Interview with
Peter J. Sprague
Menlo Park, November 13, 2012

RB: Hello, I'm Robert Blair. I'm standing in for Rob Walker, the founder of Silicon Genesis Program at Stanford. This late 2012 interview with Peter Sprague, we will talk with Peter about his history in the semiconductor industry. Peter's family name – Sprague - is famous in the electronic component world, Sprague Electric Company. Peter did not actually work for the family business. He had other plans. He attended Yale, MIT and Columbia and grew up on the east coast. Early in life, Peter spent time in France, Hungary, Switzerland and Iran. His semiconductor career began in earnest in 1964 when he invested in a small, almost bankrupt semiconductor company in Connecticut called National Semiconductor. Soon thereafter, around 1966, he became chairman and was instrumental in the hiring of National Semiconductor CEO Veteran Charlie Sporck in 1967. National Semiconductor was relocated to Silicon Valley and the rest is history. Peter remained Chairman of National Semiconductor for over 30 years. He also had wider interests beyond the semiconductor industry which included chairman of Aston Martin Lagonda Ltd, a U.K. luxury car maker. Let's talk now to Peter about his interesting semiconductor history and some of the other things that he's done in his life. So Peter, welcome to Silicon Valley. Begin by telling us, if you would please, where you were born and a little bit about your upbringing and where you went to school.

PS: I was born in Detroit, Michigan, left at the age of 11 months. I don't think it had anything to do with Detroit but moved to a town called North Adams, Massachusetts where there was a company called Sprague Electric. And Sprague electric had been founded by my uncle and my father joined him about a year and a half later, so that was sort of 1924 to 1926 and they made capacitors. My father invented a tone control for radios that I think in those days actually had a wire going to a crystal, the famous crystal radio. Then oddly enough their father had grown up in the 1860s and his parent – his father – his mother died and his father disappeared to the west and he was raised by an aunt. So effectively he was an orphan in North Adams and he was a bright orphan and he wanted to go to West Point and so he went to Springfield probably in something drawn by a horse. And the exam there wasn't West Point. The exam was Annapolis. So he went to Annapolis and he went with Perry to Japan and eventually became the Secretary Gen – he went AWOL and became the Secretary General of the electrical section of the Paris Exposition. He was supposed to cover it for six weeks and he stayed for two years and wrote a paper which was the third book in the history of naval intelligence on generators and motors. And came back and worked for Edison for a while who had a bad habit of patenting everything that anybody around him invented, as well as what he invented. And my grandfather wanted to patent his own stuff so he went off and basically as the inventor of record of the trolley car and the elevator. There's a recent book by the MIT Press on Frank J. Sprague and he's in Wikipedia. So anyway, he – that was my grandfather but he would've been my great-grandfather. My fore father was born late in his life and so I had a

sort of background in things that were electrical. But North Adams was about as unprepossessing a place as you can come up with. They have finally bailed themselves out by creating a thing called MASS MoCA which is a spectacular museum in the old mills of Sprague Electric. And then we got fancy and moved five miles south towards New York. Went to Williamstown, so I kind of, to the extent that it happened, grew up in Williamstown. I was in a real hurry which may reflect in some of the – the rest of the story in a sense that my mother ran the school in Williamstown, the private school. I got so tired of going to my mother's school, I went to the public school. There were only two schools in town. Then I went to Andover and I didn't like that much. And I flunked French so my French teacher decided I could go stay with his mother for the same price as going to Andover and summer school. And that was fun and that opened my universe to Europe and I lived in a village in the south of France in '54. And then I finessed myself into a playboy finishing school called LE ROSEY which takes two years to finish you and I was only there one year but it was where the Aga Khan and the Shah of Iran and Prince Rainier went. I'm a long way from high tech at this point. And I wrote a thing called www.Sprague.com and I write stories. But I got into Budapest during the revolution and my first job when I was 17 was working for a newspaper when the Hungarian Revolution broke out and I was in Switzerland. I decided that was going to be the last story and the last revolution that was ever going to happen in the world and if I missed it, I'd miss life. So I went. So basically I was a fairly pushy kid. I got married when I was 20. My wife came from Eastern Europe, was one of 17 women accepted at MIT. Went to Harvard instead. So we got married in the middle of her sophomore year and the middle of my junior year at Yale and her sophomore year at Harvard and I commuted back and forth with some difficulty. And then I went to MIT following a professor named Karl Deutsch who was a disciple of Norbert Wiener, spoke as Wiener did, about 17 languages and was trying to apply the theory of cybernetics to communication flows in bureaucracy and politics and what-have-you. Wrote a book called *The Nerves of Government*. And then I went on to Columbia. My first job was advising American travelers to the Soviet Union and Eastern Europe because I'd spent two summers in Moscow and I spoke some Russian working for United Press in Moscow. And while I was a student and I was doing that, I also started a company in Iran. I mean, I was in a real hurry so somehow – I don't know what, looking back, I was in such a hurry for. Been a long life since then.

RB: What attracted you to the activity in Hungary at the time Peter?

PS: To do what?

RB: What attracted you to the activity in Hungary at the time?

PS: Mostly kids fighting in the streets. I get very – I don't know which came first. I mean, I worked – by that time – I think it was just – I was a journalist and it was a story. I honestly don't – I got there and I took the photographs and I sold them to the United Press and I sold the story to Associated Press and I got a job in Moscow covering the Nixon debates and I was basically a photographer. And I loved it but the photographers are the poor bastards who go out, find out

what's actually happening and come back and tell the journalists, who are sitting at a bar, what actually went on. But you can't take pictures if you're not there but you can write stories sitting at the bar. And I was a pushy kid with sneakers. And the life expectancy of pushy kids with sneakers doing that kind of photography is not good. But when I came out of it I got held by the Russians for a couple of days. Nothing unpleasant really happened and I got really fascinated with Eastern Europe and it began to mesh with the education I was getting because I think the downfall of communism is really a function of communications, of people beginning to pierce the iron curtain with broadcasts and what-have-you. At one point the – the whole area in eastern Germany, they discovered all the young people were going to Berlin. They actually took a poll, why are you going to Berlin? Well, they wanted to feel part of Western Europe and watch Western European television. Instead of putting up more jamming stations, they actually put in repeater stations at which point you began to think, you know? This game's changing. And finally, even after the brutal put-down of the revolution, Hungary was the country that really brought down the Russian Empire and they did it with no noise, nothing to do with the Berlin Wall. It was still a more liberal regime than most of those countries. The Czechs and East Germans almost made communism work. The Czechs went out – the Hungarians went out with a pop – and said okay Hungarians. You can go to Vienna. Well, if they could go to Vienna why did they need a border? And that border – and I tried to write a book on how the wall worked and the border was different. Some of it was landmines. Some of it was electric – high-powered electric wire – the actual barbwire was to keep the animals off the things that kill people. And so the Hungarians took down a mile of the wall. Put a Caterpillar tractor out and ran over the mines because they used landmines and the actual border was about six half a mile further into Austria and they took down the barbwire. It took about six weeks to two months for the rest of Eastern Europe to say, wait a second. I can take a Czech bus by CEDOK TOURS and go to Prague – Budapest. And then I can take a Budapest bus and then go to the border and then there isn't a border and I can walk out. So all of a sudden a flood of people started coming out and the Hungarians never said a word. And what was fascinating was the Russians were then faced with either reinvading Hungary, for which they had no enthusiasm, or building a border on the other side of Hungary between Hungary and the other satellites. They didn't have much enthusiasm for that either. So to bring it into the semiconductor world, a few years later I compared notes with Andy Grove because he wrote a book called *Swimming to Something*, and it turns out the day I went into Hungary through a town called Gyor which is a main city on the road in, he was getting out. I might point out that he was much more successful than I have been. So maybe the act of trying to get in – I think he was smarter at that point to get out but that wasn't what actually happened [laughter] I was there to get in. And – and it worked. I had one of those funny lives where every time I took a risk it worked and every time I tried to beat my contemporaries through hard work, diligence and, you know, diligent effort and pure decency, never worked.

