



## **National Semiconductor Oral History**

**Charles E. Sporck**

Moderated by:  
Floyd Kvamme

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**Floyd Kvamme:** Why don't we start at the beginning?

**Charlie E. Sporck:** At the beginning.

**Kvamme:** Where were you--

**Sporck:** I was born in Saranac Lake in 1927.

**Kvamme:** Depression time, shortly after there?

**Sporck:** That's exactly right, at the beginning of the Depression.

**Kvamme:** Your family was wealthy?

**Sporck:** No, my father drove taxis. He had a one car taxi.

**Kvamme:** And did you have any hobbies that kept you busy or?

**Sporck:** Oh, now you're going further ahead here.

**Kvamme:** As a kid?

**Sporck:** As a kid, meaning somewhere between 0 and 12th grade, after birth, right?

**Kvamme:** Yeah.

**Sporck:** I was always interested in sports. And we always, because we didn't have a lot of money, we always worked. Newspapers - delivery mostly. But also, my father was a mechanic before he became-- he caught tuberculosis. In Saranac Lake, where I was born, and where the family had moved, it was a TB center. It was a recuperation center for people with TB because it was very cold and very dry. It was very good for your lungs. So that's why they moved there. And where am I going with this story?

**Kvamme:** Hobbies. He was a mechanic.

**Sporck:** Right. And he was trained as a mechanic. But he used to repair his taxi in the evenings. And I spent time with him at night, holding a flashlight and so on while he was working his car. So I got to be a very effective mechanic. And I used to work on cars a lot.

**Kvamme:** Interesting.

**Sporck:** We had a gas station. It was a national sort of thing to do. The people across the street, who were black, the man was also a great auto mechanic. And he would work on cars at night again. And I had the opportunity to go over there and hold the flashlight with him. And I learned a lot about automobile mechanics.

**Kvamme:** Yeah. And is that what caused you to decide on mechanical engineering?

**Sporck:** That's it, absolutely. I felt I really knew things, mechanical things, very well.

**Kvamme:** Yeah. And why Cornell?

**Sporck:** Cornell frankly was because my brother went there. My brother was a very, very bright guy. He was valedictorian of our class. We were always very proud of him. Because here's my father, a cab driver. And the town is full of doctors, medical doctors. My brother is the valedictorian of the school. He's the brightest guy there, the cab driver's son!

**Kvamme:** That's great. Is this Chris?

**Sporck:** We were very proud of that. And he got a scholarship to Cornell. I did not get a scholarship. I went into the service, and Uncle Sam paid for my time at Cornell.

**Kvamme:** Oh, so that's how you afforded it.

**Sporck:** Yeah.

**Kvamme:** And any particular recollections from Cornell that stood out and helped guide you?

**Sporck:** Well, what can I tell you here? I did get some preparation for the Wagon Wheel years. I never touched alcohol in high school or in the Army. But Cornell showed me some of the advantages of alcohol in reasonable restraints. The other thing about Cornell is that it is truly a very democratic-- when I say

democratic, not in terms of politics, but in terms of freedom of acts and opinions. A very democratic kind of--

**Kvamme:** Now, you didn't start at Cornell though, right?

**Sporck:** I got out of the Army in January, 1947. Yeah, 1947. And I couldn't get into Cornell right away, until some six months later. So I started going to school at a place called Paul Smith's College. It's a little college outside of Saranac Lake. And that was an interesting period. But it was only very short time.

**Kvamme:** Yeah. So you chose engineering because of this mechanic experience.

**Sporck:** Yes, very definitely. And I was always interested in mechanics. It turns out, mechanical engineering is a lot different than automobile mechanic tinkering.

**Kvamme:** Sure, lots of math.

**Sporck:** That was an influence, though.

**Kvamme:** And then, first job is GE?

**Sporck:** Yeah. I want to step back a little further there. While I was at Cornell, I had met this girl. Actually, I met the girl before I started at Cornell. Before I went in the Army, I was a lifeguard at a local beach. And my wife showed up, complete stranger, in a bathing suit. And I remember telling the lifeguard, who was a good friend of mine, sitting next to me, that I'm going to marry that girl right there. And I did.

**Kvamme:** That's amazing.

**Sporck:** Three years later.

**Kvamme:** So were you at Cornell at the time of your wedding?

**Sporck:** I just finished my sophomore year, and we got married. And my wife went to work as a librarian at the Kennedy School at Cornell. She paid for what money we needed that Uncle Sam wasn't providing, because I had just finished a couple years in the Army. And also, I started GE, working at GE at that time. Three months assignments about every two terms anywhere in the country, as a matter of fact.

**Kvamme:** And that was their co-op program, right?

**Sporck:** That was their co-op program, exactly right. Which was a great program.

**Kvamme:** Tell us a little about that. You don't see those these days.

**Sporck:** No, I don't think you-- a lot of companies, many companies, don't do it anymore. But GE was dedicated to that. And what they did is to-- first of all, you had to be in engineering courses. And you had to have a couple of years in engineering, so then you were of some value to them. And then, they took you into assignments, put you with some engineers.

I can remember going to the aircraft jet engine [factory] in Lockland, Ohio. And after the first couple weeks, we were testing jet engines, I mean literally. The Korean War was on, you know? And we were working seven days a week trying to turn out the jet engines for F-86 fighters. It was important, legitimate work, and good for us, and good for the company.

