awareness month? If we're not ready with our new technology for two times a year – one is October and the other one is the week after Thanksgiving in November in the United States and March in Europe. But in October, it's breast cancer awareness month. Every TV station, every newspaper is going to write stories about women's imaging and how important it is and what's the best technology. And the reason it's big right after Thanksgiving in the US is there's a huge trade show called the Radiological Society of North America Show, RSNA. And it's in Chicago, and it used to be at the Palmer House and then it moved to McCormick Place.

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And it takes over every hotel in Chicago. And they do it the week after Thanksgiving because it's a lot cheaper to get hotel rooms in Chicago. It's the last big show that hits Chicago. And about – I'd say half the people there are outside the US. Doctors from all over the world and administrators looking for equipment, and people who sell to those people all go to the RSNA. In the case of Hologic, we would take about seven moving vans to move our display to the show. We build a structure maybe two stories high that's the equivalent of two or three houses that big to display our equipment. And so, the RSNA show was a very big show.

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The big one now in Europe is called ECR, the European Congress of Radiology. It's a little bit more difficult in Europe because you have all these different languages. But ECR in Vienna in March tends to be the big show. And I'll also say more and more people are not going to those shows because they can get the information easier now on the internet through social media, et cetera. They don't have to go shake the hand and meet the person. But those three events were big, big events for getting out the word about your equipment. And I have to tell you a story. So we're Sterling Diagnostic Imaging and we're Direct Radiography Corporation. In 1996, they're asking me to come on as the brand manager.

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They said, “Come to Chicago and see what we’re going to do at this show.” And at that show, they took a digital detector and put it in a hospital in Chicago and they didn’t – they took a phantom of a hand and they x-rayed it. And we sent the image digitally through transmission lines -- they weren’t very high speed then – over to the floor of the show. And they demonstrated to people the first live digital radiography images. The biggest detector we could make was only big enough to do a hand. It was a quarter panel. Now it’s a full four panels making a full detector. But the Chicago RSNA went crazy. They all knew it was coming. Nobody believed they could do it.

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And they did also things – as we vetted out and we had a guy there up on the stage and he’d be saying – somebody would say, “That’s not real.” And he’d say, “What’s not real about it?” And they’d say, “I bet that’s all film.” And he’d say, “No, let me show you. We’ll put a pencil on the image.” And we had to demonstrate, we really were taking real digital images and feeding them from a hospital over to the show. That was the first year. They hired me. I got excited about this thing. And I had this idea – how can we get people, these doctors, to just show them – McCormick Place is huge. It’s got three big halls at least. And you’ve got GE and you’ve got Siemens and you’ve got 60,000 people there. And how can we get them to come to our booth?

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So we said, why don’t we make a bunch of hats called – makes me think of our current president and his hat – but we’ll have hats of Direct Radiography and it’ll have our logo on it. And we’re going to give them to every cab driver, every limo driver, every bus driver in Chicago. That wasn’t that hard to do, by the way, because they’re all owned by, you know, maybe three companies. So you go to the three companies and you say, “Look, if your cab driver will wear our hat for this week-long period, and one of our people” – we’re sending several hundred people to the show. “If one of our people gets in that cab and he’s wearing the hat, he gets ten bucks. If he says, ‘Hey, are you going to the show? Are you going to go look at that new digital technology?’ We’ll give him a hundred bucks.”

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So every cab driver is blah, blah, blah, talking about this digital detector. You got to go to this show. You got to see this thing. Well, I don't know how many doctors we influenced, but I'll tell you who we did influence – our chief financial officer got into one of the cabs, didn't know we were going to do this. And the cab driver's talking to him about Direct Radiography Corp and this amazing technology. And all of a sudden, our guy who's talking to the industry stock thing is convinced that this little company can compete with these big guys. So that hat thing was kind of one of the first marketing ideas that worked. Another marketing idea that I want to talk about – do you mind me talking about the Amy Roebuck story?

Q: Sure, go ahead. By all means.

[01:11:46]

A: Okay. Again, October, breast cancer awareness month. We're going to do something. Can we do a live mammogram? Can we do a live 3D mammogram on air? Now, it's an x-ray. It's a breast. How can we do this? Said, well, let's talk to Good Morning America. They've covered it. Let's talk them into it. We tried it one year, didn't work. Then they called us and they said, "Okay, this month, we are really getting behind breast cancer awareness month. Every billboard on Times Square is going to go pink. Our whole – you know, for a week long, every show we're going to be really covering it. We would like to do a live mammogram. Would you do it with us?" So we come up and we said, "Well, we want to do a 3D mammogram," and they said okay.

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And I said, "Well, the problem with the 3D mammogram is it's not in coaches." There weren't very many of them and they were not in these big busses. So I had to go find somebody that had a bus and I had to talk them into putting that equipment in the bus. And we've got somebody sawing wood outside or something. But anyway, I took care of the coach thing. The Good Morning America people took care of all the permits to put the coach right in front of NASDAQ, which is the stock exchange that we are – they're right across the street. Good Morning America

is right there. So we're going to put it on the sidewalk in front of the Good Morning America studios. And one of their anchors is going to come out to the coach and get a mammogram.

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And we took several months to get that equipment onto the coach, to get all the things set up. And just the week before we were going to do the show, we're saying, "You know, you got to tell us the name of who's your anchor that's going to do this." One, because even though – in New York State, a doctor can approve – it varies by state, but in New York State and New York City, any radiologist can approve the woman getting a mammogram. In some states, the woman can do it on their own. But some states are more regulated than others. Anyway, we had to get the doctor's permission. We had to be ready. So they said, "Well, we're not going to tell you who the anchor is yet, but the anchor wants to ask her husband." What? "She wants to ask her husband because her breasts are going to be very famous. You know, the first digital mammogram ever done." Okay.

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Then we get a call a couple days later and said, "Well, guess what: we're not going to do a 3D mammogram." And I said, the whole purpose of this was we put this equipment on – there are some coaches with 2D equipment, but not 3D. And they said, "No, we're not going to do it because her doctor says don't do 3D. You don't need it. It's too high a dose." And in the early days, 3D mammography took a 2D image, and then they took an image that would do the slices. So basically, you were getting twice the dose. It was low, but it was twice what it was with 2D mammography. Nowadays, shortly after, you still do a 2D and a 3D image, but you get the 2D images by combining all the slices into one image.