[Talking at same time]

PS: So we're one of those people who, oddly enough, tends to, given a choice, I'll finesse it [laughs].

RB: So when you got through that phase of your life and you got back to the U.S. then, you know, where did your career go? Where did your education go? And at what point in time -

PS: Well, Hungary I was 17. So I got out of Hungary and I – I was still in high school. So certainly no matter what my grade scores were, that bio helped me get into Yale. Then I followed Karl Deutsch to MIT. Then I was in a doctoral program in economics and I did everything but the thesis. In my spare time, my thesis was value added manufacturing in developing countries which is basically Freedman's recent book about the *Earth is Flat*. It said that the jet plane was going to change the configuration of economics and you could make semiconductors all over the world. So at one point, while I was chairman at National with all this brooding about jobs, I think I added it up and I created about 440,000 man years of employment but two thirds of that was in Asia. You couldn't have put together 20,000 employees to do the job of trying to wire a semiconductor to the pins outside. I tried it once in front of a giggling group of Malaysian girls and I got it right once. Then I did the next one half as much time – fast and then I did the third one twice as long. By this time I'm sweating like a pig and they're giggling at the chairman and it was a tough job. But we were paying people in Singapore 25 cents an hour. Today we're paying them – if we had people in Singapore, they're getting probably 12 and 15 dollars an hour but it changed Southeast Asia. I mean, what Charlie Sporck did when he was at Fairchild – if you went first into a country, you could make a better deal on taxes and various things. So we didn't go to Formosa and Korea. We went into the Philippines. We went into Malaysia. We went for a short time into Indonesia which didn't work out terribly well where we were really the pioneer going in but at one point we had some 20,000 people out there and so did everybody else in the business. And then what happened is the production stayed out there because as we got more and more automated, the people who could fix that equipment were the people who were already on the job. But it would've been very difficult to – where am I going to go and find five – 20,000 people? And what we ended up doing is we hired 19, 20 year old girls before they went off and got married. We looked at their needlework. If they did good needlework they could make semiconductors or assemble them. And our most successful manager had been a high school teacher and a gym teacher and that was in, I think, Malacca and decided – he divided up the group between the – like in school, the gold team and the silver team and the blue team and they competed but they also had sporting events and they had a beauty contest and the winner got a trip to Formosa. It wasn't a career. It was a weigh station. And [talking at same time] it was fun. It was slightly inappropriate in this day and age but I remember sitting there at 3 o'clock in the afternoon and he had some venetian blinds in his office and he wound them up and he was looking out at the entrance to the plant. And about 2,000 cute little girls poured into the plant. 2,000 cute little girls poured out of the plant. He didn't do anything. I don't think he was involved with any of them but he said this is one of the nicest parts of the day [laughs]. We issued them uniforms which they immediately went home and took the bottom six inches off. But it was closer to feeling like a

school than it was a – you know, this was not the kind of plant that I think is happening in China today with making iPhones and what-have-you. That sleek – maybe it was. It wasn't my reaction to it.

RB: So after your college days Peter, you found yourself heading towards the semiconductor industry and at a very young age you joined the board of National Semiconductor. In fact, you saved National Semiconductor as, you know, I understand it. Tell us about how that happened and how a $75,000 investment changed your life there and started a 30 year connection.

PS: Well, I had about – I inherited about $300,000. My father died when I was 21. I had heard the word transistor in 1956 when I went down to talk at Bell Labs to a group of research guys because they invited me down because I was just out of Hungary. You have to realize that I just finished a book on computers. The whole Manhattan Project, half of those people were Hungarian mathematicians. A Hungarian is best described as a man who goes into a rolling door behind you and comes out ahead. So somehow that was a group that was interested in Eastern Europe. And a man named Kurt Lehovec, who'd been a blue ribbon scientist and was Czech and we snatched him before the Russians got him and is often credited as being one of the fundamental inventors of the integrated circuit, was on the plane and he was telling my father about this thing called a transistor. I don't think it had much effect. It's just that it went through his head. What happened was I was working in New York and I met a lawyer named Bob Beshar whose client was a guy named Don Weeden. National Semiconductor had been formed by four roommates at Stanford. They were forming companies out of Stanford all the way back into the 50's. We're talking '57. And those guys were Don Lucas who went on to fame and fortune in the Valley and became chairman of Oracle among other things, Bill Witter who is of the Dean Witter family, Bill Vanderbilt, I don't know what happened to him but he was a Vanderbilt and a guy named Don Weeden whose family was in the brokerage business. His grandfather had been on – set a record in a clipper ship from San Francisco to New York. He became a jet pilot. Those four guys formed the company, very early on. I think it was – I don't know the exact day, somewhere wedged in between '57 and '59. The idea was that they would be a second source transistor company when transistors cost 10 or $15 a piece and they were called "glop-top" transistors and the planar process hadn't been developed yet and it was run by a guy named Dr. Bernard Rothlein. And Dr. Rothlein started the company with – of his first 26 employees, 25 came from Sperry Rand and Sperry Rand brought a lawsuit on the grounds that that looked like they were taking intellectual property in the form of everybody from Sperry Rand. And so Sperry Rand won the lawsuit and they had a million and a half dollar judgment against them. And Bob Beshar got involved and turns out Mohawk Data Sciences and Control Data had also started about that way out of controlled – out of Sperry Rand and they'd paid a quarter of a million dollar exit fee so it looked like after you'd done this you gave them a quarter of a million dollars and you got out and they really didn't want to take a company that had 200, 300 people in an abandoned hat factory in Danbury, Connecticut, abandoned because Kennedy refused to wear a hat if you remember when hats went out of fashion. And so they really didn't want to exercise it but there was a judgment and they couldn't pay the judgment so they were in

