



## **Oral History of Irwin Federman**

Interviewed by:  
Gardner Hendrie

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**Gardner Hendrie:** We have with us today Irwin Federman, who has very graciously agreed to do an oral history for the Computer History Museum. Thank you very much.

**Irwin Federman:** You're more than welcome. I'm delighted.

**Hendrie:** Good. I think what I'd like to do is start out with a little bit of your family history, your background, what you were exposed to when you were a little kid. So, maybe you could tell me a little bit about--

**Federman:** Sure.

**Hendrie:** What it was like when you grew up-- growing up.

**Federman:** I grew up in Brooklyn. And we grew up in, I should euphemistically say, very modest circumstances. Lived in a tenement, a walk-up tenement in Brooklyn. My father was not an affluent man. He worked in a shoe factory, and he did hand lasting of women's shoes. And every once in a while, he brought home a paycheck. And sometimes he didn't. So, it was a tough youth. I've worked one way or another almost full-time since I was thirteen years old, partly to support myself, and at times, I had to kick in to support the family. As I look back on those very early days, I don't look back at them at all with chagrin or distaste. We were poor. I think when you're poor, maybe you don't know you're poor. You don't know what you don't have. We never had a car. We lived in a very small apartment. But I don't think I measured things, at that time, by what I didn't have. I don't think I measured things by what I had either because that would have been a very small measure. But I don't think we worried too much about what we didn't have. As I look back, I know that my vistas were very narrow. I had no idea of possibilities. So, the kids who came from more well-to-do homes, where their parents had gone to college and had been exposed to opportunities, had a much broader view of their own possibilities. I had no idea of anything. I was very naïve and very uninformed. And I lived in this four-square block area of Brooklyn. And I had never been out of it. I wasn't out of New York until I was married, and my wife and I took a bus to see friends who had moved to Denver. **Hendrie:** Wow, okay.

**Federman:** My first time out of New York.

**Hendrie:** Now, did you have any siblings?

**Federman:** I had a brother. He has recently passed away. He was four years younger than me. And my mother passed away when I was a teenager.

**Hendrie:** Oh yeah. Now, did your mother-- was she just a home--- was she a homemaker, or did she--

**Federman:** She had a terrible life. She was sick most of her life. She had cancer on multiple occasions and it finally did her in.

**Hendrie:** Oh, all right.

**Federman:** I was a teenager when she passed away. I cooked for my father and my brother. I didn't-- don't take that too seriously. I didn't cook much. And I didn't cook anything of any significant interest.

**Hendrie:** But it was food.

**Federman:** But it was food, , I like to cook now. I cook a lot. As a matter of fact, I cook-- I'm the principal chef in our home. But what I learned was not to be afraid of the kitchen. And I became familiar with the kitchen. So, many men, they walk into a kitchen, and it's like walking into outer space. They don't know what to do. And I became very familiar with the kitchen. So, that was a benefit. But my father and my brother and I didn't eat brilliantly under my watch. But then I worked while going to college. I went to Brooklyn College.

**Hendrie:** Yeah. Well, tell me a little bit-- I just want to stay a little bit longer on your-- you went to an elementary, local elementary school?

**Federman:** I went to an elementary school, public school, PS 232.

**Hendrie:** Oh, you remember the number.

**Federman:** I remember the number.

**Hendrie:** Okay.

**Federman:** And then I went to Samuel J. Tilden High School.

**Hendrie:** Oh, okay. Now, what subjects did you find were easy for you? And which ones were hard? Presumably, the easy ones you liked, and the hard ones you didn't like.

**Federman:** I could draw pretty well when I was a kid. And I had this notion that maybe I was going to be an artist, a commercial artist. As I got a little older, I became disabused of that. I could draw pretty well, but not nearly well enough to make a living at it. So, I liked the art classes. I was intimidated by math and physics, the sciences.

**Hendrie:** Okay.

**Federman:** I was intimidated by those courses. I liked the humanities.

**Hendrie:** Okay. All right, good. What I was going to ask you, what was your earliest thought about what you might like to do when you grow up. But I think you may or may not have answered it about the art.

**Federman:** No, that was more of a fantasy that was-- The first time I actually thought about what I'm going to do-- I got married very young. I got married a few days after I graduated college. I was not yet twenty-one. And I met my wife-to-be when I was a sophomore in college. And she was graduating high school at the time. So, I started, from the time I was a sophomore, to think about how am I going to earn a living.

**Hendrie:** Okay.

**Federman:** It was a reality. I mean-- you know I had nothing to fall back on.

**Hendrie:** Right.

**Federman:** Not a nickel. So, I was thinking then of going to law school. That was the first time I had any serious thoughts of what I'm going to do.

**Hendrie:** Yes. Okay.

**Federman:** And I thought I'd like that. So, I majored in economics. And I was going to go to law school. I minored in classical literature.

**Hendrie:** Now, why did you major in economics? What made you do that?

**Federman:** Because I thought that you didn't have to major in political science in order to go to law school. I thought economics would give me a broader base.

**Hendrie:** Okay, you thought that might be a good base to--

**Federman:** A base, something to understand, something that didn't come naturally to me, I didn't come from a household where anybody ever bought a share of stock or knew anything about anything. So, this was fresh territory for me. Even though I had to think very practically when I was a kid, I planned my courses so I could work. I went to school during the day. And yet I worked almost forty hours a week throughout my education. So, I had to think very practically about everything because of the cost of doing whatever I was doing, plus kicking in when my father wasn't working. It was tough economic times. So, I thought economics would really teach me something, though I had an inclination to do humanities throughout. So, I majored in economics. And I was going to go to law school. But when I got into my junior year-- that was in probably my freshman I was thinking of that. I chose my major. When I got into my junior year, it occurred to me I couldn't afford law school. And my grades weren't good enough for me to get a scholarship. I said, "I'm kidding myself. I'm not going to go to law school." I mean how can I afford it. I'm going to be married. I'm going to be working. Maybe I could go at night. But I'm not going to be making much-- I'm going to be having trouble making ends meet on my salary. And it turned out my first salary was two hundred and seventy-five dollars a month. So, I'll tell you it was trouble to make ends meet. So, I decided I was going to be an accountant instead. I said hey, I'm an economics major. I'll take accounting courses.

**Hendrie:** Okay.

**Federman:** And that's what I did.

**Hendrie:** Yeah, all right. Roll back. Now was there any-- did you always know you were going to college? Did your father think you ought to go to college? What was the impulsion from, you're relatively-- I assume your father had never-- of course never been to college.

**Federman:** No.

**Hendrie:** Or your mother.

**Federman:** Or my mother, no.

**Hendrie:** What was the impulsion to go and do that?

**Federman:** I had a-- this is preordained.

**Hendrie:** Oh, okay. It was expected of you.

**Federman:** It was expected. It was demanded of me. There was no way, I was in college, a freshman, when my mother passed. It would have broken her heart if I didn't go to college.

**Hendrie:** Okay. All right.

**Federman:** my father was an immigrant. My mother was born about a month after her parents landed here from Russia. So, I'm as close to a first generation American as you can get without actually being one.

**Hendrie:** Yes.

**Federman:** And they were poor immigrants and had no education. And they came to America. And this was their dream. And their son was going to be an American. And he spoke English. And he is going to go to college. And this was--

**Hendrie:** This is-- you were living part of their dream.

**Federman:** Absolutely, and frankly, mine too. I've never-- when I was a kid, I didn't think about anything. I didn't have any great philosophical thoughts or wasn't observing myself. I was living from day to day. But as time went on and I started to be a little retrospective and look back, I've never taken anything for granted. And I just think I did live the dream. And I look back, and I say what a wonderful opportunity. What other country in the world? Two poor Jews who never finished high school and had no idea about the world, were subject, if not directly but by reference, to all sorts of prejudice, and here I am taking advantage of the wonders that all these people-- I'm walking on the backs of so many others who laid the path for me. As soon as I started to think about that-- and god knows when that was. It was a long time ago. But as soon as I started to think about it, I never stopped. I never stopped thinking about how generations of people had put out the runway. And I was so lucky to be able to run on it. And I didn't have to get any picks and shovels. They had done it all. And they had created this opportunity for me. And I've always been grateful for that.