[01:14:59]

The doctor does want to see one image, and they want to see slices. One, because when the woman comes back from last year, he's got one image. So he wants to compare last year's one image to this year's one image. And then two, they want to be able to look at it slice-by-slice. So we, Hologic, and everybody else has figured out how to make – how to lower the dose so it's still equivalent now to a 2D image. But back then, the FDA had not approved that. So it was, in

the negative words of the industry, double the dose. And you could yell all you wanted that it was very low, but yes, true, double the dose.

[01:15:35]

So anyway, her doctor said “I don’t want it.” Well, it turns out his hospital didn’t have it. That’s why he didn’t want it. So we said, “Alright, we’ll still do it because we think it’s important that women realize a breast cancer screening is not that complicated, not hard, not painful, and the anchor that will get it is Amy Roebuck.” And the end story of this is Amy – all this hoopla in Times Square, crowds all over the place. She walks in the coach, she gets her mammogram. She leaves the coach. And this is all – now you can go on YouTube and find the videos. I brought one if you want to – at the end, we’ll listen to it. She has breast cancer, and she has it really bad. She has invasive breast cancer, and thank god that she found it when they found it.

[01:16:31]

I still sometimes go to sleep at night thinking, oh my god. What if we hadn’t found it? You know, and then what happens? You’re now on national television where they’re saying, “Mammography doesn’t work.” This person, they missed it. She just had screening three months ago, and now she’s got a lump and she’s gone to her hospital complaining about the lump, and it’s three months later. Why didn’t you find it in your screening? And I’m thinking, we took some chances. The likelihood of finding it would’ve been a lot better if they allowed us to do 3D over 2D, but they did find it with 2D, and she’s now a major proponent, spokesperson of breast cancer screening. But that was an interesting way that we tried to get the word out about getting a mammogram.

Q: So I think that leaves us quite naturally a little bit down and all over the place, but how did you convince folks to adopt something new? Was it on a doctor by doctor basis? Hospital by hospital?

[01:17:35]

A: Well, I think in the medical industry, yes, it is doctor by doctor and hospital by hospital and purchasing agent by purchasing agent. And by the way, the doctors are a lot less powerful than

they used to be, although they're still very powerful. I'll give you a good example. Cleveland Clinic was one of the first – they come out with a list every year, the top ten medical innovations of the year, Cleveland Clinic. And they were one of the first people to say digital mammography is very important. It was number one, okay? But they didn't buy digital mammography for years and years. Why not? Because they're a Siemens hospital. They didn't have it.

[01:18:14]

They were so tied with their contracts, they couldn't buy it. So they were very late in the game. Cleveland Clinic is like the Mayo Clinic. It's one of the premier hospitals. But the doctors could say all they wanted. The purchasing people and the owners of the hospital didn't go along with it. So yes, they had to reach the doctors, you had to reach the purchasing people. And the interesting thing in medical – again, there's not a lot of – JAMA, the Journal of the American Medical Association, and the New England Journal of Medicine are very important journals. And if you can get an article there, you know, it would be very important. And we were fortunate to have some doctors who published in those publications early on.

[01:18:59]

There's a doctor in Northwestern called Doctor Sally Friedewald who got ten big hospitals – Yale, Mass General – it wasn't Northwestern. It was another hospital in Chicago at the time. But she got ten hospitals to all pool their data. They took all their cases of film mammography and then digital mammography – so, the same patient walked in a year later. She had digital. And they compared cancer detection rate and seriousness of the cancer, that type of thing. And they found – by the way, when we went for FDA approval, when GE went for FDA approval, they went not for a better than. They went for equivalent to. They went for a claim that 2D is just as good as film, but it has some advantages. Easier to transport, costs a little less money. So they didn't claim it was better. And they couldn't claim it was better.

[01:20:00]

We all believed it was better. We had evidence that it was better. But the initial claims for digital mammography were that it was equivalent to because it was a lot easier to get approval if you were just saying it's equivalent to. Then later on when we came out with tomosynthesis, we

started getting articles saying no, no, it's better than. And that's why film has basically disappeared, and digital mammography, and particularly 3D mammography is standard of care.

Q: Perhaps this is a little bit of a tangent, but I'm curious. What does tomosynthesis mean? Why did they pick that word?

[01:20:41]

A: Well, it's a terrible – it is a medical term, or not – it's an imaging term. I don't know what the roots of the word are. But we said this is never going to fly. We early on started calling it 3D mammography. But in a way, all you're getting is slices. In two, three – true 3D, you should be able to look at the breast from any angle. But you're really looking at the breast from top to bottom in slices. So it's really not 3D. But 3D was a lot better term than tomosynthesis. And I would say almost everybody's jumped on the 3D bandwagon instead of calling it breast tomosynthesis. Tomosynthesis has to do with doing it in slices. By the way, they're basically taking, I think in the case of Hologic, 13 low dose images. The detector moves across the breast, takes 13 images, and then takes all that data, manipulates it, and then feeds it back in about 100- and some slices. About one centimeter thick slices so you can look at the breast one centimeter at a time.

[01:22:01]

You could change that. You could look at thinner slices or thicker slices, but they kind of settled on looking at this many slices. So it's really taking a series – tomosynthesis as a technology is taking a series of images and then using the computer to re-compute that data and looking at the object then in slices. So it's used in other fields, but that's what it is. Not a good name, however. And I would say in terms of names, our initial detector name was Selenia Dimensions. We're looking at the breast in dimensions, and Selenia is selenium, and selenium is the mineral that we're coating it with. Not a brilliant name, but it wasn't too bad if we were just going to sell detectors. But then we moved to, well, let's call it Direct Radiography and then let's call it – we don't want to call it Digital Radiography because that includes computed radiograph images, no good. And so we called it Direct Radiography, which GE couldn't call theirs because it was not direct. It was indirect. So that became a big term for selenium-based detectors.

Q: So I've got a couple questions now about more on the theme of adapting something new. What was it like to work with the FDA to get this approved?

[01:23:22]

A: I was lucky enough – ended work long enough that I got to go to a number of those hearings, which was just amazing to have a panel. They're always down in – they're a green belt down in Maryland in a hotel lobby, in a hotel auditorium. And they have these doctors come in, experts from the field. And they present their research and – you know, there's different types of FDA approval. This one happens to be a five, ten K approval. We were going for equivalency, so that's the kind of approval it was.