receivership. And Bob Beshar knew Don Weeden and Bob Beshar thought I was a smart kid but mostly I had the name Sprague and Sprague Electric was a $300 million company. It was the leading maker of passive components not around the world but certainly in the U.S. So then he figured out that I must've learned something around the family dining table by some curious osmosis that would make me of some use, an extremely dubious theory but it was the best theory at hand. And so I went up and Don Weeden has since become a very close friend of mine. I ran his political campaign in '68 and a whole bunch of stuff. But they were there and they passed the hat and I added $75,000 to the hat and I got a seat on the board. And then about 8 months later, somewhere around '64, '65 we were approached by Dave Widlar – Dave Talbert, Bob Widlar and Bob Widlar's girlfriend – Dave Talbert's girlfriend and they had led the way into the development into the linear integrated circuit. Anybody who knows anything about this business knows Bob Widlar was the genius that started it off. And he came to us – woops, along the way – I forgot to mention I took the company public [laughs] without using an underwriter, without doing a formal registration and I did this through Allen & Company because one of my classmates at Yale had a job at Allen & Company which is one of the foremost wheeling and dealing banks and I did this shortly after I got there. And this was kind of interesting because they didn't really pay you very much. They just gave you a desk. Well, they didn't even give me a desk but I decided I'd learn investment banking. So I hung around the place and I got to be friends with a guy who ran the trading desk whose name was Alan Lopato. I'm already on the board and I said how do you get in the pink sheets? And he says well there's got to be buyers and there's got to be sellers and it's got to be legal. So I went to our law firm which was called White & Case and I said hmm. What's the rule? And the rule was you needed 500 shareholders. A couple of hundred needed to be round lot holders. The interesting thing about that is it's pretty much the same rule. They've got to have held the stock for a couple of years and they can't be insiders, if they want to sell. They can be insiders and sell under the rules. We had approximately 600 shareholders. People had gotten divorced, left the shares to their wives, given it to their kids. Anyway – and we had enough round lot holders so I figured I'd take the major ones and I tracked them all down and figured out what their home number was and their office number and how many shares they owned and what they got and I took that to White & Case and I said, why can't we just sell if we file with the SEC, just fill out the form? We have to take it case by case. I said fine. I've got all day. Let's start with Mr. Abrams. Two days later they couldn't find any reason why we couldn't be public so I went back to Allen & Case – Alan Lopato who was the trader with a letter from White & Case that said these people could sell. They didn't act in accommodation and what-have-you. And I said well here's some buyers and here's a letter that says it's legal and here's the filing we made with the SEC. Now if I go find some buyers will you make a market? He said sure, kid. That's what I do for a living. So that's how it actually went public.

RB: Okay.

PS: And so now we have public stock. Widlar and Talbert wanted $500,000 a piece, tax-free in their bank account in five years. Obviously, you had to have stock to presume that. So we

gave them enough options except that Rothlein felt threatened, didn't want to go into the integrated circuit business, didn't want to see locusts of power move out here and then along the way we acquired a company called Molectro which was in Chapter 11 while we were in receivership. That started where we are now in Silicon Valley. We own that lot [laughs]. So we had a place for Widlar and Talbert to go. We ran out and raised a million dollars because now we had a public stock, sold it privately and made a deal with Robert Widlar and Talbert where they each got 20,000 shares at $4 a share and if that went to – I'd forgotten how we figured the math – but whatever it is it actually worked out. They ended up with a half a million tax-free and Widlar went off to the beach in Puerto Vallarta, Mexico for a couple of years and then we hired him back. But Widlar was the design genius. Talbert was the production genius and Talbert's girlfriend cut the rubyliths on her knees with hockey pads on her knees on a big glass table with a backlight and cut them with a single edge razor blade. That was production. And about two years later we were ahead of Fairchild because they allowed those people to leave and that had an effect on Charlie Sporck because, you know, that gave us something for Charlie to work with, you know, further down. Anyway, Rothlein resisted all of this and so being a pushy kid, I said we've got to get rid of Rothlein. So I went around and politicked. None of this is fun. I mean, I've been involved in terminating CEOs and the usual reaction is I go in the parking lot and throw up. It's hard because nobody's all bad or all good. They're just – but it was necessary. And I got everybody lined up with the exception of one guy who was running the advanced studies program at the Harvard Business School, this sort of Grad School of Harvard Business School and he was camping in Maine so I didn't get a hold of him. And Lucas we decided would be chairman and a guy named Jack Hagerty would become president and he'd been executive VP sales. So it was all lined up and Lucas was going to fire Bernie Rothlein and he couldn't make himself do it. So 45 minutes into the meeting I slammed the briefcase – I actually had a briefcase with a lid – and I walked out and said if this is the way the future of this company – I mean, nobody can seem to get anything done. I'm out of here. So, what's that all about? So Don screwed up because nobody likes to do this and explain to Haggerty – I mean, to Rothlein that he was out but they hadn't figured his compensation so he came out. So the two of us are out of the room and then we started debating putting Haggerty as president at which point this guy who I didn't know at all – he had a fancy office at the Ford foundation – he said no, we think Sprague ought to be chairman. Really bad idea. I couldn't run a company day to day. I'm not disciplined enough and organized enough and couldn't focus on it but he had decided. Well, that threw everything into a cocked hat but eventually we all settled down and Lucas became chairman except at 10 o'clock that night as he was getting on a plane to go to California he called me up and he said Peter, I think you ought to be chairman mostly because I don't think Don wanted to come back twice a month on airplanes. And frankly, it wasn't a very promising situation anyway. So it was one of those, you know, stories like football and baseball, you know, send the kid in. Maybe he can do it. Mostly because everything else had been tried and it wasn't working. And so I woke up in the morning and I went up to Danbury, Connecticut and it was very tough. And Bernie Rothlein was cleaning his desk and one of the – he said, you know, this will fail. There's no hope. And then what usually happens is his closest assistant came and said, I know how much you hated to do that but you needed to do it and I'd like to

stay. And then about six months after that, Charlie Sporck who had been negotiating with Plessey for the previous two months with the Clark brothers and, you know, Charlie was a big boy and in the Fairchild days, Sherman Fairchild basically said, you all come to Long Island and we'll have some drinks and you can report in. He didn't really enjoy that process very much and the Plesseys made it – I mean, the Clarks made it quite obvious that they do kind of the same thing except instead of going to Connecticut – Long Island, he was going to get an opportunity to go to England. And he went over and back and he couldn't make a decision. And so they approached Lucas – I'd forgotten who approached – but I was in Spain trying to get us out of a joint venture and a phone rang and it was Don Lucas and he said there's six or seven people from Fairchild who want to leave on block and do you think we should talk to them? One of the really brilliant things I did during my entire career is I said, yeah. I think we should talk to them. So we made an appointment in the Racquet Club in New York. This is this kind of racquet not the usual mafia – that racket club meets in Brooklyn. And the only thing that we did which was really quite unusual is I insisted Jack Haggerty come to the meeting. So he got to – we didn't do it behind his back. We said this is a group coming in. And I made a deal with Jack that I'd look after his back if he'd look after my front, one way or another. And Jack came out of the meeting and said these guys will make this a more successful company than I can do it. So he stayed on. For a while the company was in Danbury as the headquarters. They had a putting green outside and Charlie – remember, among other things, the putting green disappeared under Charlie's – Charlie's enthusiasm for putting greens was relatively limited. And eventually the company's base shifted but we kept the Danbury facility. But it was an active, you know, it was an active period. If we hadn't gone public we couldn't have gotten people in. And the odd thing is you could probably do that same stunt again but when you go and talk to a lawyer about it they say you're out of your mind. And then if you take them threw the steps, it's just paperwork. And -

RB: So you settled into essentially a 30 year role as non-executive chairman of National -

PS: Yeah.