**Kvamme:** Yeah. And I would think good for young people to get an acquaintance.

**Sporck:** Absolutely. It was a valuable experience. And frankly, I worked for GE that way for going on three years because Cornell was a five year course in those days. And they hired me afterwards, and they hired me at a higher rate than-- it was still low, but they hired me at a higher rate than normal because I'd had that experience.

**Kvamme:** Sure, OK. Sounds like something maybe we've missed recently.

**Sporck:** Yeah. I think that's probably true. I don't know the reason for that, though. For example, at National Semiconductor, we used to take kids, engineers, and bring them in for periods of time at National on real jobs. Is that a universal? I don't know.

**Kvamme:** I don't think so.

**Sporck:** It's an interesting question.

**Kvamme:** So what did you do at GE?

**Sporck:** When I got out of school, and these repetitive assignments-- I was being sent around for even about a year after I left college. I was still being sent on these assignments. And then, they decided that I should go through the apprentice machinist program. Now, why they needed to do that, I don't know, come to think of it. But they sent us through nine months of apprentice.

**Kvamme:** That's in New York?

**Sporck:** That was in Schenectady, New York. Schenectady, New York is an interesting place. That was their biggest facility. They had over 55,000 employees there in their River Works. Now, they have 1,500.

**Kvamme:** Wow. Wow.

**Sporck:** The impact of things in the world.

**Kvamme:** Yeah, changing.

**Sporck:** But yeah, I learned to run a lathe, run a milling machine, you name it. Because, and I'd say it was the only value out of that, because obviously it doesn't help you as an engineer, but what it did do is that when I-- one of my later assignments after that was being a supervisor running a production line. It did give me an insight into what our employees were doing and what they were not doing. So there was some benefit to that. But I wouldn't recommend it to engineers in general.

**Kvamme:** Yeah. But do you think any of those experiences helped you in later manufacturing activities?

**Sporck:** Yes. Where it helped was in managing people, really.

**Kvamme:** Hm. Not necessarily on how they did, but what they were doing.

**Sporck:** At GE, yes, exactly. Handling people. GE, they weren't a leader in technology except in heavy industry. Steam turbines, they were a leader in technology. But in terms of semiconductors or something, they were certainly not leaders, as you know.

**Kvamme:** Be careful. I worked there.

**Sporck:** I know that. It just occurred to me. So you knew that, also. But in the heavy industry, they certainly were a powerhouse.

**Kvamme:** You were there quite a while.

**Sporck:** I was there going on nine years.

**Kvamme:** And what caused you to leave there?

**Sporck:** Well, it's an interesting story. And it's a story that's important to future questions you might ask because GE was a unionized entity, strongly unionized.

**Kvamme:** I remember.

**Sporck:** And the last assignment I had at GE was in Hudson Falls building capacitors. A very unionized shop. And I had this job running manufacturing, running production, on power factor capacitors. And the management, who I might say I rarely saw because they never got out of their offices. It's very different if we get around to talking about the move to California and Fairchild. The big change is that you've got to know everybody in the business.

At GE, I worked there eight years, nine years. I knew practically nobody except for my immediate boss. Entirely different environment. But I was given the job of putting a new method in for assembling semiconductors. The union rules--

**Kvamme:** The capacitors? Yeah.

**Sporck:** The power factor.

**Kvamme:** Yeah.

**Sporck:** To come up with a new price for assembly. The rule then was that you could not make a change in the price unless you had a methods change. So the powers to be in the front office decided, well, change the method out there. And we'll reprice it. Because the price was established probably five years earlier and nothing changed. It got to be better and better for the employees and less and less for the company.

Anyway, I came up with a new method, completely new method. And I was getting ready to introduce it. And I was preparing these guys. And of course, they were resisting. They don't want any change. And I was pushing this and pushing it and pushing it. And suddenly, the powers that be decided, the hell with it.

We're not going to change. Just continue it the old way. And I said, well, to hell with this. And on the way home that night, I picked up a Wall Street Journal. And there was an ad in the paper for Fairchild Semiconductor production manager. And I applied. They had me come down to Lexington Avenue in New York City. I can't remember the name of the hotel. It was August, hotter than hell in New York.

And I came up to this room. And sweating, and I rap on the door. And they open the door. And there was this guy, Fleckinger. And the general manager of Fairchild, Grady, Frank Grady, are there. And over in the corner is this table, loaded with alcohol, all kinds of alcohol bottles. And both of these guys were well into their cups before I arrived. And we had a great meeting, really. These guys want to drink and hire me? Fine, I'll drink with them. And they gave me an offer. I was making \$8,000 a year at the time. They offered me \$14,000, and I accepted. And they confirmed it.

**Kvamme:** On the spot?

**Sporck:** Pardon?

**Kvamme:** On the spot?

**Sporck:** On the spot, absolutely. I was ready to go to California. And there was no question about my wife because her father lived in California.

**Kvamme:** Had you been to California before?

**Sporck:** Never. Never been. Never been east of Lockland, Ohio. So I came home. And I told Jeanine, well, we're going to California. Put the house up for sale, sold it. Borrowed money off my old man, bought a new car. And we had one child at the time. And we loaded everybody up in the car and came to California.

**Kvamme:** So the reason really was a union problem?

**Sporck:** I would say that the union problem, I got along very well with the union. Very well with them. Matter of fact, most of them worked for me because I built houses on the side. And these guys worked for me building houses. They had to work harder there than they had to work at General Electric. But it was-- GE was a marvelous company, a marvelous manufacturing company. And you work for GE, as a refreshing, new idea, driving kind of company. That's not GE.