**Hendrie:** And Brooklyn College, the tuition was modest enough so--

**Federman:** Zero.

**Hendrie:** Zero?

**Federman:** Zero, nada.

**Hendrie:** That's what can get you to college.

**Federman:** That's right, nothing. The only thing I paid for at Brooklyn college were books and lab fees.

**Hendrie:** Okay. Well, that's very good, yes.

**Federman:** You bet. I'm a trustee of Brooklyn College now.

**Hendrie:** Yeah.

**Federman:** I love that school. It gave me everything.

**Hendrie:** Exactly. All right. So, you get through-- you get to college, and you decide you're going to be a-- that an accountant is a more practical thing.

**Federman:** I had to earn a living.

**Hendrie:** Yeah, of course. So, talk to me about what comes next. Do you graduate?

**Federman:** I graduated in 1956 and got married in 1956. I graduated, I think, on June 6<sup>th</sup> and got married on June 9<sup>th</sup> or something like that. The June 9<sup>th</sup> is for sure. June 6<sup>th</sup>, I might be a little off on that.

**Hendrie:** Okay.

**Federman:** And that, in itself, was interesting because I had made reservations for our honeymoon. I hadn't paid anything. But I had made reservations to fly to Bermuda with my wife for our honeymoon. And I was counting on wedding gifts to enable that to happen.

**Hendrie:** Okay.

**Federman:** And they came through. And at that time, you didn't have to pay things in advance, you know, no credit cards. Everything was cash. I didn't even have a checking account. But we went. And that was my first time on an airplane flying on a BOAC jet prop plane.

**Hendrie:** Okay.

**Federman:** Two engine plane, half-way to Bermuda, the left engine catches fire. And we're looking at them. We were on the left side. And we see first some flame, and then the flame went out. The captain had damped the fire in some way and just black smoke coming out. And then the smoke kind of wisped away. And the four propeller blades were just standing there doing nothing. And the plane was full of a bunch of sports writers. They were going to Bermuda to cover some golf tournament. And I was taking photographs through the window of this dead propeller. And one of these guys said, "I hope you have

waterproof film in that camera, son.” And what I remember about that was we had no fear. Well, we’ve got another engine. The captain didn’t tell us to prepare our life vests or anything. And sure enough, he got us there on one engine. That was my honeymoon.

Another good thing that happened in that very short period-- well, it happened before I graduated. The job that I had at that time was working for a small outfit that did mail order sales to the Spanish-speaking population in America. And they advertised in all these Spanish language newspapers around the country. And they sold all kinds of stuff, a lot of religious stuff, a lot of crosses, and Virgin Marys, and things like that and a whole bunch of stuff that was oriented towards the Latino trade. And I was looking for a job as an accountant. I hadn’t gotten my job yet. I had been offered a couple of jobs. I didn’t take them. I had been turned down twice by a firm called S.D. Leidesdorf and Company, which was the premiere CPA firm on the East Coast. They were an independent firm, had the largest single accounting office in the country because the old man, Sam Leidesdorf, didn’t believe you could have quality control with branches. Five hundred accountants--

**Hendrie:** In one office.

**Federman:** In one office. And this was in 1956

**Hendrie:** Okay.

**Federman:** Just a second, '56 was when I got married.

**Hendrie:** Yeah.

**Federman:** Did I say '56?

**Hendrie:** Yes, you did.

**Federman:** So, that was 1956. You can imagine five hundred accountants. If you scale it today, it would probably be thousands.

**Hendrie:** Wow.

**Federman:** But at any rate, they turned me down twice. I applied twice, and they turned me down twice. And then I got offers from other firms. But I really wanted a prestigious firm. And I didn’t have a job. So, I asked my then boss, Mr. Marks-- I don’t even remember his first name, Mr. Marks. “Hey, Mr. Marks. Could you keep me on after I graduate on a nine to five forty-hour week until I get a job, a real job. And he said, “Yes.”

**Hendrie:** Oh, good.

**Federman:** And that-- he just did me a favor. He didn’t really need me. He gave me work to do. I wasn’t making much but- it was enough to pay the rent.

**Hendrie:** Yeah.

**Federman:** Seventy-five bucks a month for rent.

**Hendrie:** Okay.

**Federman:** We had a nice little apartment in Brooklyn. And so, I had a job. When we went on our honeymoon, I had the security of having the job from Mr. Marks. I didn't have my accounting job yet. And the plane didn't crash. And we had a wonderful time in Bermuda. And we took the boat back. So, it was really--

**Hendrie:** Were you planning on taking the boat?

**Federman:** We were planning on it. We were planning on taking-- it's a two or three day trip from Bermuda to New York. It was really nice. I got seasick on the boat back. I remember that. And when I came back, I applied to Leidesdorf for a third time. And I got a call back from them. And they said, "You've been-- we told you twice we didn't want you," or something like that. I said well I'm persistent. I want you. And they said, "Okay, come in for an interview." And then I came in for an interview. And they gave me a job at this magnificent salary of two seventy-five a month. The Wharton guys were getting five hundred a month.

**Hendrie:** Okay.

**Federman:** But I was not a Wharton guy.

**Hendrie:** Right.

**Federman:** And I didn't have-- I don't remember what my GPA was, but it was under three.

**Hendrie:** Okay, all right. Yes. Okay.

**Federman:** And so, I was kind of street meat. And they paid me accordingly. But it was a great-- they gave me a great education. The job was a-- they were disciplinarians. It was like going into the Marines or special forces. They did everything absolutely by the book. The discipline was extreme. I'm looking for a word. The word escapes me. You could not use an adding machine. You had to do it in your head. They taught you-- even now, one my colleagues and partners, I look at a row of figures and I tell them what--

**Hendrie:** What it adds up to.

**Federman:** That number is. I can zip through numbers like crazy. It all came from Leidesdorf. This is not inherent.

**Hendrie:** Yeah, this was training.

**Federman:** They taught me arithmetic. They taught me how to sight read what the likely answer is about. I could look at a column of numbers. And if the total down there is wrong, I may not know the exact number, but it's not right.



**Hendrie:** Yes, okay.

**Federman:** You know?

**Hendrie:** Yeah, exactly.

**Federman:** See, they gave you the ability to glance at stuff and get a sense of its more or less correctness, if it's in the ballpark.

**Hendrie:** Right.

**Federman:** And the little tests they gave you. I remember one was really terrific. At that time, you had adding machines with a roll of--

**Hendrie:** Roll of paper.

**Federman:** Paper. And they were mechanical. And you put in the numbers. Well, what they would do to trick you, they would give you a paper tape with a whole row of numbers and a total on it. And you were to figure out, within a very short period of time, whether the total was right or wrong, and if not, what the numbers should be more or less or exactly if you were fast enough at it. And it was long, five or six digits, and pretty long. And what they would do is they would roll the tape back and put in some numbers, then roll it forward, tear off that top, and then keep adding numbers. So, you had numbers in there that weren't on the tape. So, the answer was always too large, too much.

**Hendrie:** Okay.

**Federman:** How do you like that? Clever little devils.

**Hendrie:** Yes.

**Federman:** And some guys would say, "It looks about right." No, you had to be more precise than that. You had to be able to almost add it up.

**Hendrie:** Or add it up very roughly, yeah.

**Federman:** Very roughly.

**Hendrie:** It would be like adding all the dollar numbers, leaving the cents out.

**Federman:** Something like that.

**Hendrie:** Something like that.

**Federman:** Because the numbers that those-- those misleading numbers that they put in and then tore off were not pennies or a dollar or two. They were to the left. So, they were enough to make a material difference in the total. So, they didn't try to catch you on the nits. They wanted to see if you could see

more or less wrong. When-- you had to do all these things in your head on the job at the client's office. But they sent in ladies-- talk about gender discrimination. It was always ladies with comptometers. You know what a comptometer is?