RB: East coast based and Charlie got on with running the company out here in Silicon Valley.

PS: I'll tell you one other story which is kind of a pocketful and I think the data prosecution is run but I learned a fair amount about the stock market. And our stock was selling at about 3 and I knew that when we announced Charlie Sporck and group that the stock was going to soar. And I had one friend of mine who was out here, who is still a very close friend and has been raising money for wave systems which is – I'm involved in and he was 23 and he had a little tiny brokerage house and I broke absolutely the law. I called him up and I said don't be short because he – I didn't tell him what was happening. I didn't tell him anything and he didn't have enough equity to buy 10,000 shares long but it would've bankrupted him. I didn't tell him anything else. The irony is – and I didn't tell anyone – the irony is the people at Allen & Company thought I deserved to tell them and they had all kinds of resources and that might have changed the story. But all these things that look very rigid, underneath them all there's –

there are layers of human stories that come along that – and I don't feel badly about it even though on the face of it I was busting some law, probably not the first or last time but it was just – it was a very – and then two years later, Charlie gave me the job of picking the underwriter to take us seriously public and it was Morgan Stanley, E.F. Hutton and Merrill Lynch and I was supposed to pick. They all say the same thing. They're going to do this offer and they're going to stand behind the stock and they're going to do research forever. It's the same story. What they're really going to do is give you a check if they can, sell the stock as quickly as possible and if things work out they'll follow your company. So I wasn't believing any of it. But there were two guys from E.F. Hutton – s somehow those firms really think if they can get really big former football players to come out and make the pitch that you're going to be impressed because us "guy types", you know, like football players with championship rings. These guys are going to flab and they were about 250 pounds apiece. That's when football player were small. And there was a restaurant called Jimmy's run by a struggling Greek lady in the middle of Wall Street who kept all of her books on a – the menu and the books were kept on a sheet with chalk, I mean, a little chalkboard. I arrest – I'm sure she was in her widow's weeds into Jersey, you know, when the IRS came around. But the air conditioning failed that day and these guys' shirts went translucent. And we were all sitting there in 100 degrees because we went in and got the food off the kitchen – before dessert I said, you guys got the deal. Said, you know, this is supposed to be a longer process. Why did we get the deal? And I said, I know. I can't make much difference between any one of the firms but you guys sweated hard enough for it [laughs]. It was just a – but there wasn't any other reason to make the decision. So E.F. Hutton took us public and we raised – and then we went on the New York Stock Exchange. But that's the whole financial history of going from, you know, bankruptcy to the New York Stock Exchange and I think the whole thing took three or four years. And it – looking back it was fun at the time and it's amusing looking back at it and some of it sounds hard to believe but that's the way I remember it.

RB: So you've done a lot of things other than the semiconductor world, Peter, in your career and we'll come to a couple of those things. So what do you think kept you in the chairman's role for 30 years? I mean, it's not like you're a technologist and you were in love with the technology, per se. That's a long stint for, you know, following and directing one company.

PS: Well, for one thing the fact that I lived on the east coast and was doing other things was a rather critical factor because if I'd stayed out here and decided to meddle in the enterprise as chairman, Charlie and I would've betted longer heads in a hurry. The fact of the matter is I did what a chairman is supposed to do, which is to try and avoid doing anything stupid. The fundamental job of a board of directors is to hire and fire the chief executive officer. In the process of doing that you better learn enough about the business that you know who's in it and if something happened to Charlie and the famous bus hit him, who would you choose? And Charlie did a very interesting thing with me. He always – I had total access to anything, so I went to all the sales meetings and in the process I began to learn something about the business. But there is a – you know, there's that famous – there was a Broadway show called *The Solid Gold*

Cadillac and the thing that brought the show down at the end was a little old lady with an umbrella and she said, I see here that chairman makes $20,000 a year. What does the chairman do? And nobody had ever asked that question and the whole thing blew up. I don't know what happened to him. It was just a funny line. Chairman does various things but chairman don't run companies. And I think Charlie and I developed a respect for each other but you have to realize, when we joined the New York Stock Exchange we had a three-man board of directors – makes the formation of an outside committee really easy – and that was Don Weeden, myself and Charlie. Eventually we added Bob Beshar, eventually we added a couple of other people. I've been on a lot of boards. Boards don't run companies. And I – in some ways it would've been fun to live out here because I probably would've gotten involved in other things. I visited Apple when there were 20 people there. And I certainly learned a lot from being chairman. The oddest thing is my academic career in science and technology was rocks for jocks which got the football team through the science requirement without really disturbing their brain cells with a whole lot of information. But then I'm basically a journal – I'm curious about how stuff works. And since then I've gotten, I don't know, two software patents and three hardware patents and an optics patent and turns out my gene pool hadn't completely run out. Looking back at it, I – there's some things I wished I could've done better. I mean, I – when we came into the watch business, it was a joke. We thought telling time was a fundamental issue in the watch business. Man, we could tell time for amazing accuracy. Watch – I was also involved in a modern design company called Design Research – watch is a billboard to wear in order to tell somebody something about himself. You've got the macho pilot watch. I've got my scuba diving watch. I got a gold watch. So I'm a pilot, I'm a scuba diver and I'm rich. That's why you have three watches. It's a billboard. It's a fashion statement. I mean, look at how the Swiss have, you know, they're selling $100,000 watches. We thought watches were about telling time, so I wanted to take the elements that were in the watch because watches don't have to be round. They have to be round if you've got gears. Semiconductors don't have gears. So I wanted to take a kit of parts and hand it to the five best designers in the country. I remember Charles Edens was one of my targets and say guys, rethink the watch. Just think about it. Do something. I gave it to my friend Mary who had lunch and she was at Parsons School of Design. Biggest problem is that – well they were battery hogs and the components were bulkier than you'd like but I got the bright idea of building it in titanium which costs about a buck and a half more than steel. Sounds sexy. Sells for 3 or $400 more and chews hell out of the gears – the equipment that makes the cases. But there are only three people in Switzerland who make cases. They didn't want to hear about titanium but for another buck and a half they'd make it. I would've liked to have taken a few projects like that and seen if I could, you know, had an effect. But that's twiddling. That's a British chairman twiddle. They come in and – they're the chairmans who everybody thinks they're important and therefore they listen and they build up a sweat and they fiddle with something. You don't run companies by fiddling. You run companies by seeing it through to the end.

RB: Around that time, of course, there were three or four of the major semiconductor companies that put their foot in the watch business.

PS: None of whom are in it now.

RB: Among them Fairchild and Intel and National and so on and none of them lasted very long. And as you say, figured it out .

PS: TI had a watch.

RB: TI had a watch.

PS: Black watch.

RB: Black watch, plastic watch.

PS: That was a big controversy. The jewelers we were selling watches to said nobody will buy a watch with a plastic case. TI came out with that watch. It was a silly statement but we didn't belong in the watch business. And [talking at same time].