**Kvamme:** Not there.



**Sporck:** Just not GE. So we sold out. I left. And we stayed with my father-in-law for a short time until he made too much-- he spent too much time telling my wife how to raise the children. That was enough for Jeanine. And so we left, and we moved into Dinah's Shack here in El Camino. Remember that?

**Kvamme:** Oh, sure.

**Sporck:** Palo Alto. It's now Dinah's Garden Apartments.

**Kvamme:** Right.

**Sporck:** Not the Shack anymore. And then, I reported to work at Fairchild. And as you know the story, I went to the receptionist there, on Whisman Road, and I said, I'm Charlie Sporck. And I'm reporting to work here.

**Kvamme:** What was your title to be?

**Sporck:** Production manager.

**Kvamme:** Production manager.

**Sporck:** And they didn't know me from Adam. There was no record. And they called, kept calling around. Not only that, but they had hired somebody else for the same job.

**Kvamme:** Terrific.

**Sporck:** These two knuckleheads were drinking that day. They hired somebody else. So finally, Fleckinger, apparently he remembered, yeah, we did hire him. So they brought me in, put me on the payroll, and brought me to this office, this office in the back of the old Whisman plant. And he had already hired somebody else, and he was in there. And we had two desks, both for the same job. We didn't think about this. Think about how screwed up you can be. Two people for the same job.

These guys like Ed Pausa would come out. He was a general foreman. He would come in, and there were two guys there with desks. And which one would he go talk to about his problem? It was unbelievable.

**Kvamme:** So how long did that last?

**Sporck:** It lasted only a week, and he had the other guy disappeared. Why he disappeared, I don't know.

**Kvamme:** Amazing. So wild west then, pretty much?

**Sporck:** It was the wild west. It was the wild west, but at the same time, it was as exciting as hell.

**Kvamme:** Now, did you know much about semiconductors?

**Sporck:** Absolutely nothing. I'm a mechanical engineering. I knew nothing about semiconductors.

**Kvamme:** So how did you learn what was going on in the production line?

**Sporck:** Well, first of all, everything was very open. All these guys, we toured this place today. And all these guys, who were the founders, they were all there. Companies in California are not like they are in the east coast. They're out there with people. If you want to talk to the general manager of Fairchild, you just go to his office and talk to him. Different, entirely different environment, and much more effective environment.

**Kvamme:** So it was on the job training?

**Sporck:** Exactly. I mean, I knew nothing. But when the problem arose, these guys participated.

**Kvamme:** These guys being the Noyces.

**Sporck:** The Noyces.

**Kvamme:** And the Hoernis? All that?

**Sporck:** And they were working in the factory all the time, too. Not so much Bob because he had a lot of administration issues, but these other guys were all hands on people, like engineers. Many of them were PhDs, but they were hands on, dirty hands kinds of people.

**Kvamme:** Now, what kinds of volumes of devices were you trying to build in those early days?

**Sporck:** We were building transistors. And not a great deal of volume because of our limited facilities. We started, we were growing in size and running out of space. The first effort was to find another location. And we started looking in the United States. And we found one in Portland, Maine. And we started a facility there.

I have to say, Bob Noyce was the first guy to say, instead of building these things in Portland, Maine, why not go to Hong Kong to build them? Because he had already established a pocket radio plant. He was building transistor radios.

**Kvamme:** Privately?

**Sporck:** In Hong Kong, his own little plant, very little, very small. And he knew what the wage differences were. He knew the availability of engineers and the wage difference there.

**Kvamme:** That's fascinating.

**Sporck:** And he said, we really should try this. By then, I had become sort of the general manager. Bob was a marvelous boss. If you performed, boy, he promoted you, and he backed you. And he was truly a nice guy. If he had a fault, he was too nice. He had trouble saying no. But he was a marvelous person to work for. And he had promoted me a number of times. And he gave me the job to go over to Hong Kong with Julie Blank. Julie Blank is one of the founders of Fairchild. And we saw his factory, which had a lot of-- Bob's factory, I have to say, there was a lot of room for improvement there. And then, we surveyed around the mainland side of Hong Kong and picked a place on Hang Yip Street just beyond the airport there for a location. We leased some space in the building. And we started an assembly line.

**Kvamme:** So you made the wafers here?

**Sporck:** We made the wafers here and tested them here at that time. And we shipped-- it was transistors. And we shipped them to Hong Kong. And they assembled them and tested them, finished testing them, many of which they sold right there, sold in the Orient. And it was a winner. It was the first offshore assembly plant for semiconductors that I'm aware of, for Americans.

**Kvamme:** I think that's true.

**Sporck:** I think it's true. And it was tremendously successful.

**Kvamme:** Cost was obviously a driver. Were there other drivers?

**Sporck:** I would say that the quality was excellent probably because we had engineers working as foremen. And they were, it turned out to be, very good at handling people, but also understood the importance of real care in terms of the quality of the product. It was a very, very successful--

**Kvamme:** So then, you must have started to have some volume, though.

**Sporck:** Pardon?

**Kvamme:** You must have had some volume requirements by then.

**Sporck:** By the end of the first year, we're turning out hundreds of millions of transistors, huge numbers. And we increase, so we were encapsulating there. We're testing there. We were actually dealing with the customer there, too. Because we had a salesman--

**Kvamme:** This might be taking you earlier a little bit, but when did you first say to yourself, this semiconductor thing is real. This is a real business.