**Hendrie:** Yeah, I've seen them. Yes, yes.

**Federman:** You've seen them. We're talking about medieval adding machines. It's one step up from the abacus. And these women were on comptometers. And they would add up the books. These were handwritten books at this time. This was not IBM. It was pre punch cards.

**Hendrie:** Right.

**Federman:** And they would add up the books and would spend all day just adding up the books. So, the precise addition was done by this army of women with comptometers. They didn't take anything for granted. If they could roll the tape up and create a phony number, other people could do the same. They didn't-- so, that was part of the audit. And your job and the work that you did on the journals and the ledgers and whatever, you had to add up what you added up. And everything was in your head. They sent us to-- the training was two weeks intensive. And I'll tell you. It was more arithmetic than it was accounting. They figured-- in the course of the interview, they tested you on debits and credits. But they pounded it into you. And I felt it was Draconian. That's the word I was looking for, Draconian discipline. And I felt-- when I was in the Army, I went into basic training. I thought this was the great-- looking back, absolutely great basic training.

**Hendrie:** Yes.

**Federman:** So, that was that. And I came back. And I got my job at Leidesdorf. And I thanked Mr. Marks for providing a bridge, bridge financing, if you will. And that was it. Then it was off to the races. My wife was still in college.

**Hendrie:** Okay. Did she go to Brooklyn, too?

**Federman:** She went to Brooklyn, too. And she graduated in 1958.

**Hendrie:** Ah, two years later.

**Federman:** And in 1958, I went into the Army.

**Hendrie:** Okay, I was going to ask you. You just mentioned the Army.

**Federman:** Well, there was a draft then. It was the post-World War II draft.

**Hendrie:** Okay.

**Federman:** And I didn't want to get drafted. So, I joined the Reserves. I joined the Army Reserves. And I went in in 1958 for six months. I did my basic training in Fort Dix, New Jersey. And then I went to MP

school. And I went to accounting clerk school. MP school was in Brooklyn. And the accounting clerk school was Fort Harrison, Indiana.

**Hendrie:** Okay.

**Federman:** And then I came back. And my wife graduated. And we moved to California in 1959.

**Hendrie:** Oh, wow. Okay, and why did you do that?

**Federman:** Why did I do that?

**Hendrie:** Yeah, what made the two of you decide--

**Federman:** People have asked me over the years, "What brought you to California." And I tell them a '57 Plymouth.

**Hendrie:** Yeah, but I'm interested in a little bit more in-depth psychological answer.

**Federman:** You know, I'm not sure. -- god's honest truth, I'm not absolutely sure. But I think, looking back, I think the impetus was a lack of self-confidence in whether or not I could compete on the East Coast with all these Wharton, and Harvard, and other guys. And I remember doing arithmetic on life. I'd say eight hours of work, one-hour lunch. That's nine. One hour getting ready to go to work is ten. One hour coming home from work is eleven. Seven/eight hours of sleep, eighteen or nineteen, and then four hours commuting is twenty-three. And I said shit, this is no life because I always thought I'd live out on the island. And I'd be one of these Japanese salary men who, I didn't know the term then, but that's how I perceived myself. And I'd be schlepping with all the other minions coming from Long Island to New York, taking the subway to the work, getting on the subway, crowding the subway, going back to Long Island railroad, and going through this for the rest of my life because there's no way I'm going to compete with those resumes. There's no way.

And I'm thinking we used to watch "The Streets of San Francisco" on TV with a-- detective show. And it looked so pretty, and so bright, and the hills, and the bay. And we had never been out. We'd never been-- we had been to Denver. That was our one trip, had never been west of Denver. And we said let's try. Let's go and see. If it doesn't work, we'll come home. I had a Shell credit card. I didn't have a-- I don't remember if there were Visa at that time. There might have been or Diner's Club or whatever. But I didn't have a credit card. All I had was a Shell. And I told my wife that-- oh, I told my wife. We discussed it. She was a wonderful girl. She had all kinds of courage. But I tell you something, we had nothing to risk. People said, "Boy, what a risk. You went out there. You didn't have a job. You didn't know anybody." We didn't know anybody. We didn't know anybody on the West Coast, didn't have job. And they say, "Wow, were you scared?" But no because we had nothing. It informed my later life - be careful if you're dealing with people who have nothing to risk. They're very dangerous. You can't figure them out--

**Hendrie:** Yes.

**Federman:** Because we always operate from a position of you have to be defensive. You have to protect something. If you have nothing to protect and nothing to be defensive, you can't imagine what people are capable of doing. So, we didn't have anything to risk. San Francisco seemed like a great destination. I put a position wanted ad in the Journal of Accountancy I rented a box in San Francisco Rincon Annex. I rented a box, and I asked for replies to come to the box. -- we had six hundred dollars to our name. We took-- got in our car, put all of our possessions except for a sofa and a dining table, which we put in storage. We filled up the car with all the rest of our belongings and headed west, took five weeks to cross the country.

**Hendrie:** Oh, wonderful.

**Federman:** we stayed a week with our friends in Denver, saw Bryce Canyon, and Zion, and Grand Canyon, and got to California, made a wrong turn coming north from Los Angeles and wound up in Oakland. You know when you're coming up 101, if you stay on your right, you wind up on 17? Well, that we did and wound up in Oakland. I said how the hell did this happen?

But here I am in Oakland. So, we took a motel. It was fifteen dollars a night at that time for the motel. And we wake up on Sunday morning, and we've got seventy-five bucks left of our six hundred that we started with. And I don't have a job. And there's no other income. I said we can't stay in this motel. We don't have anything to eat. We can't pay for anything. So, that Sunday, we went looking for an apartment. Here's a great story, really great story. We go looking for an apartment. And we were in Oakland, so we looked in Oakland. Why, I don't know. Why didn't we go to San Francisco? We could have lived in the city. We have not lived in the city. So, we found this very nice-looking apartment complex right near Lake Merritt, a very attractive location. And the residents, they seemed to be all women and young children. And they were very attractive young women. And the place was clean as a whistle. And we saw the apartment. It was a lovely apartment. And we told the lady, a middle-aged lady, that we would take the apartment.

So, she takes us into her apartment and gives us chocolate cake and milk and sits us down to fill out the documents. It turns out the reason we saw only women and children were almost all of the apartment dwellers were Navy pilots at Alameda Air Station. And they were off on their aircraft carrier. And this lady was like the mother hen for all these women and children. And she was a delightful lady. And she gives us these forms to fill out. And it's first month's rent and a cleaning deposit and last month's rent. And I told her, "Well, we like the place. And we'll be good for it, but we don't have any money." And I told her we only had sixty dollars left. But I was going to go on the next day to see what responses I got at Rincon Annex. And I'm sure I'd get a job very shortly.

And she said, "Okay." She lent me fifty dollars and gave us the apartment without anything down. She says, "You can't go looking for a job with no money in your pocket." Hello. So, I say we're on a different planet here. We came to the right place. And I couldn't believe it. I was fully prepared to have her throw us out. And I didn't know what we were going to do next. But she didn't throw us out. And we took the apartment. I went to Rincon Annex. And I had three replies. And on Tuesday, I had a job. One of the three worked. I went to see them the same afternoon. And the next day, I had a job. And I went to work I think on Wednesday, for a firm called Shea, Good, and Fowler. They had two accounting offices, one downtown and one in Stonestown. Do you know where that is?