RB: So as national Semiconductor moved forward ultimately to become a very large and very successful company, what are the other things that kept you busy? You know, what did you do in addition to National that was exciting.

PS: About the time I was – became chairman at National I had already started an enterprise in Iran, loosely referred to as the chicken farm, completely ridiculous story. I was in graduate school at Columbia. I took a course in the law school on U.S. government program called Public Law 480 which was running currency that they couldn't legally take out of Iran so they wanted to lend it to projects that might be useful. And as a joke I took the course and then I wrote an appendix as a sample application. And I really don't want to spend too much time deviating but in 1962 I was also a delegate to the Communist Youth Festival in Helsinki – you can read all about it at www.sprague.com – where I met a former spook, if there is such a thing, this former, who had been – had a friend named Warren Greedy and they'd been in the cattle project and they said what they should have done was a chicken project. So I wrote this thing up knowing practically nothing about anything involving Iran or chickens and I sent it to the government, the appendix. The government, virtually without talking, they sent me $280,000, that's about a million dollars now, and said go for it. And the two guys and the government were two guys who went on to run Morgan Guarantees International Banking, a guy named Alex Vagliano and a fellow named Rodney Wagner. So now I got $280,000 and the obligation to start a chicken farm so I talked Ralston Purina into coming into it, who grew about 10 percent of the chickens at the time, the Arbor Acres company that was in breeder stock who was owned by the Rockefellers and been a basic economy corporation, and three Lebanese and eventually an Iranian and off we went. And the idea was that we would bring in breeder stock from the United States and Italy, fly them in as day old chicks, raise them for six months, they would produce fertile eggs, we would incubate them – incidentally in an incubator that was cleaner than National

Semiconductors fabrication plant in Danbury at the time – and then we would go out and sell these chickens that would take two and a half pounds of feed and produce a pound of meat, ace chicken. Well, we'd go 6 – we'd go 20 miles in the countryside and the guy was just short of cash that day so we weren't paid very often so we said, the hell with this. We're going to go take our – we're going to go build 7 buildings that were 50 by 500 feet and we're going into the broiler business. So we got into the broiler business and once a week we'd take 25,000 chickens and stuff them in a truck and drive them to the bazar at which the price went down by 20 percent at which point about 7 years into this nonsense we suddenly said, you know, Iran's got an export economy. Why don't we just export oil and bring in frozen chickens? So we took the 7 buildings and converted them to subzero cold store and ended up as the largest cold storage in the Middle East except the one in Jeddah. So it was 27,000 tons of cold storage and it got taken over, not by the Iranian government but by the Ayatollahs who have little groups of Ayatollahs who own this and that. So that got me all over the Middle East. I mean, I've made 50 trips to Iran and crossed Afghanistan with my wife and a dozen trips to Syria, particularly Aleppo, southern Turkey, Lebanon. I started a project – I was starting a project in Adana – I read the history differently of what's going on. I mean, I was there when the world was changing. Aleppo still has the most – had until a month ago, the most beautiful bazar in the Middle East. A third of it's gone. Iran was 500,000 people when I got there. It's 13 million now. I still had a journalist curiosity. I just – I love that part of the world and my Iranian partner really became – again, that pantheon of really close friends, which Charlie Sporck is now one – died a couple of years ago. His son now runs Oxford Analytica, is a Rhode Scholar and what-have-you. So I was doing that. And then in '68 I ran a campaign for Don Weeden who ran for Congress in a hopeless district on the west side of Manhattan. He was running as a Republican. I ran his campaign and we actually were in favor of legalizing marijuana as a Republican, charter schools, getting out of Vietnam and leaving the equipment behind to rebuild it. And then I decided the only thing wrong with his campaign, he had a brilliant campaign manager who was the candidate so I decided to run my own campaign. So I ran against Ed Koch on the east side. It takes a particular kind of nutcase. Let's put it this way, there was no primary competition and I took the same positions we'd taken with Don Weeden and amazingly enough, I'm the only Republican you will ever interview who is endorsed by Bill Abzug [laughs]. And I would take every position I took then, now. And I did one thing in the interview thing – this one is a bit of a boast – but I bought 4, and a half hours on channel 9 and that was one of the summers National stock went down by 80 percent, so I'm running as a millionaire candidate and I'm broke, which is a wonderful combination. You get all the opprobrium of one side and none of the money to pay for it [laughs]. So it cost $5,000 a half hour and I – my program was live on tape, pretty much like this, no editing, no ground rules, no restrictions and my first three interlocutors were Jimmy Breslin, Jack Newfield and Lawrence Barick, he was the correspondent for Time Magazine. And Newfield was Newfield. The deal was that you – I had never met any of these people. I confused that I'd met Breslin in a bar. We paid them $100 each and I figured I could get away with admitting that I'd met Breslin at a bar because every one had met Breslin at a bar [laughs]. And the second one was foreign correspondents and the third one was students and the fourth one was community people. I did it 7:30 Monday, Wednesday, Friday and election eve. I got

write-in votes all over the place and I came closer to beating Koch than pretty much anybody else has but I lost by 12 or 15,000 votes. I ran a full page ad at the end of The Post that said it won't make any difference whether you vote for me or my opponent because neither of us will get anything done because people were asking us to get out of Vietnam. Freshman congressman? Forget about it. I mean, all the things you're promising to do, you can't deliver on. And I would've been a terrible congressman and I just can't imagine it.

RB: So right in the middle of your National Semiconductor period, a long period Peter, something popped up on your radar screen in the automotive industry and caused you to take a right turn, you know, which resulted in a very interesting outcome and also your pioneering work of electronics in the automotive industry. So maybe you can [talking at same time].

PS: I'll get to that but I better go back because I just flashed on one thing you'd be amused by .

RB: Please.

PS: …which is that I ended up guaranteeing the loan in Iran and I think – we were the sixth American business that wasn't an oil company and we had some problems and I ended up paying $260,000 – the 280 I paid back to the government without interest which has kind of never been done. Unfortunately, that $280,000 – I was interviewed to be the first chairman of Data General, circa 1967. And Pierre Lamond set me up on this because he knew the group Burkhart - I think and there were three or four of them – and they needed a chairman and I looked, you know, I just pulled off this stock going to 26 with Charlie Sporck and I was walking gently on water. And so that $270,000 would've gotten me the chairmanship of Data General and 10 percent, which was worth about five years later about 80 million bucks. It instead went to a lawyer who – their in-house lawyer. I was offered it. Whether they would've delivered on it, I wasn't as comfortable with that. Herb Richman was one of the guys. That's who I think Pierre knew. And I – but I damned near pulled that off at which point I would've got myself, you know, better cats. I would've upgraded the kids. I would've got myself a better plan, you know. Life would've changed. Upgraded the whole lot. However, that didn't happen. But I was interested in opportunities so I ended up rescuing in '67 a company called Design Research, had a store in Ghirardelli Square in New York and Boston and what-have-you. So I kept that going until '79, so I was chairman of that. And then I got involved in a company called Advent because it was going out of business. And they made large screen televisions. That's what I got my optics thing in. All of these had conflicts and problems and chaos and confusion. If any – most of which isn't worth talking about. It's just none of this is ever quite as simple as it looks. And mostly because it generally involves people including me. And stirring a blend of people together who are interesting and curious doesn't always guarantee it's going to work out. So I was ready to go do something else and I had an Aston Martin that I'd bought used. It was a DB4 and that was the family car. When I had four sons we put a piece of plywood in the back with some foam rubber on it and we bounced them around in the back of the Aston. If you've seen