**Sporck:** By just listening to Bob Noyce. He was such a proponent of it. It was going to take over the world. There was just no question of it. And we were all believers. He was an easy guy to follow. He was a real winner.

**Kvamme:** Yeah, interesting guy. You've already talked about this a little bit, but the other members of that originally, you mentioned Bob, Gordon, Jean Hoerni, Tom Bay, not the original eight, but--

**Sporck:** He wasn't one of the original eight.

**Kvamme:** What was it like working with that crowd?

**Sporck:** I'm sorry, pardon?

**Kvamme:** What was it like working with those other individuals?

**Sporck:** Well, they were all different. Some of them were very strange. We already mentioned Jean Hoerni. Very difficult guy to deal with, but brilliant as all hell, and a hard working guy. So you can deal with a pain in the butt person as long as he's performing. And he used to perform.

**Kvamme:** Yeah. What about Tom Bay? You were good friends.

**Sporck:** Tom was, of course, the marketing manager. And I'm the manufacturing manager. And one of the real strengths of Fairchild in those days is we liked each other. We really did. And we would talk. We planned a lot. He would-- when we looked at entering, selling devices, most of our devices at the very beginning were sold in the military. It was later when we approached Control Data, like we were talking about earlier, that's a different price issue. There was a lot of lower price. And Tom wanted it. He'd go after that business. And he'd talk with me about, where are we going cost-wise? And we'd make a commitment. Let's go get the business. We'll meet the price. It was a very good arrangement.

**Kvamme:** Did you have much interaction with Gordon Moore?

**Sporck:** Actually, for a while, Gordon worked for me, which was kind of ridiculous because I knew absolutely nothing about what he was doing. I think in Bob Noyce's mind was that, well, he needs some kind of experience. Have him go up there and help run R&D. I talk about it like a duck out of water. It was crazy. But Gordon was an easy guy to work with, so it was never a problem.

**Kvamme:** Now, you're also credited with having determined that this transfer process from R&D in the semiconductor business was kind of a bad idea. Can you tell us a little bit about that? Because I think that's a standard that has now been adopted since almost those days.

**Sporck:** Right. We had great problems in transferring products from R&D. Realize that the first transistors were developed right there in the factory. There was no transfer involved. These guys, the original eight, were down there doing their thing on the same lines as it would move into production with. But later on, we got to the stage where the transfers were being made, or fully developed.

**Kvamme:** Because R&D had been set up, right?

**Sporck:** Fully developed in R&D, and then transferred to the factory and on the wafer fab. And it was a problem. There was some expertise lost in the transfer. There was also probably a certain level of competition existing between the people developing the product in R&D and the people absorbing it in the factory. There was a lot of conflict there.

And over time, we gradually moved back to what existed originally at Fairchild, that the product was developed right there in the factory. To a great extent, that got to be the case for most products unless there was some really exotic change. And I think that got to be standard practice that the development work was done right in the same factory. It was the case when we left and went to National. It was the case there. It was the case at Intel. I think it's probably broadly the case.

**Kvamme:** I think it's standard in the industry today.

**Sporck:** Yeah. These transitions are difficult. People wise, they're difficult.

**Kvamme:** So you have this great job, you're general manager of Fairchild, a name company going like gangbusters. What ever got in your mind to go someplace else, do your own thing?

**Sporck:** Well, I think it was part of the culture. You got all these young guys trying to make it big. And many of them are leaving the company and starting other little companies. And it's working. And it occurs to you, and you're talking to your friends, and they're telling you, we ought to do something. It's hard to resist! It's hard to resist the challenge. It's hard to resist the opportunity of being a big frog in a little puddle.

**Kvamme:** How did Bob take your leaving?

**Sporck:** Pardon?

**Kvamme:** How did Bob Noyce take your leaving?

**Sporck:** He had already decided to go to Intel.

**Kvamme:** Oh really?

**Sporck:** Yeah. He hadn't announced it. And when I told him that I was going to leave, he said, well, let's go out to lunch. And we went to lunch. And it was at the Chez Yvonne, if you remember that place. We had a couple of gins on the rocks. People drank in those days. I've talked to my grandson now. They don't drink. It's a different-- and it's probably better.

**Kvamme:** Probably better, yes.

**Sporck:** But anyway. And he told me, he said he was leaving and starting a company. And Gordon was going to go with him, and Andy Grove was going to go with him. And he said, we need to talk about combining our companies.

Well, I didn't see how that was doable at that time. We talked about that once more about two years later. And it was even less likely to do it then. Anyway, he went off founding Intel. And I went to National Semiconductor.

**Kvamme:** How did the National thing happen?

**Sporck:** OK. It turns out that Fairchild was very strong in linear circuits, primarily because of two people, Dave Talbert and--

**Kvamme:** Bob Widlar.

**Sporck:** Bob Widlar. And both of which had left Fairchild and joined National. And about a year after they left, Dave Talbert approached me and said, you know, this National is really a mess over there. We really need somebody to straighten this out. And that was kind of interesting.

I had been talking to another company, Plessey, in England. And god save us, we didn't progress there all the way.