[01:23:57]

By the way, once the first person gets it approved, everybody else after can come along and say, "Mine's just like theirs except mine's green." So it's a lot harder when you're the first to get approvals. And to get approval for 3D, we definitely beat the heck out of everybody else, years ahead of everybody else. To get approval for 2D digital mammography, GE ran that gauntlet. They had to pay to do the studies to prove that it was equivalent to film. And so, they cost them a lot of time, a lot of money, a lot of research, a lot of contracts with hospitals to do the work they – you know, they basically had to expose the woman to film and then do a separate image digitally and then you had to tell her. You know, you're getting twice the dose.

[01:24:45]

But that's the only way the FDA wanted to see the evidence that these two things were equivalent. So it is – I think our medical system is very tough, but it's inspiring to see these people and how hard they work to justify the claims that they have. And I would say as a marketing guy, I spent a lot of time with the regulatory people on what we could say or we couldn't say and how to say it. I'm particularly not very good at – I hate giving interviews. When the New York Times calls and, "Jim, the New York Times is on the phone." I want to try and find somebody else to do that interview.

[01:25:23]

But a number of times, I ended up being the guy. But I always write out what I was going to say and stick to that paragraph. But your claims are very carefully watched and monitored, not only by your competition, but by the FDA.

Q: So did you have to work with any foreign regulatory agencies too?

[01:25:47]

A: All of them. Every country. Europe is a little better organized than other areas of the world. But yes, you're dealing with – and there's a lot of axes to grind and a lot of doctors that have spent their whole career going down one road like computed radiography. And they're not going to be swayed easily that this new technology could be better. So it is a lot of work.

Q: So I'm trying to think of a way to word this, so forgive me if it's awkward. But a lot of the other interviews that I've done medically have been with the pharmaceutical industry. And there was one particular drug that everybody wanted to tell me about where they found – after it had been on the market that it had a secondary use, and it had to go through the FDA not quite from scratch because they'd already been able to prove it wasn't harmful to people. But it had to go through a lot of the same regulation again for this secondary use. Did you ever have any situations like that?

[01:27:02]

A: Well, you know, every device – here's a similar situation. You are finding the cancer with this amazing plate detector. Now you have to display it on the workstation. That workstation has to be approved. So now you've got to prove that not only is it a good image, but it displays well on that work station. Then a doctor has to go remove that cancer, so they have to do a biopsy. How are you going to find that lesion in the breast that you saw on the x-ray when you're on a biopsy table? You don't have a large detector. It'd be way too expensive to have a large detector in that room. So now you've got to have a biopsy device that can image that. And that was a big problem early on.

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When you and I first met, I was telling you that story about the Hubble Space Telescope. The original biopsy detector that we used. They only have to be very small on a biopsy table. We know what breast it's in, we know about where it is, we just have to be able to take our needle and biopsy exactly. So those initial detectors for many years on the biopsy table were CCD technology, which was the same technology that was used in the Hubble Telescope. And the reason it's the same technology is our engineers that work on equipment – not the detector. Detectors are done in Delaware. The equipment is done in Danbury, Connecticut. And in Danbury is where Perkin-Elmer, the maker of the Hubble Telescope mirror is located.

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And those engineers shared a cafeteria with our engineers. And we were talking with them about – we have a problem. We have very little information, and we have to be able to see it very precisely. And they said, that's the same problem we have with Hubble when we're looking for distant stars and different planets. And so, we followed the – we took the exact same detection technology, which they were small detectors – put them in our table. NASA got a lot of mileage out of saying how many women's lives were impacted by Hubble, all this money we'd been putting into the Hubble technology. But it was true. It helped.

[01:29:24]

But there was a product then – we had to now go to the FDA and say no, we've got a different way of doing it. It's going to be better. So going back down the regulatory thing. And again, if you're the first one to do it, it's a lot harder. You've got to do the big studies, you've got to generate the data. It takes years and costs a lot of money.

Q: How many years?

[01:29:48]

A: I would say in the case of tomosynthesis it was – we were selling it in Europe five years before it got to the US. Took us that much longer to get approval in the US. You know, it was a much – a big hurdle.

Q: Now would you be at liberty to say a ballpark figure for how much that cost?

[01:30:13]

A: I don't know. But you've got your whole research group. You've got all your regulatory people, all your marketing people, all your sales people. They're all – they can't sell 3D. They can't even talk about 3D. It's expensive. I don't know what the number is. Big. A small company couldn't afford it. You got to have some pretty deep pockets. That's why the only people in medical generally are big players or have found somebody with big pockets to fund it.

Q: So we're kind of talking about this out of order because we talked about how you get the product approved by the government and regulatory agencies. And we talked a little bit about how you get healthcare providers to purchase it. So I guess sort of in between there, where do the insurance companies play in all of this?

[01:31:09]

A: Oh, there's another thing. A hospital might say it is a better technology, but if I don't get reimbursed for this, I can't do it. And believe me, the insurance companies are not jumping on the bandwagon for a more expensive technology. And it's state by state and you're working with the American Medical Association to get the evidence to prove that it's the right thing to do. You've got a whole team of people whose only job is to deal with insurance companies and try and get you as approved on their schedule. If Blue Cross Blue Shield will not reimburse for a 3D mammogram and they'll only do it for 2D or film, that's a big problem.

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So you're dealing with every single medical insurance company. Now, it does help when you convince a few of the big ones. And there's a lot of pressure to get the others onboard. By the way, one way to do that pressure is to get your company – there's a lot of companies that are offering women's services to their employees. And when they say, "Look, I want to get my women employees the best technology. You figure out, insurance company, how to reimburse for it," there's some pressure on the insurance company to approve it. But they have doctors on

their staff and they have researchers on their staff and they're going to the same conferences that you are. And they have to be convinced that this technology is one they should reimburse.

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Mammography generally right now is – the woman does not have to pay for a mammogram. Somebody's going to pay for it. And the question is, who? And what equipment? The hospital's not going to put it in if they're not going to get reimbursed for it. They'll put in the minimum of what they have to put in that they can get paid for. So yes, insurance companies are another big hurdle. FDA, insurance companies, the doctors, the purchasing agents. I spent a lot of my time – there's two big organizations in medical. One is called Ecri, out of Philadelphia, and the other is called MD Buyline out of Dallas. And purchasing agents – they can listen to the salespeople all day long.