an Aston, there's not a lot of room. The kids were small all of which is strictly illegal but – now, but they survived. And I read an obituary. I was sitting at a bathtub, which I tend to do, reading the New York Times and there was an obituary, an actual obituary of the Aston Martin car company and it turns out Walter Cronkite the date before had gone on the news and with a black tie – something I don't think anybody can remember him doing for a human – had read an obituary. So I came down sputtering, so why does Aston Martin have to go out of business? I sat around grumping. And there was a young guy there in the house who was a friend of ours. My wife looked at me and said, stop complaining about it. Just go do something. Why don't you do something? So I asked this guy to find out the name of – somehow I could have the telephone number of the then managing director and he knew a guy named Rex Woodgate who sold cars over here and was a famous mechanic. And I went over – and I called this guy up and I said I'd like to come over and visit the factory. I visited the factory as a customer but I wasn't important enough to get inside, so I'd never seen the inside. So I figured the worst that happens is I'm going to get to walk around and see what a car factory looks like. And everybody had gone home. The equipment was just lying there as if it stopped. And this sneaky guy leaked to the English press that an American was coming over to save the Aston Martin car company. They sent a car down to pick me up and I got there and there was a scrubber, 30 or 40 journalists and cameras and everything else to meet this mysterious American. And the first question was, who are you? And I said well, I'm not any – I'm not anybody. Now I really got the British press excited. So I got around and I wondered around the factory and I escaped. I didn't have much of an interest of doing this. I mean, it was ridiculous and I had no idea how bad England was in '75 but the FTSE was at a hundred. Today it's at 4,000, the equivalent of the Dow Jones, maybe it's 5,000. And it was hopeless. But I made the front page of most of the national newspapers including the whole front page of the equivalent of The Post with a headline that said in four inch letters, the total thing, "Millionaire to the Rescue." That's nice. First paragraph, an American millionaire without a name toured the Aston Martin works today. So I don't have a name. I got no connection to anything but I must have a million which I think that week I was pretty solidly in that category in the end. I was okay in lira. I'm not sure I had it in dollars. But anyway, whatever had happened I got trapped and I spent six months and I began to love the people that I'd met who actually worked there and detest the people who'd actually run it into bankruptcy because they did it on purpose. They were going to liquidate the company. They were going to, forgive the phrase, Romney it. You could've – I bought the company after I sold 60 cars for 10,000 pounds apiece and gave the receiver back his cash. I owned the Aston Martin car company buildings, equipment, parts, service and spares business I made a quarter of a million pounds. I owned it for 190,000 pounds but I promised I'd start it again and that became interesting. And Charlie Sporck came over after I'd been at it for about a year and a half and I really think of all the things that Charlie had taken a look at, that was the company he really would've liked to have run because he was not a car fanatic, he was a factory person. He understood how things get made. And one of the depressing things about the semiconductor business is at least with the Aston Martin you can park it outside, meet some girl at the bar and show her your car. Pulling little squiggly things out of your pocket that looked like caterpillars and plunking it on the bar and say, I'm a chairman of a company that makes

these, nowhere near as good as having an Aston Martin in the parking lot [laughs]. So it was fun and I kept it going for five years and came out about even. So that's what else I was doing. And then life got really exciting. In '79, basically my world collapsed because Aston couldn't give a – we had the oil price rise, National stock plunged, every one of the things I was involved in had some kind of a crisis. I could have fixed any one of them. I couldn't fix them all at the same time. So then I sort of licked my wounds for part of the 80's and I was involved in a bunch of other stuff but I then started a company called Wave Systems with a patent that I got in 1990 which looking back was still a pretty good idea. It was basically a metering chip that could go into a computer and allow a computer to give vending machines so that the computer could make money after it was sold. I couldn't sell it to anybody. That is, I might point out what Apple does today. And you – I could get access because I was chairman at National Semiconductor. I couldn't get anybody – there was nobody in charge of aftermarket income. There wasn't anybody to talk to except for one guy named Bob Frankenberg who was running HP and he signed the deal with me in a sports bar here. And we were going to pay 70 percent to the content and keep 30 and split it, pretty close to the current deal and he couldn't sell it to his own people. And oddly enough Bob is now – he went on – after I left National he went on the board – kind of had my seat at National and he's now on the board of Wave and he's a very good man. But half of that chip, because that chip had an encryption engine. It had a 128 bit unique identity that couldn't be queried. It could only be volunteered but we couldn't ask you what your number was. It was a phone that didn't answer, that didn't have a line. And it had three or four secure vaults. It was about half of what my chip had because my chip had more stuff in it including a clock and what-have-you. That chip's now in 600 million computers. And when we finally get around to winning it, and we've done a $10 million deal with GM and a $3 million deal with British Petroleum and we've been leading the government on this but you're not going to have security in the cloud or anywhere else without hardware. When you want to talk to that cloud, your computer better be a known entity. So Price Waterhouse, for instance, made a deal with us where when you sign in, the computer gets recognized and then the password and then the login and maybe a finger print but you have to be on the computer that is – been known to be Blair's computer otherwise that computer could be in a Shanghai cyber bar and the same thing would happen. So I got really involved in that and I – we've raised hundreds of millions of dollars. The company was worth – worth. If I'd sold out, if I could've sold out, it was 2 or $3 billion in 2000. Unfortunately, I borrowed some money to fix a few things and most of that value disappeared practically overnight. I've long joked with my son that I should've quit at which point I could've sold. I should've just gone off and said, damn it all, Steven. I'm out of here. I disagree with what you're doing. Then I should've stole all the stock because I could've – that was about $40 million. And then about five months later I should've called up Billy Graham and offered $50,000 to his favorite charity if he'd happen to have lunch with me at the Four Seasons and I'm going to bring Steven and we could've explained that this family had been ruptured and I'm very close to my kids and this has been weighing on my soul and my conscience and would he please lay on hands and bring us back together at which point I would've had my $40 million. I'd have gone back in as chairman and we'd have finessed the whole thing [laughs]. Unfortunately, my mind sometimes runs that way.

Every once in a while I – saner people, particularly lawyers and accountants, tend to point out that, might have worked but then again. [Talking at same time] So I've always been very busy and I – but I take a lot of time goofing off. I've flown my super cub to – what is a 1,200 pound airplane – to Labrador and around the Caribbean and over to California. I've probably taken six weeks to two months' worth of vacations. I took my kids around the world with me one by one. It hasn't been a hard life. I mean, I basically had one job and I got fired and I hated it and frankly I haven't had a job since then. That's the nice thing about being chairman, nobody knows what the chairman does.