**Kvamme:** We came close. We came close!

**Sporck:** Would have been a nightmare. That's a separate story. Anyway, a conversation with David Talbert progressed, and I ended up meeting a guy who was in the venture capital business who talked further. And it seemed like a reasonable deal, taking over at National. They already had an operation in Silicon Valley. They already had the best design guy in linear circuits working for them. And I had already made some contact with a few guys, those people that you know, at Fairchild, who were interested in leaving. And we made a deal, and we moved.

**Kvamme:** How did you differentiate National from what Fairchild was doing, or did you try?

**Sporck:** National was doing very little right. And we fortunately were given the power to change whatever we wanted. And we went over it with a group of people who were very effective-- yourself included, as you remember. So it was just a matter of what we considered doing it right. And it was, overall, right.

And we didn't have a lot of money frankly. So we had to be, in many ways, brutal about it. Get it done and get it done fast. But it worked.

**Kvamme:** Yeah. The '70s showed-- I mean, there was explosive growth during the '70s. And what do you think drove that?

**Sporck:** Well, speaking for ourselves, it was obviously selling product into commercial areas. Most of these companies started in military product, very high quality, very high reliability, great performance and so on, very high price. It was not growing enough to satisfy our motivations in terms of size. And the only way to do that is to go commercial, which means we had to go down dramatically in price, which means we had to go down dramatically in cost. And that drove-- it worked. In a relatively short period of time, it became a bigger business than the military business.

**Kvamme:** One of the things you then did, of course, was go back to your Hong Kong strategy and start doing business in Southeast Asia, plants out there. You had a lot of them. Tell us how that all started from the National point of view.

**Sporck:** Well, when we left Fairchild, we decided to leave-- we considered Hong Kong as a location. But Fairchild was already there. Fairchild was dominant overseas. So we looked elsewhere. We looked in Taiwan. I looked in China, in Korea. And then, I got this call from a guy in Singapore. He says, you really ought to come down here and look at Singapore. It was a guy who used to work for me. And I said, I've never been to Singapore. I'll go to Singapore. And Singapore is a marvelous place. It's not a democracy. It's far from a democracy. But it's a great place. Lots of hard working Chinese guys down there.

So we set up. I remember calling Fred Bialek and saying, Fred, you gotta come over here, and you've got the start of an operation here in Singapore. And it was successful.

**Kvamme:** Now, for some reason, then, you started multiple operations. So you didn't let any one of them get too big, right?

**Sporck:** Right. We didn't-- what we were concerned about, first of all, is Singapore had its risks. The guy who ran Singapore was like a dictator, Lee Kuan Yew. He was not a democrat in the sense of freedom at all, and who knew what was going to happen there? So we, shortly after we started there, we started looking elsewhere, too. And we found a marvelous place in Malaysia in Penang. That ended up being a super facility. And lots, again, lots of Chinese workers, who were marvelous workers.

**Kvamme:** Did you have any particular idea about what size these could get to? I mean, Vietnam's going on. Asia, there's issues there. I mean, did that worry you?

**Sporck:** I can't say it did. I'm a manufacturing guy, and it just struck me as any size, just keep producing more and making at lower cost. And frankly, we started, we had around four different factories running at



the same time. So if we had a problem at one, we had the alternative to go elsewhere. No, I can't say that--

**Kvamme:** Yeah. Now, did you ever have any union problems out there? We spoke about unions earlier.

**Sporck:** We never had any union problems in the Orient at all, never any interest in anyone. But we had union problems in Silicon Valley, especially in the diode facility.

**Kvamme:** That was back to the Fairchild days?

**Sporck:** That's right, and that's exactly right. Fairchild. I get mixed up. We ended up buying Fairchild, so it's like one. But yeah, and Fred Bialek was running the diode facility. And most of-- go a few steps back. Most of us at Fairchild came from the east coast, big union facilities. And we saw how disastrous that was to company success. We were dead set against unions.

Started with Bob Noyce. He worked at Philco. That was a disaster. I worked at GE, disaster. And it just permeated all of our thinking. So when the unions tried to penetrate-- there weren't any unions at the time in Silicon Valley. They tried at a diode facility. And we worked really hard. We find out who the executives were in the union. And we plastered the pay scales that they were getting, the money they were making. They were making more money than Bob Noyce, general manager of the division.

**Kvamme:** Now, when you went to National, and I think you had this at Fairchild as well, you were behind the notion of stock options for everybody.

**Sporck:** Which started at Fairchild.

**Kvamme:** Is that trying to making them owners as opposed to wanting to organize?

**Sporck:** Exactly. Be a participant.

**Kvamme:** Be a participant.

**Sporck:** Unions in the east coast, I don't know about now, but then, they were destructive to the company. The way they sold themselves to employees was, that god damn company! Those bastards! We gotta get 'em, that kind of attitude. It was very destructive. And we changed that around. One of the things we did was give employees, all employees, stock options.

**Kvamme:** Yeah. I mean, that was unique in the country, right?

**Sporck:** It was unique in those days. Now, it's pretty common, I think.

**Kvamme:** Well, there's some changes happening on that, unfortunately.

**Sporck:** Yeah, I wouldn't doubt it.

**Kvamme:** Back to the Far East, as the '70s go, of course, the volumes are going straight up. You pioneered automation in those plants. But yet, you left them out there. Can you talk a little bit about why you did that?