[01:33:36]

They want to get together and talk to other purchasing agents about, what are you going to do? So they tend to subscribe to MD Buyline or Ecri. Ecri does the consumer reports of medical. Ecri tests equipment and reports, did that car overheat? You know, they're talking about medical equipment. So Ecri tests equipment. MD Buyline more reports what other people are doing, how many people have done this. So we spent a lot of time. Our CEO would fly down once a year and meet with the analysts at those two big organizations so that when the purchasing agents called them they'd say, "Look, I think the best product out there is Hologic," or "Here's what Hologic's doing, here's what GE's doing. Here's what I'd use to consider it."

[01:34:23]

So there's another kind of a layer in the pie in terms of who they're going to go to for an objective opinion about that product. I don't know if they do pharmaceutical stuff or not. By the way, every time you talk – you talked about pharmaceutical a minute ago. The one thing they did for our industry which was a good thing – we're in equipment. They're in pharmaceuticals. But the whole Sunshine Act – what was that, 2010? When the government forced medical companies to stop buying lunches and giving money of any sort to doctors without the doctor having to report

it. I think even a ballpoint pen at the trade show – if the doctor comes to the tradeshow and picks up one of your pens, he's supposed to report it.

[01:35:11]

I think pharmaceutical caused that problem. But it actually ended up being a good thing in the equipment side of the business. I really don't think that a coffee cup, a hat, or a ballpoint pen is going to sway some doctor to buy my \$200,000 piece of equipment over somebody else's. But it did cause – we couldn't do lunches. We couldn't bring in speakers. It became a whole different game on how you market in medical because of the problems in the pharmaceutical industry where they were giving doctors – paying them to be speakers and all sorts of stuff. It was a big problem.

Q: So then how much does a machine cost?

[01:36:00]

A: When you get everything together, you're talking \$200,000 to a half million dollars. Now, do you already have workstations? Do you already have archive? Do you have the data capacity to store these images and transmit them? Do you have high speed data lines to be able to move it? Nowadays, most imaging centers do. But in the beginning, they didn't. And mammography puts a huge strain – you know, the IT manager at the hospital, our imaging centers – hey, somebody gets a broken arm once every ten years. I got one image. You're giving me four images every year for half the women in the country? You're kidding me. You know, these huge images, gigabytes of data. That's not easy.

[01:36:51]

And so, having the peripheral equipment – it doesn't have to come from the detector vendor. But having that in place – if you don't have it in place, you're not going to get into the industry. But now, what is so cool, we just put a bunch of systems in Kazakhstan or something. The president of Kazakhstan wanted to offer – I don't know. But the problem was he made a deal with the University of Pittsburgh where the doctors were going to read the images of the woman getting an x-ray, a digital mammogram in Kazakhstan.

[01:37:25]

And do now have satellite networks and high speed lines that they could do that. I don't know whether he ever was very successful with that, but you can move data around the world and a woman can go in anywhere and get her mammogram and they can get last year's mammogram and take a look at it.

Q: So were there any other sort of regulatory bodies that I might've skipped over?

[01:37:53]

A: Well I'm mammography, the Mammography Quality Standards Act was passed by congress in 1992. And that law – there were a lot of arguments in congress. But that law says that women should be able to get a mammogram. And then the issue comes, how often? Who's going to pay for it? Does it vary by race? Like by the way black women tend to have a bigger breast cancer problem than Caucasian women, but generally do not get mammograms as frequently which is sad. So the Mammography Quality Standards Act was really important. And that's where you go on this MQSA National Statistics – they report – and they report centers.

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You can look up when the center was last inspected and did they pass the inspection. It really made this narrow field of women's imaging a very carefully controlled thing. I'll tell you a story. Early on – another thing I got into – one way to convince a doctor that it works is to have him sit down and try to read images on a workstation. So we went and bought workstations from our businesses, and we'd take them to these congresses like RSNA and we'd set them up. And they could come in and take a course and read a mammogram and try it out. And I think is kind of sad.

[01:39:33]

One of the early tools that we had is called Computer Aided Detection. And that is the computer would generally – over and over, you can say, “This is what cancer looks like. This is what it doesn't look like. This is what it looks like.” So the computer could tell a doctor, look here. You

still have to look yourself, but I'm going to tell you, I'd look here at some things. So the good thing about that is you could get better and better every time you did it. Every next patient, that system could get better and better and better because it's learning and learning and learning, the information learning. But it's not going to work. Why is that? Because at some point, the doctors – when a lawsuit happens, they're going to say, “Show me the image you made that decision on. I want to see whether you missed something or not.”

[01:40:21]

Well, the CAD's changed. “No, no, you've got to save that image. You've got to save that software from some point in time. You've got to lock it down.” This is the CAD version we're running right now. So the CAD thing in mammography has never really been as big as it could've been or it should be because of regulatory concerns – a doctor worried about being sued. But where I'm going with this is we'd go to these congresses, we'd put up the workstations. The doctor would come in. I had to meet people teaching these courses. Usually say, “Are you a mammographer?” “Yes.” “How many images do you read a week, a month, a year?” “A lot in a week.” “Okay, sit down.”

[01:41:04]

They miss so much stuff. And you started to say, there is something as good doctors and there's some things as bad doctors. And even though they passed the course, I really wonder sometimes – you really got to be careful about which – like if I thought I had breast cancer, my wife had breast cancer, let's get a second opinion before we do some of these things. I'll tell you another group – surgeons. What are the surgeons going to say? A surgeon's going to say hey, don't worry about it. Don't get a mammogram. When it shows up, I can take care of it surgically. I am that good. And you say, “But it's going to cost a lot more and it's going to be a lot more painful for the woman.”

[01:41:45]

So you get the whole argument where the surgeon's arguing one thing, the screening people arguing another thing, the good doctors and bad doctors – it's an interesting field. But I do believe there are some amazing doctors out there. I want to go to somebody who reads a whole

lot of mammograms. You don't want to go to somebody who just does it occasionally. And they do have to do a minimum number and they do have to take refresher courses. Interesting thing is you don't have to take a course in reading 3D images to read 3D images. You just have to sit down on the workstation and I think spend an hour looking at images or something, which you don't have to pass. There's no pass-fail. You just have to put in the hours. In a way, because there's arguing and the doctor – anyway. It's interesting.

Q: So were you involved in any other trade organizations?

[01:42:42]

A: I know you kind of gave me a list of some of the things you were going to ask about and – other trade organizations? I think, you know, MD Buyline and Ecri, [01:43:02], RSNA, the American Medical Organization, the American Cancer Society. By the way, if the American Cancer Society, doesn't say something about it is good, you get a big problem. The insurance companies will listen to them. They'll look for any evidence they can to support their position. I can't think of anybody we haven't already talked about.