RB: So of all these things, Peter, over this time, you know, where you're at today and doing a lot of interesting things, which of all those things was the most interesting for you and which was the dumbest thing, if you will, that you got involved with over that whole career?

PS: I'm actually doing something I discovered I have fun doing. I'm actually inventing stuff at the moment. I seem to be able to do it. Part of it is I've got such an odd background that I tend to look at things from a different perspective simply because, you know, I don't know what goes on in your mind. You don't know much about what goes on in my mind but my mind is a hodgepodge of stuff. It's different than your mind which is a hodgepodge of other stuff. My stuff seems to work when it comes to looking at problems and I find this whole – I don't want to invest. I'd like to actually start things again. And the glorious thing about – two things, physical distribution. Invent something and Amazon will put it on the shelf if people will buy it. You don't have to start marketing in California and then discover I'm going to hire somebody east of the Mississippi and then discover you met somebody on a plane who happens to be English who told you that there's a market in Europe. So you organize to get a market in Europe. You stick it on the Amazon shelf. How you get them to find it there is a different issue but all of a sudden 8 or 10, you know, 800 million people can buy it. The internet – you come up with this – a gadget, an app of one kind or another, 600 million people can buy it tomorrow all over the world and then you build a, you know, the Google variant and the Microsoft variant. So I got a half dozen of those percolating along one of which has the name of retroactive recording device which simply allows me to go to a meeting like this and somebody's going blah, blah, blah while I'm going blah, blah, blah, if this was electronically recorded you can say well he hasn't said anything interesting yet so I'm going to do my mail. But then I say something interesting and you can go back and capture the three minutes that you thought was interesting because you never know what you want to actually record until you have the good luck to do that. It also works out that I can do that in video, so I could be watching the evening news and a friend of mine shows up. Instead of TiVo going back to the beginning of the news program, I can grab that little segment, I'd say, it looked like two minutes so I'll record three of them. It's a clipping service. So I got that virtually finished and -

RB: So you're going to move that forward as a product in the market?

PS: No, this is – has nothing to do with Wave. Far from – yes. I'm going to have it out in about a month.

RB: Okay.

PS: I figured out how to measure you pretty much perfectly because it turns out the fashion business is 25 - $30 billion a year in the States and $30 billion in Europe. And so I came out with the idea that if I had a reference design like a CD and I took four pictures of you and I merged them together I'd have your – I'm not going to tell you how I do it but I can now take one picture and get all your dimensions within about one percent with one frontal picture. When – so I find a guy up in Rochester – I haven't even started this one but Rochester is known to be good photo reconnaissance. So obviously, I'm counting pixels in some fashion. I just find this stuff interesting. What I'd really like to do is get rid of the idea to somebody who gives me a bunch of money so I can go get another idea. I really don't want to go higher as CFO and talk to VCs and go through all that hassle. It's – I'd rather get half as much and have half the hassle. So that's one of the reasons I'm out here this week is to go back and reconnoiter with the people I knew here and those who are still staggering around then maybe I'll get to talk to their kids who are – actually it's getting so bad I may end up talking to their kid's kids. Along the way I've got, you know, no one Bushnells on my board at Wave. George Gilder is on my board. Life's not boring but I probably have less energy than I used to and -

RB: You spend a lot of time in Europe or the Middle East still or are you mostly active around the U.S.?

PS: Well, Wave's got an active operation in Europe which I helped set up. A lot of the reason I travel right now is if you want to keep friends you better visit them about every year or so or you're going to lose them. I mean, basically you've got to cultivate them. Just go down the list and figure out, oh my God I haven't seen this person for three years. You got to work it. It's like cultivating a garden. As I have a quality for bullshit and it seems to, you know, be fine in terms of cultivating a garden. My garden of friends has to be afflicted with a certain amount of bullshit every couple of years [laughs]. I got to go see them and generally they are creators of bullshit as well. Whatever it is. I have a lot of friends around the world. I probably – I could probably mooch off my friends, you know, a month here and a month there on a permanent basis which always struck me as being not a bad idea because by the time I came full circle they'd forgotten how unpleasant it was the first time and will welcome me back. But I haven't got anything useful going in Europe at this point.

RB: You stay close to Charlie Sporck after all those years?

PS: Very much so.

RB: A nice relationship

PS: And it's a very strange thing but Charlie's a very busy guy. My politics are different than Charlie's. My interests, you know, have been pretty diverse and Charlie's been pretty focused. But he lives in Saranac. He went home to – the stories I was telling earlier about – that's where he came from. That's where he and his whole class signed up to go to West Point and then the war stopped and he refused to go to West Point. And because it was going to be five years. You don't tell the army you're not going to West Point. So they had him mowing the grass with a bayonet on his hands and knees in front of headquarters. Hard to picture that. But I got all those stories because I now go up to see Charlie every summer a couple of times. I usually fly up in the super cub with four or five lobsters and I make dinner and we sit around and it used to be a night or two and now it's kind of a week or two. And I've been in the car and I've heard his life story. And I probably know more of that story than his kids do. And the more I've learned about him the more I like him but it's a very different relationship than before. I mean, we went through some adventures together in terms of, you know, problems that – National went through its ups and downs as well including battles with the government and all kinds of stuff and finding his successor was not an easy task. But Charlie's an extraordinarily loyal guy and I – so I know Charlie Sporck lots better.

RB: So Peter, having had, you know, 30 years with National and a lot of other very interesting projects going on in parallel, just to kind of draw to a conclusion here, what do you think about the future of the semiconductor industry? It's become a tough business. It always was a tough business but it's become a tough business to stay in. I mean, only a few of the big companies have survived, Intel, et al. What's your thoughts on the future?

PS: I commented when the camera was off. It's very – it's a tough question because to a certain extent, when you stop being able to influence events you tend to go think about the things you can influence. It was fascinating being – having a front row seat. We were very arrogant about the fact that the Asians would never make semiconductors. They would fabricate semiconductors. They'd never make them. And then you look at somebody like Taiwan Semiconductor and they went about this in a scientific way. They came and put together 600 people. They hired a guy out of Texas Instruments. They basically ran a school for two years. And now they and the other company in Taiwan make an enormous amount of the world's semiconductors. They had cheap interest rates. They were focused. They had government support. And Charlie and the rest of us were wrong. The fact of the matter is we had to look around our buildings. If the Chinese are so smart when they're working for us and there's so many of them over there, why aren't the smart ones – I used to hope that all the smart ones were here. There's no evidence to support that [laughs]. And so I think the actual concept the real men have fabs, there are very few real men in the game anymore. Intel is. TI has fabs. National has some but mostly if you're making linear circuits the fabs are cheaper. Smartest thing I could've done and it's going to continue is that when we thought the Japanese were going to run the world, Charlie was an absolute paranoid believer in that theory – we talked the government into kind of waving antitrust so the companies could talk to each other at summit tech and figure out what the roadmap was going to look like. And it turns out, there are