**Hendrie:** No.

**Federman:** Stonestown is on the west side of--if you drive down 19<sup>th</sup> Avenue-- you know where 19<sup>th</sup> Avenue-- you get on the freeway--

**Hendrie:** Yes.

**Federman:** If you drive down 19<sup>th</sup> Avenue, you will pass Stonestown on your left.

**Hendrie:** Ah, okay.

**Federman:** It's in the western part of the city. It's kind of a windy, chilly, foggy area.

**Hendrie:** Okay.

**Federman:** And then a few months later we moved to Burlingame. They had an office in Millbrae as well. And they moved me to the Millbrae office. And so, I moved to Burlingame.

**Hendrie:** Yeah, makes sense.

**Federman:** So that was the thing, and so that was in 1959.

**Hendrie:** That's great.

**Federman:** Yeah, it was terrific.

**Hendrie:** That's a great story.

**Federman:** It's not only a great story, it was great to have lived it, you know, it's--

**Hendrie:** Yeah, no exactly, it's a great experience.

**Federman:** Great experience. And then, I took the CPA exam and I got the highest grade in State of California, I won the Forbes Medal, I have a gold medal to prove it. And my wife got pregnant, and we went and bought a house, a little house, \$23,000 for the house. And I think it was like a few hundred dollars down, and the payments were 120 bucks or something like that a month, different world, huh?

**Hendrie:** Yeah.

**Federman:** Paul Shea, the senior partner-- I was the first Jew that his firm ever hired. They didn't know what a Jew looked like, and I didn't know what an Irishman looked like, so we were even. And we got along famously, it was a terrific experience, and I think a good experience for all of us. Paul Shea became kind of a father figure to me, so when we went to buy the house, I had never bought a house. I had never lived in a house, I didn't know what to look for, you know, you're supposed to go and look at it, what are you supposed to look at? So I asked Mr. Shea, I never called him Paul. I asked Mr. Shea if he would come with us to look at the house, and let us know if it was the right thing for us to do, and he did. And we

bought the house and then in the fall of 1961-- okay, that was '59 to summer of '61. In the summer of '61, I would read the newspapers and then as now, the *San Francisco Chronicle* was completely oblivious to what was happening down in Silicon Valley. It wasn't called "Silicon Valley" then it was just the Peninsula, but they were completely oblivious, you know, it's like they had their back to it. They--

**Hendrie:** <laughs> They were facing the other direction.

**Federman:** You know, they were standing in South San Francisco and looking north, and what was happening behind their back, they had no idea. They had no idea. I think half the people in *The Chronicle* probably never heard of Hewlett-Packard. I swear to God, and to this day, that newspaper has not taken advantage of its truly unique relationship.

Now, with all these .com startups, web internet startups in San Francisco, they still have a business section that's one-and a-half pages. Their business section is ridiculously devoid of all this local information. There's stuff going on in San Francisco that never report on, never report on. *The Wall Street Journal* is full of it, pages of it. *The New York Times* is full, but *The San Francisco Chronicle*, for some reason is out to lunch. At that time, it was the same thing. But I got an inkling, I didn't read the *San Jose Mercury* because that was too far south. There was a real divide between what is now Silicon Valley and the north peninsula. That divide has shrunk considerably since. But there were things going on down here, you know, by Hewlett-Packard and other companies starting in Palo Alto, and I thought that there was something important happening.

So, I figured putting an ad in the paper worked once for me, so I put an ad in *The Wall Street Journal*, "Position wanted." I knew nothing about headhunters, I didn't know how to put a resume out. So I did it in my own primitive way, and I got a few replies. And I got a reply from this company called Optics Technology that was looking for a chief accountant. They made lasers and optical thin-films, helium-neon lasers, CW lasers and I took the job. And I made a tearful goodbye to Mr. Shea, and all these guys who I loved, but I said "Look, this is an opportunity, there's things happening down there, I've got to get a piece of this, I've got to be part of this."

So I went to work there, and that was in the summer of '61. In October of '61 or at the same time, maybe I don't remember the month, but that's when the Russians put up the wall in Berlin, in the fall of '61. And that's when John F. Kennedy activated the reserves. Hello! I was in the reserves and I got activated, 431<sup>st</sup> ordonnance company, so I got activated. I had just started this job at Optics Technology. We had a baby. I had this \$120 a month house payment, my wife wasn't working. She had a degree in early childhood education, but she wasn't working, because I was working. I was making 650 bucks a month, I was in fat city, and she didn't have to work. She could raise our daughter. And all of a sudden, she had to look for a job, she had to find a nanny, I was going to be pulled out, and I think I left in November or December, I don't remember exactly, unceremoniously, 75 bucks a month. I was a spec two Specialist Second Class, like a corporal, 75 bucks a month, shit you know? So I asked the guys at Optics Technology whether I could do some work, you know, maybe they'd give me 100 bucks a month or something--

**Hendrie:** Do something remotely, yeah.

**Federman:** Do something remotely, they did it as a favor, I don't know, they were very small money. And, then I left. I went to San Francisco and I was stationed initially, at, Fort Mason, and then The Presidio and then Fort Ord in Monterey. And then I was sent to Aberdeen Proving Grounds, Maryland, for training in EOD, Explosive Ordnance Detonation. I had signed up for that because I got an extra 30 dollars a month -- hazardous duty pay. I needed the money. And, I got to Aberdeen and, that was about it.

One other experience, the Army was a very good experience for me. I think maybe a very good experience for anybody who thinks about it. Things that strike me are that, in the Army you don't have any choices of anything. You have to do what you're told. And, if you want to carve out a place for yourself, if you want to have kind of a life and not be the first guy that they choose to do all the crappy work, you have to figure out how to-- when to be invisible and when to be visible. And it's a great training ground for that. You know, when to kind of meld into the background, or when to be an individual. You don't volunteer for anything, you don't want them to know your name. You want the name to be discovered by them, for something that it's going to-- something good that's going to happen to you. But anything that you insert yourself into in the Army is going to be bad for you. You know you don't volunteer, you don't stand out, you're not the first guy who has your name tag pinned on. All the red hots, you know, as soon as they tell us "Go, get your name tag, here's your name tags, have it sewn on," all the red hots had it sewn on in under 20 minutes, and they were the ones who were called for any kind of duty.

**Hendrie:** Yeah, of course.

**Federman:** You don't want to be last one because you'll stand out then too, but you learn to be in the crowd. After all the red hots and they remember Smith and Jones and their names because they've called them a few times. And so that the drill sergeant will call Smith and Jones almost as a reflexive thing. After they've got Smith and Jones plastered into their heads, that's when you get your name tag on. And so you learn a lot of things like that.

But also, I went into the Army kind of soft and flabby, and I couldn't do the push-ups and I couldn't do the pull-ups, and I couldn't do any of that stuff. I'll tell you, I came out of basic training wiry and hard as a rock, it made me feel really good about myself, it was a very good feeling to have, you know, you're feeling like you're physically capable, and you can do—"Drop down and give me 25," "Well I'll give you 25, I'll give you 50 push-ups." You know, at first I couldn't give them 10, but you know, you get to the point, where "You aren't scaring me bud" and you feel very good about that. And being in a situation where you have to play by somebody's else's rules, I don't know how that applies going forward, but you know, you're into so many things in life in which you have to accept it the way it is. And you have to work with it as it is, and the Army is a great training for that. Also, I look back and I say, "We live in a democracy, you want a citizen army. You don't want to have an army of mercenaries who are doing it for the money, you want-- you know, it's our country, it's our job to defend it, we don't hire people to do it for us. It's our job." So, when I came out of the Army, I became very sanctimonious about it on that subject, and anytime I would talk about it, even to my wife, I would say "I believe in the draft, we should have it forever. We should have universal military training, it should always be a citizen Army, because that's what differentiates us. We don't have thugs and hoodlums and people who like to shoot people. I mean we want people who don't like to shoot people, but want to defend their country." So, being in the Army

had multiple impacts on my life, like so many things, mostly retrospective, mostly retrospective. At the time, I didn't have any of these great thoughts, I didn't have normal thoughts, I just--