Q: This might be a good time to talk about the Aunt Minnie [?] program, because that seems like it sort of walks the line between a lot of different things, as you explained it to me before we started recording.

[01:43:39]

A: Okay. Well, I've found in medical it really – you can do an awful lot with not a lot of money because you have these – one, big trade show, RSNA. Yeah, you've got regional shows, but the big one is RSNA. And you have just a few publications. Now, I'm a guy – I have a master's in advertising. I taught marketing and advertising. But in medical, I really believe that the better way to communicate would be not – my business card did not say Director of Marketing. I think I had Director of Strategic Planning or something. I never put marketing. I never say advertising. If a magazine said they'd run my story but I had to put advertorial on it, I would try and get them to – you could call it a sponsored paper.

[01:44:29]

You could call it lots of things. But try not to use that word because doctors do not want to think they're being marketed to. Even though you want to be able to communicate with them, but how are you going to do it? We were fortunate in medical imaging that there is an internet channel called auntminnie.com where you can go to get information on medical imaging. They have an Aunt Minnie Europe also, because sometimes they want stuff that's more specialized. They have different regulatory problems in all of Europe than we have. But Aunt Minnie was a very, very useful tool.

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And Aunt Minnie allowed us to buy – they put out their own letter from the editor – I think it was once a month. Maybe more frequently than that. And he'd go down and summarize – you know, there's a new detector, there's a new player, there's a different show, there's a new name, there's a different insurance thing. He'd summarize the news in his letter from the editor. Well, he allowed me to put out a newsletter from Hologic. I had our logo on it. That basically looked like his letter except it says Advertorial at the top. And nobody ever saw the word advertorial, or didn't pay much attention to it.

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But that became an awfully useful tool. We could communicate now to our audience without running ads. Print was going away and it became very useful. The second thing that became very useful, and you could tell from my dialogue – so many doctors that just thought this thing – they believed in it and they had stories to tell. And we would place those stories or we would tie them together with a newspaper or whatever and get those stories out. I call it repurposing. I am the expert of repurposing things. The same story would appear in a newsletter and an Aunt Minnie broadcast and a video and this and that because there really are not a whole lot of messages. You just kind of figure out a new way to get people excited about it or remind them about it.

[01:46:42]

And we put out materials to our sales force that they could pass onto their customers. You know, more stories about what's happening in the industry. The Aunt Minnie people, by the way – at

one point, that was owned by Kodak. They started it. There was a company that asked us to start one, and we didn't want to spend the money to do it. But Aunt Minnie clearly in imaging is one – and they're trying to do a similar thing in dental with a Doctor Bicuspid. But if I go to my dentist and ask next week, you know, have you ever heard of Doctor Bicuspid? I bet the tech cleaning my teeth and all will probably have heard of it. These unique channels in certain fields for getting the word out.

Q: Do you know how they came upon the name Aunt Minnie?

[01:47:35]

A: Yes, that's a good thing. And that is asked a lot. I think it is so stupid. But it's too hard to change. Just like the name of the company that – Hologic is a terrible name. We know why we did it. But early on we said, at some point, you've got to lock it down and that's the logo and that's the name and we're not going to change it. But Hologic was never – I don't think today was not the most brilliant name in the world. But Aunt Minnie was – some of the older doctors – and I'm not sure there are many of them still left – who would call something they've seen before Aunt Minnie. There's Aunt Minnie. I've seen that before. So that was where the name came from. It's a familiar anomaly in a breast would be called an Aunt Minnie.

Q: Interesting. I have to ask since you brought it up – what's wrong with the name Hologic?

[01:48:36]

A: Well it's like, the company we bought, LowRad, low radiation, that was a good name. The problem with Hologic is there's Analogic. There's another company in the same town with a name similar to yours. The problem with Hologic is they are a multi-device company with a lot of products. I'd rather spend more time talking about women's – for a long time, we were only women's imaging. Then they wanted to become a broader thing. But I think they're moving back now to women's imaging. I'd say 90% of their products – like bone density. Is that a woman's problem? This is a neat story: early on, we had a company picnic. And we had a little ultrasound device. Ultrasound is not a radiating device. It's just like a shoebox.

[01:49:24]

You put your shoe in it and it measures your bone density of your foot. And it's a good screening tool. You could use it in shopping malls and drug stores and all sorts of stuff. And it's called The Sahara. It didn't use water. Most ultrasounds, you have to have something in some sort of water or gel. It was a good name. But the FDA never gave us approval to use that as a diagnostic device. It was only a screening device. So the imaging centers would say, "So I got to use this to screen and then I got to do another device to do a diagnosis. No thanks." So Sahara never became a big thing.

[01:50:02]

But I brought The Sahara to a company picnic and I was imaging people, and one of the said, "Jim, go get an image," and I got one. And my T-score was bad. And they said, "Well, we'll do it again," and it was still bad. And they said, "Well, you ought to go get a bone density test." And it was bad. And they found out I have osteoporosis. So I was on Fosmex for a long time. Men have osteoporosis, too. Men have breast cancer, too. Men die of breast cancer. But it's primarily a woman's problem. I don't think any men get them. A man would get a mammogram if he felt pain or had a lump. But other than that, they wouldn't do it. But genetically, a woman is far more likely to get breast cancer. Anyway, that's where the name came from.

[01:50:58]

By the way, you were going to ask me – I think one thing about philanthropic organizations. Let me do that one. I got excited about that. We're always looking for new – something every year, you had the trade show, you had an annual sales meeting, you had a breast cancer awareness month. You had something. So I'm going to put on record here some people that did amazing things. One, if anybody someday would write more stories about this guy – a guy named Stan Brock, Remote Area Medical. Here's a guy who was – I don't know what he was. A paratrooper during the war or whatever.

[01:51:35]

He believed that women in poor countries were not getting – or people in poor countries did not have access to good medical care. And he would get American doctors to fly with him. And he'd

fly the equipment and doctors down and they'd give eyeglasses and they'd do mammograms and they'd test, do all sorts of tests. And then he said one day, "You know, there's parts of America that are not getting this." And he'd go and get a football stadium and put his Remote Area Medical tents up and do – and we would work with him and try and find doctors and try and find equipment, donate equipment. Like one thing Hologic now does is pap tests for cervical cancer screening, pap tests. And we'd give him the materials to do that.