always known hurdles. I mean, there's one ion implantation which I got close to which I'm not going to bore you with. But bombarding the single ions is a problem. If you can get 18 ions in a cluster you can use less power and you solve one of the problems. Every time they've identified a problem a company has come along, this helps solve it. I still think that we're going to stay on Moore's Law for another 10 or 20 years. In the back of my head I believe that there will be some biological versions because the human brain is still way out ahead of computers in certain ways and I know how that's going to work out. I've tried to read about things like quantum computing. If you really want to read something that you don't understand I suggest a long evening with a book on quantum computing will do it for you particularly if you have insomnia. I think this country does about as many dumb things in organized fashion to keep us from being a leader that I find it unacceptable. I once stood up in a conference out here in Palo Alto in front of 600 people. It was an Esther Dyson conference and Summers was there and Summers is about as much of a jerk as I've read him to be. I thought he did well in the movie – when he was president of Harvard the movie Social Networks– because I got up and I just asked, how many of you are U.S. born – are foreign born and U.S. educated? And about 25 percent of the hands went up. And I looked at Summers and I said you know, why don't we just give all these people a green card? And I should've spelled it out a little more because I got a Republican version of this argument and a Democratic version of the argument and in both cases those kids are ripping us off. You can't buy an education from a California school system that isn't subsidized by the California taxpayer. You can't buy an education at MIT that isn't subsidized by the endowment. So you spend your $40,000 and you're getting $70,000 worth of education. So we give them $70,000 worth of education and what are we going to do with them? We're going to let them take our taxpayer's money and escape the country except it's worse than that. We're trying to throw them out of the country. So a guy came up to me at the end of this who looks sort of like Obama. He was African with a mixture of Greek and Ethiopian, Kenya and I think a hunk of Yemen and something else and I got a story out of him and it turns out that his sister had come over here and gotten an PhD and sold her company to Microsoft and some brother did something else. Younger brother was stuck in Yemen and the country didn't want – United States didn't want to let him in because the family had a bad habit of staying here and this guy would be very easy to track down because I would bet that he's the only African who was even the Bose Scholar at MIT, which is the Armand Bose Scholar. That's the smartest kid in the undergraduate, period. We're doing everything to get him out of the country. I said well, Christ just marry an American girl, you know, get over it. And he said well he spent six months learning Japanese and he had a Japanese girlfriend, so that, you know, didn't work. So he did the next best thing and went to Goldman Sachs and I'm sure Goldman Sachs fixed it. Why on earth are we doing that? I mean, just look at the people you're interviewing. I mean, Andy Grove would have to be a political refugee. Well, he probably could've been. I mean, that's the greatest asset we've got and we're destroying it in order to make room in the – in order to imprison four times as many people as any other country in the world. I mean, we've got 25 percent of the world's prisoners and 5 percent of the world's population. And Californians used to spend 12 in education and 8 on prisons. Yeah, I'm pissed at it. I mean, if I really wanted – I mean, I would love to be a politician. Actually, what I'd really like to do is be a talking head because this stuff –

it excites the hell out of me because there's – we're not doing anything that really helps this thing work. Things – products are being built by really smart people wherever they happen to be. They're going to be manufactured where it's cheap to do and they're going to be sold universally and that mechanism is there. You want to benefit by it? Then make damn sure those people are here and that the education system works. You know, I can get really hot under the collar because that's what this game is about now. ARM makes 8 times as many microprocessors as Intel, they have 2,700 employees and $8 billion market valuation and no manufacturing. They license some 180 companies or more, 2 and 3 percent licenses. It's a bunch of buffoons in England, good buffoons. I'd just like this to be the place that everybody wants to come and visit. Now imagine you're a 19 year old – Iranians had 157,000 students in – abroad under the shah. They're all over this country being very successful. There's still bright Iranians. Imagine you're an Iranian kid and you'd like to come over here. You get interviewed in Dubai – if you can get there – by the American Embassy. How – when I'm 17 years old, how in hell do I explain that I'm not a terrorist? I mean, when I was 17 I was walking into Hungary. I could've been a terrorist. If you go back and look at the head – the vision on the Time Magazine, *The Man of the Year*, *The Man of the Year* that year were three Hungarian kids. It was actually – it came from a photograph. It was a painting done by a Russian painter and I finally met a guy who had actually known the three kids. They were real. They got out of the country and that was the man of the year, three Hungarian terrorists. We just need to recognize that that's, you know, just open the thing up. Tear the borders down. If Turks can overrun Germany, the Mexicans can overrun America but most of the Mexicans I know would like to be in Mexico. They just want to make some money. I just don't – so what I am is a radical, liberal libertarian, which is – I don't believe government's very good at things and I agree with the right-wing that there's a bunch of things other than FEMA that government should probably get out of like schools and, you know, some things. But otherwise I care about people. And, you know, whatever it is I got hot and bothered during the election. If you want me to go down on this line I'll bore everybody who's going to have to watch this thing. But the semiconductor business is still at the root of everything. I guess one thing I would probably end with is the man who made the most effect on my education was a man named Karl Deutsch who founded the political science department at MIT. I think I referred to him before that. And he was a disciple of Norbert Wiener who was there for 50 years. All of you think cyber means outer space – got that from Necromancer – but cyber meant helmsman and helmsman is about using feedback to run a machine. You got a light here and a receiver there and you've got a lathe and when the light gets from here to there it turns the lathe off. Feedback. Almost everything that's happened on the internet that's worked was built on that without knowing it. How do you keep the crooks out of eBay? You let the other people on eBay police it. It was founded by Pierre Omidyar who's French and Iranian and amazingly enough, that technique is how the bazar works. It's how the Jewish 47th street jewelry business works. You screw around with us, you're not going to do business with us anymore. EBay. What's Google? What is this new thing called WAVZ, W, A, V, Z? It's a social network for navigation that you can actually tell everybody in the community, there's a cop around the corner behind a tree. That's feedback. Everything in this game is about feedback. So as you make these things better and better, that little iPhone that

you made me turn off, will be 800 times more powerful than it is now in about 16 years. What are we going to do with it? Some things will be easy. It will recognize the foreign language that you're talking into it. Now, whether we understand the language when we hear it even in fractured English – but imagine, 800 times more powerful. Are we going to do anything useful with it?

RB: Information is, you know, a growing at an exponential rate but the computing power, I mean, you said that you think Moore's Laws going to keep going and, you know, whether the number is 800 or some other number, I mean, it's going to keep growing also. So the ability to be able to compute and crunch data I think is going to continue to rise as well.

PS: Well, I have a very sweet picture. I can almost end with this. I'll send you a copy of it. It's – my son has a – sold his wave on top of the market instead of the bottom but he was able to do it – I was chairman – so he bought himself a townhouse in New York and he's got two lovely kids. And the kids had three friends and they had a blackout that lasted for a week but no flooding. So he somehow jerry-rigged the Wi-Fi because he's that kind of kid. But they – there they are, no gadgets, no appliances, no electricity, candlelight, a roaring fire and they're playing cards. And so, I guess one of the things I've learned from all this technology, particularly if you go to places like Afghanistan and what-have-you, is that there's still a small piece of me that says the purpose of technology is to make enough money so you can go someplace without it. I think I'll end on that note.

RB: Peter, thank you very much for joining us. It was a pleasure. Look forward to meeting you again out in the valley.

PS: I do, too.

RB: Thank you.