**Sporck:** Well, automation in a primitive sense. We certainly automated the lines from the stand point of lead bonding and die attach and so on and testing. But to integrate it entirely, for example, like TI did, never really seemed to make sense to us. And to this day, it doesn't make sense to me. I don't think TI continued to do it. I don't know that for a fact, but I suspect they didn't. I guess the amount of flexibility it gives, having these individual stations, trumps--

**Kvamme:** So with the automation you did do, though, you were never tempted to bring any of that back to the US?

**Sporck:** Because what had happened, Floyd, in the meantime is we got these major reductions in cost from wages. But we got major reductions in engineering costs. We got major reductions in sales costs. We got major reduction in shipping costs. The overhead cost in a business like that is much larger than the labor cost.

**Kvamme:** Sure.

**Sporck:** The overhead cost is much larger. And that dramatically changed, dramatically changed. Instead of paying-- like, when they hired me at GE, they paid me \$8,000. You were hiring engineers in Hong Kong, PhDs, who you're giving a couple thousand dollars a year. Major change. And we've had this discussion before, you and I. You can't overemphasize the impact it has an overhead cost. That's a tough nut to crack.

**Kvamme:** Now, from a--

**Sporck:** You can't automate it away.

**Kvamme:** Yeah, right, sure. From a fabrication point of view, you then also in the late '70s started to do things outside of California. What drove those decisions?

**Sporck:** Well, in those days, if you remember, we were running out of employees to find in California, Silicon Valley. There were a lot of competitors hiring the same people. We started a wafer fab facility in Portland, Maine, very successful. And later, National started in Texas, Dallas as a matter of fact, and in Europe. We never did in the Orient, but I'm sure that's something that would have happened ultimately.

**Kvamme:** As they did with the Chartereds and those others that came in there.

**Sporck:** Exactly.

**Kvamme:** Late in the '70s--

**Sporck:** One point there, before we leave that for a second. I think it's frequently looked at, well, you're going offshore. You're just giving up! The fact of the matter is our employment in the United States kept growing throughout this period, but they were good jobs.

They were engineers and management and so on. The employment level kept growing while we were still growing. It was allowing us to meet the Japanese competition. We didn't end up being Kodak and General Electric in the semiconductor business, and all these other companies who disappeared because they couldn't beat the competition. We beat the Japanese.

**Kvamme:** Yeah. That's exactly where I was going to go next. The late '70s, the Japan threat. can you talk about what you saw there?

**Sporck:** Yeah. Again, I want to go back to that. We came from the east coast, many of us, some of us.

**Kvamme:** I worked there for a couple of years at GE.

**Sporck:** Sure, you're an easterner too, right? And we had worked at companies back there who had been destroyed by the Japanese. And I say that not with negative connotation, but they really wiped us out in a lot of areas. I worked specifically on TV at GE. And you can drive by that facility now. It's still empty. It still hasn't recovered.

**Kvamme:** Amazing.

**Sporck:** Go in Rochester, drive by Kodak. It's empty! Nothing there. That didn't happen to us. We knew the dangers. And we damn right well weren't going to let that happen to us. And that meant we had to compete in their cost. One of the great things we did, interesting things we did, is we sent a group of assemblers, females assemblers, with a foreman and an engineer, to a customer in Japan who was in the semiconductor business.

And they toured the factory. They were there for a couple months, just looking at what they were doing and how their society worked. And they came back with a beautiful story, which we made a film on it, you remember? This was at National. And that film showed the thinkings of the foreman and so on, and the employees, and how pro-company they were.

**Kvamme:** Collegial.

**Sporck:** Amazingly pro-company. How the foreman put a priority on the company into his family. And it was just completely different than our environment. But it was something for all our employees to see, how that competition is tough. And this is what we're going to have to address. Interesting. As a matter of fact, you know, that film must've been in the National archives here somewhere.

**Kvamme:** Yeah.

**Sporck:** And it would be nice to grab a hold of that somehow. I don't know where that would be. TI has got it now, apparently. It would be a nice thing to try to find that.

**Kvamme:** So this threat is there. And other semiconductor manufacturers and you are talking about this. Can you talk about how--

**Sporck:** OK, I see where you're going there. One of the things that did occur is the semiconductor industry was a tremendously competitive, knock them down, fight them, kill them environment. But this new element, suddenly Japan is the threat. And interesting things happen. Suddenly, we started talking to each other, and talking about, how do we meet this threat? How do we marshal our forces in areas that we don't compete with them and make progress in a fashion so that we could compete more effectively? And that led to SEMATECH.

It led to a grouping of companies where they weren't cooperating in the area of design. But they were cooperating in the area of manufacturing expertise. And to this-- and we formed a company. We sold the government, especially the military, the Pentagon, we sold the Pentagon first--

**Kvamme:** Now, who is "we" in that sentence?

**Sporck:** Individuals, CEOs. We were very good at this. You could go, and as a CEO, you carry a lot more weight.

**Kvamme:** You were involved? Bob Noyce was involved?

**Sporck:** That's right, Bob Noyce was involved, sure, Jerry Sanders. A number of CEOs. I'm trying to think of the guy's name at TI. He wasn't the CEO, but he was a very high level manager. And we talked to the Pentagon about the fact that, you know, semiconductors are very important to you guys. And you don't want the same thing to happen to the semiconductors that happened to the camera industry and TV industry and so on. Without semiconductors, you're nowheresville. And it's true.

And they realized it. And they backed us. And they told Congress that we really need to support this effort. And they made a commitment through DARPA of \$100 million a year for the set up of SEMATECH to work on a cooperative effort to focus on the manufacturing elements of semiconductors. And that outlet still exists.