**Hendrie:** Yeah, you were just moving through the experience.

**Federman:** Moving through the experience. I'll tell you, early on, before your basic training, if you haven't been in it, so my basic training was no different than anybody else's basic training, I didn't go through anything more difficult than anybody else it was the same thing for everybody. Before every meal you have to do pull ups, and you had to do six. Well I could do two and I was hanging there, like laundry, and it was tough for me to even hang. And they'd let me hang there until my shoulders were falling off, and then they'd say "Drop down and give me 25," 25 push-ups. I could do 10, 12 push-ups at the beginning, I couldn't do 25 pushups. "Okay" I'm lying there and they let you lay there and they say "Okay, 25 squat jumps" I could do 25 squat jumps. It wasn't pretty, but I could do it. So I did 25 squats. By the time I was through with this drill, food was almost over, the meal was almost over. So I'd run into the mess hall, and instead of getting a tray I would get a bowl, and I'd put everything in a goddamn bowl. It was bread, beans, meat, potatoes, cake, everything went in, I ate it all at once; my appetizer, entrée and dessert was--

**Hendrie:** Yeah, all in one.

**Federman:** With a spoon and I shoved it down my throat, you know, because you couldn't linger, there was--

**Hendrie:** Yeah, there was a time.

**Federman:** They'd pull you out. And I finished basic training, I felt so good about myself. I had lost weight, I was wiry, I was if not buff, at least feeling strong and that was a great experience. a

**Hendrie:** And how long was this?

**Federman:** Well, my basic training was six months and then when I was activated it was another year and-a-half. So I didn't beat the system. I made a bet and I lost the bet. But it turned out to be, again retrospectively looking back, it was such a good thing. When I was activated, there was a guy in my company named Brian Shekeloff who was a printer, but he was a philosopher by avocation. And he gave me a one-year course in Buddhism, including the bibliography, and we went to zen-dōs and the whole thing. He introduced me to a whole new thing. And when I think about that from time to time, when I do think about it, I think about it in traffic. He taught me how to Zen out in traffic <exhales>.

**Hendrie:** Now that's pretty good, you need that in California these days.

**Federman:** You need it here. I'll tell you, you've got to disengage. He taught me how to disengage. I never quite was able to meditate. Meditating is very hard. Mediating is no thought and when you're thinking about it you're not meditating. Every once in a while, you have a moment and you kind of wake up, and you have disengaged in that moment. You didn't fall asleep, you're not waking up, you had gotten there but it's for an instant, a split second. But you have a sense of what it means, to be in a no-thought



state, to have disengaged. In that millisecond, there is a peace that you can't possibly know, other than that. And Brian -- he went off to translate the Tibetan sutras into English, and he died recently. I looked him up, after years and talking about this guy, who had such an impact, he had a huge impact in my life, talking about him I said "Geez, I ought to look him up." I used all my computer skills which are modest, and I found him. And I found him in Hawaii. And I called, I got his number and I spoke to him. He was very sick and then I spoke to his wife, and she knew about me, because we were good friends. And she told me the timing was perfect, because a few weeks later he was gone. But anyways, so that was all as a result of the Army. And when I came back, my wife had taught, we didn't have to sell the kid, we still lived in a house.

**Hendrie:** Yeah, she had made it through.

**Federman:** She had made it through, and--

**Hendrie:** Gotten a job, and somehow--

**Federman:** She got a teacher's job, and she was doing very well. And she went on to teach kindergarten for another dozen years or so, and then she went on, she got a Masters in special education. she wrote a course for Santa Clara University, and taught the course to incarcerated women -- on child rearing for incarcerated women. She visited prisons; she was a terrific lady. She died at age-- just before her 51<sup>st</sup> birthday, she had a heart attack, and it just destroyed my life for the time. But she was a great, great, lady and we had 31 and-a-half wonderful years together.

**Hendrie:** Good, so rolling back now to the story, you come back from the Army?

**Federman:** Okay, I come back to the Army and I go back to Optics Technology. I get my job back.

**Hendrie:** Yeah, that's right they have to give you your job back.

**Federman:** Well, they did--

**Hendrie:** Yeah, that is the way it works.

**Federman:** They saved the job for me and I got my job back, and I wound up becoming CFO, and we went public. This is a small change department. We went public at about five million in revenue. A different world Gardner.

**Hendrie:** That is true.

**Federman:** It's a different world. I tell you, another interesting story of the time. My father-in-law, Sheila, my wife's father, Sheila's father was a car dealer. But he was a very small time car dealer. What he would do, he would on a daily basis, he would drive from dealership to dealership, asking them what kind of cars they got in trade and if people were coming into their used car lots looking for a particular kind of car. And he would note all of that down, and then if he found that they got something in trade that another guy had a potential customer for, he would buy that car. And then, it was an arbitrage business, and he had three

or four cars in a garage that he rented some space for, his inventory was never more than three or four cars, and he made a living just matching. That's the way he made his living. And he went up and down Queens and Long Island, every day that's what he did. And made \$100 here and \$200 there, and he sent four kids to college on that. This guy was a hero of mine, even though his kids didn't think he was either a wonderful father or great husband, receives a third-grade education. Third grade education, and the guy was about five foot four, tough as nails, and he just made it happen. You know, and I've told my kids, I said "Your grandfather Harry, this is one of the great men. He made it possible. Sent four kids to college; he had never been to school," you know, and they were good. So anyway, where was I going with this? Oh, Harry was the reason I had the '57 Plymouth, it was a wreck and he had a friend of his fix it up for nothin', or whatever, and he gave it to me so we could--

**Hendrie:** So you could drive, you could get to California?

**Federman:** We could drive across <inaudible>. The country

**Hendrie:** Ah, that's good, that's a great present.

**Federman:** But he had never had a new car. Harry never owned a new car, he always drove one of his old cars. When he came-- he came out to California, and he drove out in a Chevy. Then he gave us the Chevy, it was an old Chevy. And the Plymouth had--

**Hendrie:** Had died.

**Federman:** Had died, he gave us the Chevy, a Chevy Sedan, and I told him I couldn't pay him for it. He said "No, you don't have to pay me for it, it wasn't worth very much," a couple of thousand bucks maybe at the time. I said, "But I'll give you some stock in Optics Technology, and I don't know what it's worth, but maybe one day it'll be worth something." I don't remember how many shares, it wasn't many shares because I didn't have much. And then Optics Technology a few years later went public.

So I said "Pop you know, the stock is worth some money, you ought to go to a broker and sell it." He went to the broker, and he was amazed to find out the stock was worth-- I don't even remember, call it eight or nine thousand dollars. He went out and bought a new Buick. For the first time, here's a guy who is at that time 70 years old or something, first time he had a new car. I can't tell you how happy he made his daughter, my wife and me that we--

**Hendrie:** Were able to eventually give back--

**Federman:** Give back and get him, Harry the used car dealer, never drove anything less than four or five years old, and finally in his old age-- and he had that Buick until he died. He died at age 92 or 93. So that was that. That's a nice story.

**Hendrie:** Yeah, that is a nice story. So do you stay with Opto?

**Federman:** I stayed with Optics for a long time, longer than I should have in retrospect. I stayed from '61 to '68 or so, or yeah, 60-- '68 maybe '70s I don't know, sometime, say in the early 70s. And then the two

other guys and I started a company. It was an optical character recognition company, not-- what is the OCR company from Texas? The big one? It wasn't that one. Another one, we--

**Hendrie:** No, that would be along story, that would <inaudible> Yeah, Reid Dennis was involved in that one.

**Federman:** What the hell was the name of it? Anyway, we started the company, and we self-underwrote-- we did a non-underwritten offer, and I think it was called a Schedule A or something. I don't remember. But you could go out with a non-underwritten offering and we peddled the stock to people that we knew, friends of friends, or whatever, and we raised, I don't know, a few hundred thousand dollars. And ultimately the company didn't do well, and it was acquired. But everybody got their money back. But nobody made anything.