[01:52:22]

And this guy, just the most amazing guy. He died recently, and in his obituary, a lot of people wrote up. But a guy – my understanding is he lived – he didn't have running water where he lived. He just put everything, his heart, soul, and everything into these medical trips. So being able to work with somebody like that – I'll tell you another. Kat Berge. We said, well, we got to have something to talk about amazing women. And he said, "Well, there's this thing called Race Across America." It's a bike race. I think it's done every five years. You get on your bike in San Diego and you ride your bike to New York. How fast can you do that?

[01:53:16]

This woman, Kat Berge, all by herself – not as a team – rode from San Diego to New York City in nine days. She slept about two hours a day across the mountains, across the desert. Unbelievable woman. And she became a major fan of talking about women's health and women's imaging. Amazing story. I got a third story. This one really came out of the blue. Sam Berns. It turns out in Boston, there's a couple of family doctors whose son had progeria. Progeria is that disease that very few people get and you generally don't live past the age of ten, but you look like 100 year old person when you die. And this Sam Berns, their son was just the most amazing child. And our CEO – we did TED Talks and we did just lots of stuff with that progeria foundation, again raising money with our own employees and with people who wanted to give us money to help that cause.

[01:54:25]

And now there's another big organization we're working with called Are You Dense? The whole issue of – in fact, by law, in most states now, they have to tell the woman, "You know, your

breasts density changes as you age.” But also, some women are just generally more dense breasts. What's the big deal? It's harder to read an x-ray if you're a dense-breast woman. That's where you probably should get a 3D mammogram rather than a 2D mammogram, or you might want to go more frequently. There's a lot of arguments with insurance companies now about, should you have a screening exam at age 40, and if you have no family history or no other genetic reason why you might get breast cancer, you can wait till age 50 and do your next one and do it every two years.

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Or should you do it every year starting at age 40? Lots of give and take back and forth. Obviously as the equipment company, we'd say do it more frequently. But the Are You Dense foundation has become very powerful in a number of the – they've asked me to work with them and I just haven't had the time to work with them. But really good, interesting people in the medical field that have done amazing things.

Q: So I think there's probably a couple of questions that we can roll in together, such as – how did your approach to marketing change over time, and how did that follow with the way that marketing practices can also change over time?

[01:56:06]

A: Well, you do learn the hard way. I'll tell you one that I – this is a more recent example, but I've been working with a group trying to raise money to dig wells in Kenya. It's called Water Is Life Kenya. And some consultant came in and said, “You know, you guys ought to get a You Fund Me. The way people on the internet are donating money – not to churches so much. They're all doing You Fund Me things. And if you have a great story, you just put it out there on one of those You Fund Me things.” And we had a particular occasion of some rangers in Tanzania or Kenya came to us and said “Our funding is dried up and we know we'll get new funding. But can you give us some money in the short run? Right now, we are out there looking for poaching. And if we don't have the money and don't have the water and don't have the food, we're going to have to go back to our other jobs and the poachers are going to kill the elephants and the rhinos that are out here.”

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And even though it had nothing to do with providing water other than they did need tanks to store the water on these ranger posts, we decided to give them \$10,000 dollars. And I said, that'll be perfect for a Go Fund Me campaign. And we put our heart and soul into it. And I'd say the total return was about \$300 dollars. I don't think we did it wrong. I just they didn't want to fund – maybe it was too far away. Maybe we didn't – I think you have to then use your Facebook audiences and everything else to tell people to go to Go Fund Me. You learn the hard way, this doesn't work. I learned that Aunt Minnie worked. Does it still work today? Well, I've been out of the business now two or three years.

[01:57:54]

I think social media works. The question is, how do you do it? How do you do it particularly in a regulated industry? How do you do it when somebody starts asking you questions on your Facebook page, and you can't just have some low level person writing answers? They all have to go through regulatory. So you end up scripting these things and you kind of have a standard library of responses you can give and you've got to stick with the script. It's a lot harder in medical to be able to respond quickly when people want information. I think the one good thing that's happened in medical is they have, in the United States, made available where you can find out who does have 3D mammography.

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And you can go to the one nearest you. You don't have to go to the one – you know, you're not tied to a hospital or whatever. So you can ask your friends, you can look around, and you can find the place that has better equipment, and you can get it paid for generally if your insurance company covers it. Almost all of them do now. So you know, things change. So you learn. And just like in marketing, and I talked earlier about the evolution of how do you get – you know, do telephone surveys and you don't do focus groups that much anymore. You might do a focus group to look for language. What words do they use? How strongly do they feel? You learn that by watching them as they talk about something. How much do they already know?

[01:59:30]

It's very difficult now. I spent all my time – I'm sympathetic to good researchers trying to do a good job. But how many times is a call you get on a phone really just a sales pitch? They're not interested. That's why I think in our last election, we got – last presidential election, the polls were so far wrong. People either didn't – we did good polling as best as we knew how to do. But people didn't want to tell you what they were going to do or didn't bother to answer. So the people who did answer swayed the polls. It's a problem. So how do you find out – you look for other ways to get the information.

[02:00:17]

I know in DuPont, we spent a lot of time – I was just thinking with lycra – I was on the woman's intimate apparel SBU, strategic business unit early on at DuPont. Women's intimate apparel. In interesting thing was one woman that chaired it, and all of the rest of the people on the SBU were men. I always thought that was a little bit weird. They were – the scientists who had to develop the fibers and the finishes to make the thing work. And here's the problem that we had – lycra is a great product. It goes great in women's underwear and bras and it's super silky and it's fantastic. How do we get it into men's underwear when men are only wearing jockey shorts? How can we get men to wear boxers, not jockey shorts?

[02:01:05]

And by the way, they can't be white because lycra yellows. So we have to have it colored. How can you get men to buy colored boxer shorts? That was the problem in front of an SBU. And I remember they got – was it Wilt Chamberlain, the basketball player to promote wearing boxer shorts or something? And it opened up a whole new market for DuPont. But it is an interesting problem. And as a researcher, you're trying to figure out fundamentally, how can I get somebody to change their behavior and get good objective information about whether it's working or not?

Q: Is there any single change that you could say was the most monumental?