**Kvamme:** Yeah. And the government's no longer involved, are they?

**Sporck:** They're no longer involved. Just a company. As a matter of fact, we even have Japanese members now.

**Kvamme:** Interesting.

**Sporck:** The world has changed. Because they didn't win.

**Kvamme:** No, no. If I could jump way to the current situation, I realize you're long retired, but as you look at the China question that's faced by companies today, do you think there's an analogy to what you faced with the Japanese thing?

**Sporck:** Yeah, I don't know. I have to say, to start with there, that when I think of China, I think about the workforce. The Chinese are tremendously hard-working people. They're just awesomely hard-working. They are tremendously capable engineering-wise. This is real tough competition, really tough competition. Now, where they're going, I don't know. I worry a lot about where that is going.

**Kvamme:** As we look back to that situation in the late '70s, early '80s, do you think our rate of innovation is what actually also helped us?

**Sporck:** No question about that, yeah. That's the marvelous thing about the Americans, they're free thinkers. They're not regimented at all, especially here in California. California's as wild as can be.

**Kvamme:** Let me take you to a totally different topic. National, along with a lot of other semiconductor companies, got into the systems businesses in various shapes and forms about the late '70s, early '80s. Everybody got in. Everybody got out. Talk to us about what happened there.

**Sporck:** Well, you gotta start back in the semiconductor business. You got all these young guys starting companies and so on. And we acquired a feeling of insurmountability. We were just winners. It doesn't matter what the hell we do, we were going to win. The first roadblock we ran into was memory. The harder we worked on it, the more money we lost!

Memory was a very sobering experience. I can remember memory prices going from, I don't know, being at \$30 apiece and going down to \$3 in a matter of months. It was just hopeless. All of us struggled with it. Intel, which was a very capable company technologically at this time, they fought it and fought it and fought it and finally said, I give up! They got out of the business. I think there's only one memory company left.

**Kvamme:** Micron.

**Sporck:** Yeah. How the hell they do it, I don't understand. It must be magic. That's what really led us to-- we automatically started building everything that materialized because we felt we could do everything. And that led us to say, well, we gotta make calculators! We gotta make cash registers! We gotta make add on memory! And we gotta make computers! You had this feeling that-- all of these, our customers, we know them very well. They're not very smart! We're better at anything! Bullshit. We're not better at everything. And we should have stuck to making--

**Kvamme:** Now, some of those you made some money at, and others, you never made any money at, right?

**Sporck:** Yeah. Cash registers, we made. We made money in computers for a while. But it was a no win road. Where are you going? You had IBM there. You're selling them through-- I'm looking over at Dave to see if he agrees. You're selling them through, who's the Japanese company?

**Kvamme:** Hitachi.

**Sporck:** Hitachi.

**Kvamme:** Fascinating time.

**Sporck:** It was, yeah. It was a great period because we made a lot of money doing that, for sure. But where does this go? And I'm sure there are differences of opinion as to where it could go. But when Hitachi went after IBM, you remember that?

**Kvamme:** Yes, I remember it well.

**Sporck:** That scared the hell out of me. I'll be perfectly honest. It scared the hell out of me. And that's when we sold our computer effort to Hitachi. Making a lot of money selling it, that's a fact.

**Kvamme:** Turning to some more general things, could National Semiconductor or for that matter Fairchild have happened anywhere else but Silicon Valley?

**Sporck:** That's a good question. I mean, there's a lot of places trying to duplicate the same thing. New York City is working with Cornell, as a matter of fact, on trying to do something similar in New York City. Are they going to succeed? I don't know. Silicon Valley was just a whole bunch of different things happening at once. Part of it was just the environment in California, wild, young, youthful. California was made of up people who came here, like people came to the United States.

**Kvamme:** And failing wasn't all that bad a thing. Failing wasn't that bad a thing. It was OK.

**Sporck:** No, because-- well, once you get started, you fail at Fairchild, you go across the street and go to Signetics. You could take the risk. They've tried, you know? Got a whole bunch of people who are trying, doing the same thing and they're trying again in New York with lots of money going into it. The CEO of Qualcomm, I think, is putting over \$100 million into that effort. That's big cash.

**Kvamme:** Real money, yeah. What do you think has changed in the Silicon Valley ecosystem since you were active? I assume you still hear stories from here. Do you think the Valley is different today?

**Sporck:** The only thing I can address there is my direct experience with my grandson and grand children. I have a grandson who is working now. He was working at Pat Brocket's company (Summit Microelectronics), which was purchased by Qualcomm. So he works for Qualcomm now. He and his friends are all engineers. They don't live the same way we did. We would spend too much time at the bar in Wagon Wheel, pure and simple. We spent too much time in the Chez Yvonne Restaurant. We were increased-- the east coast raised men who enjoyed alcohol. And these kids don't. They don't drink. They work unbelievable hours. But they don't go to the Wagon Wheel and drink after work. And that's a big change. And it's a big plus. I would be-- I'd have a tough time competing with them.

**Kvamme:** The tools that they have to work with today, of course, their work can be with them all the time. Do you think that's a factor?

**Sporck:** That's interesting. You're absolutely right. They do a lot of work at home. It just comes with them because they're so computerized, yeah. Yeah, I don't know.