**Hendrie:** Nobody made.

**Federman:** Nobody made anything--

**Hendrie:** Made a fortune yeah.

**Federman:** Since we had put nothing in, we got nothing out.that lasted a few years and while we were selling that, I was recruited, or I got an interview with Monolithic Memories.

**Hendrie:** Okay, now how did you hook up with them, did you find them?

**Federman:** I got a call from a headhunter. This time I didn't put an ad in the paper.

**Hendrie:** Yeah, well the headhunters had found you too, they'd gotten you on their list.

**Federman:** Somehow, I got on the list. So, I got a call. I didn't know or think about semiconductors or semiconductor industry. As a matter of fact, there's another little story. When I was at Optics Technology, HR worked for me, when I was the CFO. And there was a terrific lady who worked for me. I hired her from Macy's, she was a trainer at Macy's, a sales trainer at Macy's. Very bright articulate woman, and we developed a really nice professional relationship. I liked her, I cared for her a lot, and the feeling was mutual.

One day she comes into my office and she's tearful, she's leaving. "Leaving? Ann, how could you leave? I mean I need you, we need you." You know the whole story. "Where are you going?" She says "I'm going to work for a new company called Intel." I said "Intel? The semiconductor? Never make it. Never make it, it's a big mistake." And I couldn't talk her out of it, and it turns out her name was Ann Bowers--

**Hendrie:** Oh, no!

**Federman:** Yes, and she not only becomes the VP of HR, she marries the boss. She marries Bob Noyce and that's how I developed-- even though Bob and I were colleagues in the industry, I was a pipsqueak

and he was the man. So I wouldn't have gotten nearly as close to him if it wasn't for Ann. But because of Ann, Bob and I became friends.

**Hendrie:** Very good, that's--

**Federman:** That's a good story.

**Hendrie:** Yeah, you found her in Macy's.

**Federman:** Macy's, found Ann Bowers in Macy's and she was a wonderful--

**Hendrie:** You recognized a talented woman.

**Federman:** She was a wonderful lady then, she's a wonderful lady now.

**Hendrie:** And went to work at Intel and Bob Noyce recognized <laughs> a wonderful lady too.

**Federman:** That's right, Bob Noyce, said "Hey I've got more than a VP HR here." And they got married and had a-- from everything I could tell, they had a happy marriage. And I was at Jerry Sander's wedding when somebody whispered to me that Bob Noyce just died.

**Hendrie:** Oh wow, that's terrible, so early.

**Federman:** He was getting into his plane and he collapsed. And so I called Ann that afternoon, and I flew out to Austin the next day, to see her. She was a wonderful lady and he was a great guy. He really was a terrific guy, he was--

**Hendrie:** Yeah, I only met him a few times, he was--

**Federman:** I'll tell you Gardner, there's some-- he had the old thought that "They don't make them like that anymore." but every once in a while, you run into somebody to whom it really applies. This guy was so humble. He started it all. I used to tell him I said "Bob, look how nicely I live, it's all because of you. Thousands of people in this valley live so well, all because of you. How do you feel? How do you--

**Hendrie:** "Doesn't that make you feel good?"

**Federman:** "Does it make you feel good?" And he made Henry Fonda seem--

**Hendrie:** Like a bragger <laughs>.

**Federman:** It was always "Ah shucks," he was an "Ah shucks" kind of guy. And he started it all, took-- he and Gordon Moore were a great pair, because Gordon was the dedicated engineer and Bob was the much more approachable effervescent type of guy. But they were both superb technologists. And what they had in common was great humility, great humility. I'll tell you a story about Gordon, as we get along here that very few people know.

**Hendrie:** Okay, I'll remember to ask you

**Federman:** And I'll remember to tell you because it's worth telling.

**Hendrie:** Okay, good. So you get a-- Monolithic Memories, the headhunter approaches, you go in and--

**Federman:** So I meet Ze'ev Drori, and he's smart as hell, he's a wiry, hard guy, he's an Israeli. Every Israeli you meet was either a tank commander, or a parachuter or something like that.

**Hendrie:** Yes, I've met a few of those to myself, yeah.

**Federman:** And it's all true, they're not full of shit because--

**Hendrie:** They really are smart, hard ass guys <laughs>.

**Federman:** Smart guys, they all had to serve in the Army, because nobody escapes. So, they all are trained. And in the Israeli Army, rank goes first not last, so you have a higher incidence of casualties among the officers than you have in the noncoms or the enlisted. And, they're a tough bunch. A lot of them don't look like much, but I'll tell you, put the right uniform on them, and these are tough mothers. So he was a very athletic guy, he liked to ski, he liked fast cars and he's very smart. And as I came to know him over time, he was a superb technologist.

**Hendrie:** And he hired you, yes?

**Federman:** And he hired me, he hired. We got along and he hired me. He didn't know what a CFO was supposed to do, so his interviewing was not--

**Hendrie:** It wasn't one of your tough interviews?

**Federman:** It wasn't a tough interview. His hiring me was not a testimony to my wonderfulness, you know. But he did hire me and, I went to work at Monolithic Memories. I started to learn about the semiconductor industry. Yeah, I came in I knew nothing about the industry. I didn't know a semiconductor from a short orchestra leader, you know? But, at that time, the industry was-- we're talking now in 1979, right?

**Hendrie:** Well let's see, I think we're talking earlier. When you went there it was 19--

**Federman:** I went in 1979, it was 1970.

**Hendrie:** Yeah, you went there in '70 wasn't it?

**Federman:** Yeah. So we're talking 1970 and, we weren't that far advanced from the invention of the transistor. The integrated circuit had just been invented, whether by Texas Instrument or by-- Intel got the credit. So, these were very early days. It was a very collegial business that even the competitors... the employees of the competitors helped each other out. Everybody had a fab. If you ran out of diffusion tubes, the other guy, your competitor would lend you the diffusion tubes until your new tubes came in. It

was that type of sharing, very collegial. I think it would be very hard to find a business that combined such technological innovation, absolute IQ brightness, and integrity. I think it would be tough to find an industry that was so completely awash in that.

Sure, there were very bright guys on Wall Street, and things, but the integrity of Wall Street is you know, it's not with a capital I. But in the semiconductor industry, the integrity was pristine. Both the scientific integrity... there was no arm waving or bullshit. Either you could make it or you couldn't make it. There was a great honesty in our business. That was so wonderful to be a part of, you just felt that you didn't have to read between the lines, you know?

**Hendrie:** Yes, there weren't layers of hidden agenda behind everybody?

**Federman:** It was just lovely, you know. Everybody wasn't terrific, and you didn't love everybody, but the industry was-- you got along with almost everybody, you knew everybody in the business. People would take your phone calls. They were approachable; you could call a CEO, and get the CEO on the phone. So when I learned about the industry, I started calling CFOs at other semiconductor companies. They say "Sure, come on over, let's lunch. I'll tell you what the problems are here, and what you have to watch out for." I didn't know anything about cost accounting, and "How do you account for the cost of a wafer," and what the ins and outs of my job were. I was a competent accountant, and probably a competent controller and maybe even a semi-competent CFO, but I didn't understand what I had gotten into, the nuances of this business.

**Hendrie:** Yeah, you had never worked for a manufacturing company?

**Federman:** Never worked for a manufacturing company. Well I did at Optics Technology --m we made CW lasers, but it was, you know, small change. And these guys would talk to you, and it was terrific.

**Hendrie:** What was Monolithic Memories doing then? What was their reason for getting founded?

**Federman:** Their raison d'être was bipolar, programmable read-only memories, bipolar PROMS. Those were the memories. Those were the monolithic memories that they made. And they made 1K and 2K and 4K. 1K, 2K and 4K bipolar PROMS. They made them on 4 or 5 micron technology, in their own fab on 2 inch wafers. It was a big thrill when it went to 2 ¼-inch wafers. And every once in a while you got a wafer to yield, and you sold these things for \$30.00 a piece or whatever. The price or the ASPs were astronomical compared to today. And the chips, you didn't need a magnifying glass to see the lines on the chips because they were big chips. And this was the beginning of the dual-in-line packages, ceramic packages. Everything was at the beginning... I didn't realize....I look back that way... there I was. I was at the beginning!