[02:01:48]

A: Well obviously, the computer and the internet are huge. Right now – yeah, the cost of this equipment is dropping significantly because of the innovations done in other fields. The ability to display and transmit images has made a huge difference in medical. And I think that, you know, the whole television – the fact that I can buy a huge screen television for my home that has great imaging for \$100, \$1000 bucks really has helped the TFT producers to want to make the TFTs and the coating people wanting to do the coatings. And it's changed a lot.

Q: So what did you do that made your marketing communication strategy is different than your competitors'?

[02:02:45]

A: I think what is neat about Hologic is one, we were in medical. We did not have agents, ad agencies from the beginning. We did it all in-house. And therefore, you had people in the same job for long periods of time that knew where the bodies were buried, knew what's been tried before. Now right after I left, they went with outside agencies. The lady who took my position used to work for Walt Disney, I think. And you know, her whole view about how to do marketing is a lot different than mine. And I really haven't stayed in touch with what they're doing. But I think the time I was there, the company benefited in that you had a small group of people that really knew the field, knew the doctors, knew the story, knew the media. You know, my list of who to contact when you had a story –

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I got to tell you another story. Okay, so let's say tomorrow, you turn on your television and there's a huge breaking news story that they just found a new way to detect breast cancer. And the Journal of American Medical Association just published a great new study, okay? Do you think all those reporters that are covering that story heard that for the first time? Now, sometimes they do. Like the story that just broke today about the Canadian prime minister wearing blackface back when he was in some high school or private school or something. Okay, everybody's get the same story at the same time. Who's going to cover it, how important is it, what can I learn?

[02:04:24]

But in medical, a lot of these studies have been worked on for years. It's a matter of when it's going to come out and will it come out. So once you know that the story's going to come out, the major magazines, JAMA, will let you know one week ahead of time. It's got to be announced. So you've got one week's time to prepare your material. Good or bad, how are you going to respond to this thing? The person – the authors submitting the story are given a week's notice.

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So we knew this great, big study was coming out by this doctor. A wonderful doctor. And I went to her and I'm telling her, "Doctor, here's this stuff. We want to get on the front page of The New York Times." And she said, "You are not supposed to know this. How do you know this?" And I said, "This is the way it works." Do you think Good Morning America heard about it the first time five minutes ago? No, they've been working for a week getting ready to plan this story. Yes, they're under confidentiality agreement. But doctor, if you do not prepare, if you are not getting your schedule cleared to be able to talk to these newspapers, if you are not getting your talking points down –

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And by the way, you are not going to be able to handle the interviews that you get. You're going to have to find other doctors to be able to fill in for – because every paper on every broadcast station's going to want a story that night, that day, that night, that minute the thing comes out. In fact, you might even want to have some video already prepared. We call it B-roll, background roll, where you can show images. Anyways, we were back being friends, but she couldn't believe that I knew ahead of time this thing was coming out. And I just couldn't get her to want to – it wasn't a good launch. It was a great story, but it was a terrible launch because she refused to prepare for it. Big mistake.

Q: Interesting. So what was a typical day from any part of your career like? You can focus on beginning, middle, and your favorite part.

[02:06:33]

A: Well every day – that’s what I love about the job. Every day is different. I mean, every day – you have deadlines. Once a month, I had to write the newsletter. And then you had certain big deadlines – breast cancer awareness month, RSNA, the big show in Europe, national sales meeting. But almost every day, you had a new hospital adapting the technology or a new – something the competitor did or some new device you were getting ready to market. So my days were – I spent a lot of time in high level meetings, and then I’d work a lot late at night. I’m not very good at – I’m a one-finger typist. I type a ton of stuff, but I still do it with one finger. I think it operates the same speed as my brain.

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But getting ready for the kickoff the next day, you put in a lot of hours. And you sweat a lot in marketing. You know, you’re going to go do this big kickoff at some show that might better work. I have to tell you, this is a college story at the University of Delaware. Ford Motor Company came to us. I was a young professor and they said, “We want you to help get your students to develop a marketing campaign around the Pinto car,” the Pinto. I don’t know if you remember the Pinto, but it wasn’t exactly the best car in the world. They said, “We will give you a Pinto on loan for the whole semester if your students will do a marketing campaign around it and give us what they do.” And I said okay.

[02:08:17]

So I have two stories on the Pinto. This maybe is why I got out of academia. One of my undergraduate students had the brilliant idea – he had a pilot’s license – that they would drive the Pinto across the Delaware Memorial Bridge, and they would fly down with the airplane and take a picture of the car going across the bridge. That kid got in more trouble and the college got in trouble. And I’m going, you’ve got to be kidding me. And the other Pinto story where you sweat it out – what’s that guy’s name? It’s a racecar driver who lives in Pennsylvania. Very famous. Anyway, one of the kids knew this guy and he said, “Okay, I will stand in front of the Pinto and say how wonderful it is as long as it doesn’t ever go anywhere.” In other words, it’s only for a class purposes, period, okay?

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And I had hired – I wanted to sound to be right. The kids were involved. I came along. We brought the audio/visual guy from the university with us. We'd take the thing, got back, and there was nothing on the tape. Are you kidding me? "I don't know what happened." But the dude in audio/visual re-recorded it with his voice. And I'm going, oh god. I don't know. Just, god help me. Certain days are just not going to work very well. You do sweat a lot. I sweat a lot on that Good Morning America thing. That was a game changer for me. And having students do projects

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Avon products and Newark – it's not there anymore. The students had already submitted their final exam, but the Avon people called and said, "Hey, we'd love to have your students come over. We'll buy them lunch and we'll give them a tour of the building." And I went to the students' class. They had one more class. And I said, "Look, your grades are already in. Don't say you're going to do this if you're not going to do it. How many of you would like to go to Avon, have a free lunch, and get a tour of the building?" And I don't know, 30 kids said "I will." We got there. I think five show up. And I said, I'm out of here. No more teaching undergraduate students. And I probably should've known that. That's a learning experience. Don't do that.

Q: Undergrads.

[02:10:49]

A: Yeah, undergrads. Very fun.

Q: So in your view – back to Hologic – but what big decisions led to their success over time?

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A: Well, the decision to broaden out of just bone density and get into – they didn't, in the beginning, know that it would be mammography. But to get into a broader field of medical imaging – a more mainstream field – was a huge decision. Second decision, to dump general radiography and concentrate on mammography. That was a big decision. The decision to buy LowRad. Are you going to start learning how to make equipment or are you going to buy

somebody who already knows how to make equipment and all you're going to do is modify it? That was a big decision.