**Kvamme:** Yeah. Actually, you just mentioned your grandson. When you give him advice today about Silicon Valley, what do you tell him?

**Sporck:** Ha! Mainly I tell him how I want to see some propagation going on. I need great grandchildren now. That's the first thing I told him after he got married. I almost ruined the wedding right there. But yeah, they are-- these people are hardworking kids. And they got it right. They don't raise hell like we did. Many of us did, not all of us. What advice do I give them? God, they can give me advice, frankly.

They're good kids. And I can't ask for plainer living, good, family people, than what these kids are. So what can I tell them? I've just got old, terrible stories to tell.

**Kvamme:** You've already kind of covered this, but let me just introduce it one more time. This general environment, like you said, you were on the east coast. I spent some time on the east coast. And the environment difference is huge. And you wonder how long that's going to be like that. Because it still seems to be that way. I mean, as you compare them, in some respects, in the east coast, they're too much in their offices, it seems like.

**Sporck:** That's the big difference. I mentioned it a number of times. California is an open environment. It's a wild environment. And that means it probably contributes to creativity. And the choice is there. You don't



have to work at Fairchild. You can go to work at National. You can go to work at Signetics or whatever. And there's the willingness to change that.

Now, I worked at GE capacitor department in Hudson Falls, New York. If I quit the company, I got no place to work. There's nobody else there.

**Kvamme:** Company town.

**Sporck:** I could go work for the paper company, make toilet paper, and that's it. So the environment, the real issue is, can you duplicate Silicon Valley elsewhere? And that's a good question. I've heard many ask that. I don't know, because I think there's 20 different things that contribute to it. How do you get all 20 lined up? I mean, something as simple as Moffett Field Navy Base letting officers go who became foremen. They're ideal foremen! These were fighter pilots. I mean, just lots of these things happen at the same time.

**Kvamme:** Yeah. We're getting close to the end here, at least from my list, but what was the most fun thing you did in your career?

**Sporck:** Hm. Buying Fairchild. I remember, and this is just-- I was a spoiled brat-- the satisfaction of taking-- not Bob Noyce, but Tom Bay was with me. And we had just bought them. And Tom and I went over for a tour of the place, our old offices and so on, and toured the factory. I must admit, it's stupid and absolutely stupid. But it was-- yeah, I used to work here, and we bought the damn place.

**Kvamme:** Yeah, I now own it. That's interesting.

**Sporck:** It was interesting.

**Kvamme:** Yeah. On the other end, what was your biggest low?

**Sporck:** TI buying National. You remember, they were very competitive.

**Kvamme:** Oh, absolutely.

**Sporck:** TI is a good company. No problem with TI at all. But we were very competitive, especially in digital.

**Kvamme:** Yeah.

**Sporck:** Then suddenly, they bought us. That was a low spot.

**Kvamme:** Yeah.

**Sporck:** Shouldn't have happened.

**Kvamme:** One last area I want to talk a little bit about. Integrity and values in the Valley, I think, have been some of the Valley's-- that you and other Valley pioneers started with really permeate this Valley to this day. I think they're different than they are elsewhere. We fought competitively, but by and large, the folks were honest, hardworking, and high integrity people. How did that happen?

**Sporck:** That's a good question. I don't know. It was here when I got here. I think Bob Noyce was that kind of person. I mean, my circle of view was around Fairchild. And that was Bob Noyce. He was a very straight target guy. He was not the least bit devious. He was what you got.

**Kvamme:** No hidden agenda.

**Sporck:** When they called him the Father of Silicon Valley, right on.

**Kvamme:** Isn't it amazing how long that has lasted?

**Sporck:** He was such a nice guy. He was successful and nice at the same time. There's not a lot of us who fall in that category. And he was a womanizer. How can I say that? He was. That's why his first wife left him. It's garbage stuff now, but he was still nice all the time. He was nice to all of us.

**Kvamme:** Very pleasant guy.

**Sporck:** Nice to all these people.

**Kvamme:** What have I not asked you that you'd like to talk about?

**Sporck:** Do you have the answer to how they can create Silicon Valleys elsewhere? What does New York City lack in this effort to try to-- they've got money. They've got lots of people there. They've got Cornell, who's trying their damndest also to make this work. What do they lack?

**Kvamme:** Well, I don't know the answer to that, obviously. But let me say that I think the one thing that a lot of these places have tried to do this with is with government involvement. And government is great at putting money into things, great at getting things started. They do not know when to stop. They don't want to kill anything. And part of the value of the Valley has been that ideas get started. If they don't work, they get killed.

**Sporck:** Kill it and go on.

**Kvamme:** Kill it and go on. And that's a sensitivity that doesn't exist, and government is just not capable of.

**Sporck:** Once you're on relief, you stay on relief.

**Kvamme:** You stay on relief. They don't solve it. At least, that would be the one thing that jumps to mind.

**Sporck:** It's an interesting question. I do not have the answer to it.

**Kvamme:** But having the venture industry properly structured, because a lot of that has gotten too professional also, is kind of necessary. People who have done things, been in companies, helping develop people also, you've got to get the local folks tied to it. You think about it here, most of the early venture people came out of the industry. Or a lot of them did.

**Sporck:** Yeah, a lot of them did.

**Kvamme:** Anything else?

**Sporck:** That's it.

**Kvamme:** Charlie, been a great pleasure. Great seeing you again, and particularly after just two weeks. It's amazing. See you next two weeks.

END OF INTERVIEW