**Hendrie:** Yeah, lots of stuff.

**Federman:** Lots of stuff.

**Hendrie:** It lasted forever.

**Federman:** It lasted forever. It was great to look back, it was the beginning. So Monolithic Memories made these bipolar PROMS, and they were pretty fast. It was MOS at the time, but it was not CMOS. The fast MOS was nMOS, and Intel stuff was nMOS. Intel also made bipolar PROMS at the beginning, but they dropped it. They cut that. And so, we made bipolar PROMS and we made bipolar ROMS, and we had a few other chips that sold a little bit from time to time. And then we came up with the Programmable Array Logic, the PAL. That was the thing that made the company.

Signetics actually invented the PAL. They called it a PALU, a Programmable Arithmetic [Array] Logic Unit. But the problem with Signetics, they had both the "And" and the "O" were programmable, which made it a very difficult thing to program, and they didn't have software which would enable you to sort that out. What MMI did, under two guys, John Birkner and H.T. Chua, Birkner was the product guy and Chua was the design guy. They improved the product design and programmability.

**Hendrie:** I remember meeting Birkner when I was out there.

**Federman:** He improved the Signetics approach, made a fixed-AND and a programmable-OR, which made algorithms much easier. And he came up with PALASM, P-A-L-A-S-M, which was the software, which enabled you to program this thing, and that changed everything. Signetics fell by the wayside. We became the standard in programmable logic, and kept increasing the density of those chips. And it was the forerunner of what turned out to be gate arrays and all kinds of programmable devices.

**Hendrie:** I remember Data General used them on the big machines. They used them like crazy.

**Federman:** Like crazy. Still do. Altera, Intel bought Altera for billions of dollars, and Xilinx is still worth many billions of dollars, and that's what they do.

**Hendrie:** Birkner joined them in '75, and then they announced the PAL product in '78 or somewhere around there?

**Federman:** Right, somewhere around there.

**Hendrie:** At some point, MMI got out of kilter, and Ze'ev made some poor decisions. Talk to me about what you saw that was the problem.

**Federman:** The company's growing now in the early 70s, and going very nicely and is almost profitable, not losing much. Ze'ev, it turns out, had some very unpleasant characteristics. As smart as he was, he had no compassion or consideration for other people. And he would chastise, sometimes chastise would be too modest a term, he would excoriate people in front of others. He would embarrass them, and make them feel really crappy, and he would intentionally or unintentionally. His style was he played a very unpleasant political game. There were three guys working on a project, he would take one of them into his office and close the door. The other two didn't know what was going on. And the guy would come out, and say "I can't tell you what happened," and so there was always the uncertainties and who was on the right list or not and who is favored, and he would scream and yell, very harsh. In the late 70s, late '77 and '78, the industry was booming, was starting to really take off, and some of the guys just wouldn't stand for his abuse and they left. So, we started to lose some technical talent, starting in '78.

**Hendrie:** Some of the good people?

**Federman:** Some of the good people. They started to have serious alternatives, and the company was close to going public at that time. You can go public just as Optics Technology went, you could go public on very little. It was close to going public, but then we hit a snag and we were going to go public with Kuhn and Loeb, who no longer exist, but was a major firm then, and then we hit a snag and they wouldn't take us.

**Hendrie:** A financial snag?

**Federman:** We hit a yield snag.

**Hendrie:** Obviously. Yield snag leads to revenue snag.

**Federman:** Revenue snag and they wouldn't take us and that was in '77 or '78. So, it was a disappointment and people had other alternatives. Things were getting good all over, and Ze'ev was getting more and more tense. The yields weren't coming up on the new products. We had a 16-bit ROM that was a big fat ROM, and it was a high-priced product and we couldn't even get it to yield. And the fab was teetering, and then by the middle of '78 it was really serious. Yields had fallen. Some of the fab equipment was not obsolete but not adequate to the task. We didn't have enough capital to get new equipment. We couldn't get lease lines, and all this created stress and pressure on Ze'ev, and he behaved more and more objectionably.

**Hendrie:** Irrationally and objectionably?

**Federman:** More irritably than irrationally. He became very irritable and very short, and very abusive, and it amplified the notion of people wanting to leave. So, we come into the spring of '79 and the company's going under. We got enough cash for 3 or 4 months, we had one major venture capitalist, which is the Rothschilds. They said they're not putting any more money into the company.

**Hendrie:** Were they the only?

**Federman:** They were the only venture capitalist, and they were not going to put any more money in, and Ze'ev lost weight, he was visibly upset, behaving very poorly. Sometimes he didn't come in, you didn't see him, and he was really going south emotionally. So on March 19th of 1979, I get a call on a Saturday morning from a member of the board and said "We're at the company this morning and we'd like you to come over, would you come over?" and I said "Sure."

**Hendrie:** Who was this on the board?

**Federman:** It probably was Charlie Lea who called me. It might've been Larry Sonsini. Larry was also on the board. The other board member was Charley Blalock. ( Eugene Kleiner didn't join the Board until after the 1980 financing.)

**Hendrie:** Well you had some great board members.



**Federman:** We had great board members and Charlie Blaylack and Bob Wilson of Memorex. Bob came later. He wasn't on the board then. So I got this call and I show up, and they're sitting there, they're looking very sober. Ze'ev wasn't there, and they asked me if I want to run a company. To run a company. So, just a few nanoseconds of my thought process. My thought process was totally scared out of my wits, running a semiconductor. There'd never been a non-technologist, not an engineer, running a semiconductor company<INAUDIBLE>, and I could understand why. But I think to myself, if we fail, he did it. If somehow miraculously, we turn this god damn thing around, I'll get the credit, so it's a no brainer, and where else except at a failing company would they offer it to a bean counter?

**Hendrie:** No head hunter is ever going to call you.

**Federman:** To run [INAUDIBLE].

**Hendrie:** Because the board is going to say...

**Federman:** "Why did we hire a bean counter to run a technology company?" This was an exclusive technologist club. No bean counters need apply. So I said "Yes I'll take it," and they said, "Good" and Ze'ev will remain chairman on the board, and we'll talk to him and you are now President." I was still not CEO, I was President. He remained CEO and chairman, and I said, "Where was Ze'ev?" and they say, "Well he's going to be away for a while. He's recuperating. He had gotten into a very depressed state." So, he went away, on Monday morning we have our staff meeting, everybody but Ze'ev, we all sit down there and where's Ze'ev and I said, "Well, two things. He's recuperating, he's not going to be around for a while and I'm the new President of the company." So, these guys said, "What? Who? What?" and none of the board members had the courtesy to show up and introduce me. I had to introduce myself, and they said, "Well, do you have a letter, do you have something that says you are?" I said, "You're going to have to take my word for it, they didn't give me anything in writing." I didn't ask them for a raise, I didn't ask them for more stock, I was so god damn naïve. I thought it was such an honor and such an incredible gift that they had given me. I was the first, maybe still the only, non-technologist to run a semiconductor company.

**Hendrie:** An opportunity.

**Federman:** An opportunity. I didn't ask them for anything, I was such a shmuck! God I could kick myself, because I never got the opportunity again to put myself in a good position. My colleagues finally believed me. But this is like a Mac Sennett comedy, right? A guy shows up and says, "Hey believe me I'm the President." It's like come on, give me a break. But they finally did believe me, and I didn't know what to do. I never had a mentor. Ze'ev was not a good mentor, to be President and run a company. The great guy was Mike Callahan, who recently passed away. He was then the executive VP of the company. He had come from Motorola; he was an engineer, and also, he had the detail of a cost accountant. He was very, very good at knowing all the numbers and who was doing what, he had very good discipline. He wasn't a product guy, but he really knew how to run a fab.