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They happened to benefit – LowRad in Danbury, Connecticut was a well-known name. They had bought a bunch of other medical companies. But they were financially – I don't know what they did, but they overextended and Hologic picked it up for not much money. And that was a game changer for them. So I'd say those are the three big ones. Now they've recently moved to dermatology as a field. And I don't know. I'm sitting here just like you are and saying, is that a good idea? But I'm not at the top and I don't know what the reasoning behind it was. But it was a big purchase and you kind of wish them well.

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It's kind of like what DuPont went through when you decide, am I going to do this or that? They got rid of medical, not because medical was bad but because they had to. Now, what is the future of Dow, DuPont, and DuPont in general? It's hard. There's a neat infographic floating around, and it shows who the top 20 companies in the US by month over 20 years. And you just watch how big GE was, and Walmart starts coming up. Public Steel comes up, and then these come down. And Amazon – you know, the game changes. And to be successful for a long period of time is not that easy.

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And my son is a rocket engineer in Cape Canaveral, and he does a lot with SpaceX. And he is so excited about what's going on down there. And I get excited listening to him be excited. But who's going to be the winner, and how long will they be the winner? Lots of people are trying. Amazon are trying and Boeing are trying and Northrop Grumman, and SpaceX and everybody else. It'll be interesting to see how that plays out. For Hologic, the stock has continued to go up and leadership has been fairly stable. Steve MacMillan has been – probably ten years. And he came from medical equipment. He came from Striker in Michigan, a much bigger company.

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They made hospital beds and that type of thing. Boy, that was an interesting story. The board decided they had enough of Jack Cumming and he was out the door and they hired Steve MacMillan and brought him in. It was raining, and Steve had a terrible cold or strep throat or something, and they stood in front of all the employees on a live telecast and said, "I am your new CEO and we are going to change the game." And he did it. He's been very, very successful. Certain people can do that and certain people can't. But I've been fortunate to be with people like Jack Cumming and David Ellenbogen and Jay Stein and Tom McAndrews and now Steve MacMillan who can take it – can live through the bad things and play on the good things and make a success of it.

Q: So what parts of your career are you most proud of, and is there anything you might do differently if given the chance?

[02:15:01]

A: Well, I really think – you always think everything you do is great. I thought academia was great, and then I thought DuPont at five years was great. But I really think the medical career was absolutely a great way to end my – I'm 75 now. I retired in 2015 and then continued as a consultant full time for a year or two. So the fact that I could be working in my 70's doing something I love every day was just wonderful. And today you look at – most people don't have the chance. They're changing jobs every two or three years and they have to learn all new skills.

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I will say – I put a plug in for marketing. Marketing skills are pretty transferrable across businesses. You know, you're a good writer or you're not a good writer. You're a good communicator or you're not. You can learn to be a better communicator by doing some communication. And you know, marketing happens to be a field that is – I don't know if – I don't know how you teach people to be marketers. I think a lot of companies view it as a stepping stone. Like oh, that guy's pretty good at sales. Let's give him a stint in marketing. You wouldn't give him a stint in regulatory or legal, but you think, run him through marketing.

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And I think it's harder than that. I think marketing people are different. And they're driven by different things. And so, I would say the medical thing was the thing I'm proudest of. What would I change? You know, I do look back – you know, Hagley is putting investing in my father's studio. They're buying – not buying. They're donating all the films my dad made. My dad started making films in Hollywood in 1931 and he started his studio making industrial films in the 1940's and late '30's. And he's the last remaining – they don't make films anymore.

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They make e-learning and all that type of stuff. But they're the only one to survive. And when you think about, before television, how did you get your information? You got your information at the rotary or you went to the library and borrowed the film. Even when TV came out, a lot of the material was provided by companies. So, sponsored films. Dad had a wonderful career. He made the first TV infomercial for Vitamix, got to meet presidents Nixon and Reagan and all sorts of famous movie stars. That might've been a lot of fun.

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But I wasn't ready to go in the studio, and I don't think I could've run the studio. My twin brother tried it and lasted about a year and then got an insurance business. And my younger brother went in the steel business, and lived through all the – I don't know how many steel companies went under under him. But you know, he just retired. So, he's 72. And he worked in the steel industry his whole life, and basically in marketing. But steel is a lot – medical, wonderful. Steel, eh. Steel got creamed by the international competition and by pollution laws and by change in the development of plastics and just a lot of things happened in steel.

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So I think I would've – I've always been good at this, and I finagle a way. How come I ended up running the post office as a company commander in Paris when my twin brother goes to Vietnam? How did I finagle that? How did I finagle a job with DuPont when I was going to go be a department chair someplace? I'm a guy that is always looking for the best opportunity, see something that I think would be fun to do or I have some unique skill that'll help them do it. So, I don't know if I'd do anything else, although I'd wonder about the studio.

[02:19:14]

The studio thing is – I'm just learning about now with Kevin Martin and your staff. I had no idea. I mean, yeah, we went down there and played at night and stuff on the way home from school. Yeah, we had some idea. But I had no idea. My mother died at 102, and at the funeral, the owners of the studio came to the funeral and said, “Hey Jim, how are you doing?” I'd never met them, the new owners. My uncle took over and then these guys took over. And they said, “Why don't you come to the studio and take a look around?” My brothers and I did. And I said, “Hey, are all those little films still down in the basement?” And they said yeah, still down in the archive.

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And I went down and I came – took an OSHA class, grabbed a hold of Roger and Kevin and showed them some of the stuff that my dad left in the attic. And I said, “I think this is too cool. You guys ought to do something about this.” So they're preserving it, which is great.

Q: So do you have any other spots to share?

[02:20:18]

A: No, I think if I'm wishing something good to people, it's that you have good leadership. I'm back on that. I've always managed to avoid the people I didn't want to work with. So, Pam Cumming, from the entire time she was with me at Hologic was just a wonderful person. And then Tom McAndrews, a wonderful person. I never could figure out why he liked me. My junior academic guy, and why this guy was really high up in DuPont has me come to his staff meetings and sends me to Thailand and Australia and all over the world and stuff. I don't know. I just lucked out or found the right people to hang out with. And it's been a great ride.

Q: So, final thing before I turn off the recorder and we look at some videos, is there anything I haven't asked you that I really should have?

[02:21:10]

A: No. I realize I ramble a lot, but I can't think of anything that I wanted to say that I haven't already said.

Q: Great. Well, thank you so much.

[02:21:18]

A: Alright.

END OF INTERVIEW