**Hendrie:** He was on the process side?

**Federman:** He was on the process side, but design worked for him also. And at that time, the guys who were running the fab, it was a disaster. We were getting very poor yields, it was terrible. After I was telling them I was President, I said "What I'd like to do is to speak to each of you individually, and then we'll get together again. I just want to get your perception, one on one, and tell you my thoughts, and then we'll all get together again."

So, Mike, bless his heart... if I had one guy that I wanted to have with me in a foxhole it is Mike Callahan. This guy, he'd save your life. This guy is a wonderful guy. He was a wonderful guy. So, I sit down with Mike and I said "Look Mike," or something to this effect, I said, "We're not making any wafers, we're getting crappy yields and we can't get the revenues, we'll never pull out of this. I'd like you to go down and run the fab, and just do that, and I'll take all of your other responsibilities, and as soon as the fab is working again you can have it all back. I'm not trying to demote you." And he said "Okay, I'll do it," and then when we're leaving, he takes my hand, then he shakes me and he said, "Irwin, you don't have to worry about me. I'm here. I'm here for you, we're here to the end," or whatever, and I started to cry. I started to cry. He just said "Don't worry about me." People were leaving right and left.

**Hendrie:** Yeah exactly. Sinking ship.

**Federman:** Sinking ship. There was a guy who worked for Mike in production control who was a very disruptive, political guy. And I told Mike that now that the guy works for me I'm going to fire him, and I hope Mike didn't feel badly about that because he didn't fire him. And now the first thing I'm going to do is to fire this guy. And Mike says, "I understand it, but we have so much to do, so many things going wrong, I didn't want to lose a guy in that position."

Well I learned something, at that moment, I recognized that this is one that wasn't reflexive, retrospective. It was at that moment, and I've never lost it. The wrong guy is worse than no guy. An organization, people will come together to fill a hole because nature abhors a vacuum. They will fill a hole. A wrong guy is a cancer. A wrong person in a job is the worst thing you can have. Better have a lot of holes than wrong people. The holes will get naturally filled in one way or the other. But the wrong person creates disease.

So the next thing I did was I got this guy, and I don't want to give you his name, and I got this guy and I said, "Mister, I'm going to have to let you go." Couldn't believe it. I needed everybody right? We were losing people left and right, and he says "How come?" and I told him exactly why, and I told him I thought that probably basically he was a good guy, and he's certainly qualified, technically qualified, to do a good job, but he's got to have an approach, a major surgery on his approach. It's not a zero-sum game, this is an additive game. You don't win by putting somebody else down, you don't win by gaining favor, you win by winning, and when we win we all win. And I said "You learn that, you'll be good, but not here. I don't have the time to teach you, and you've got to get out of here." I walked him out, not that day, that moment. Out. I said, "You come back on Saturday and get your stuff." This was a Monday, and I said, "But as of this moment you're no longer with the company."

If I needed it, I suppose I did need it, but if I needed the approbation of the crowd, that gave it to me, because everybody knew this guy was bad news. So, the fact that I made a decision right away and got rid of somebody everybody disliked and thought was a real problem, I got a lot of brownie points, and

then I talked to each of the guys and got their perspective of what was the highest priority, and we went to work on fixing the company. I don't think if I was an engineer, I could've presided over the turnaround. I think I would've known too much, been too afraid. The facts would've overwhelmed me. And if I had been a manager before, if I had run such a company, I don't know that I could've presided over it. But the fact that I was green as grass, it was in my favor. And the fact that I didn't understand too much. I was emotionally involved, don't get me wrong. I'd been with the company for X number of years and I wanted it to succeed. But on the other hand, I also had an objectivity that comes from not being technical, and not getting hung up. I had no skin in any of the technology game.

So I got them together and we made a few changes right away. In no particular order, the business, the semiconductor industry by the spring of '79 had really blossomed. Started in '78 but by '79 the industry was booming, customers were double ordering, typical for the industry, backlogs were bursting, companies couldn't ship enough. Everybody was making it like crazy, except us. So, you could sell anything we could make, and we couldn't make anything. We have terrible yields. But what we did have, was we had barrels, filled of all the reject parts. We had tens of thousands of reject devices, maybe more than that, barrels and barrels, never had thrown them away.

So, I asked the guys, I said, nobody binned testing at the time consisted of good or bad. The parts were not tested to determine their actual specifications, just whether they met the required spec or not. Testing for actual performance characteristics is called "binning.") out at that time, if the spec was 45 nanoseconds, t and the part couldn't do it, you threw it away. There was no binning out. So I asked Tom Branch, VP of sales, I said, "What if some of these parts don't make spec but they work, could we sell them?" He said, "These guys (our customers) over spec all the time. They want margin so they over spec all the components, and you probably could, we probably could." So I said, "Okay, what we want to do now is resell the backlog, and see if we could resell it at the same price for lower specs." He says, "Well how do we know what we've got?" and I said, "We're going to retest all these fucking parts." He said, "You're going to retest these parts?" The pins were flat, they were bent, they had been jammed into barrels.

**Hendrie:** They've been in a barrel.

**Federman:** So I said, "Okay, what we're going to do is, we're going to give people tweezers and we're going to straighten all those pins, and we're going to test every one of those god damn parts, and we're going to see what they can do." So starting today, we're going to reorganize. All new product development stops, because we aren't going to be alive for new products. let's see what we can do with all the engineers who will not now be working on new products. So we got together with H.T. Chua and a couple of the other engineers and engineering managers, said "We need software, test software to be written, which bins out these parts." We didn't have such software. We had go, no go. Tests. We need software Which bins out these parts, and we got to take a couple of barrels and do this really quickly so we can tell Tom what's likely to be the specs we can make. The chances are one barrel was as good as another barrel. So that was our statistical sample, brilliant.

**Hendrie:** Barrel number six is going to be the prototype.

**Federman:** Barrel number six was going to be the statistical sample, and that's going to be what we can make. So how are we going to get all these things? So we said "Okay let's get wives and kids and husbands at night and we'll bring in pizza, and we'll give them tweezers and we're going to go 24/7. We're going to be straightening pins," and I sat with them too, and we got caps saying we're going to make it, we got all the hokey stuff, we played jazz, we played music, pizza, no beer. But we had pizza and coke, and fathers, mother, you can't imagine the crew. Our HR guy says "Hey you're breaking the law, you're not paying these people, you're supposed to pay them," and I said "Fuck it." Pardon me. We'll take our chances. We can't pay them. We can't afford to pay them. But we're doing it and at the same time we got morale going. We've jittered up a good time here, getting excited about this, and in no time at all, and I don't want to misstate it, but no time at all, we had our sample of what we could do and those parts worked.

With very few exceptions, the parts were functional, and it was a matter of speed. It was all performance. We had them binned out. Tom and his reps went out there. We didn't have a direct sales force so we had reps, but the reps loved this, we treated the reps very well. They went out and said okay they'll gag it down, they'll take this and they'll take that, and they were reselling a backlog at different specs, so it went for the same price. So that was working, and we needed more people operating testers because we didn't have enough test drivers. So, we needed volunteers from accounting, from sales to come in at night and run a tester. We'll teach you how to run a tester. We'd run a tester, two-hour shifts. So accounting people came in, marketing people came in, people came in at night, and it was all again music, and pizza, and everybody yelling and screaming and we're going to make it.

**Hendrie:** Totally turned around.

**Federman:** The attitude was like a baseball game, when there's a big rally going on, and they were all screaming and yelling. I had posters made. We had the hokiest stuff in the world. In the course of this period, and I'm not putting everything in chronological order, but in this period, in this six-month period in which we did turn the company around, we adopted the slogan. It was called STP, and we had cans of STP laying around, and I used to have one in my office. STP is the engine additive that makes your engine run more smoothly.

So we're going to have STP, which should make our engine run more smoothly, and S is self-fulfilling prophecies, T is trust and P is pride, and this is our formula. Self-fulfilling prophecy, we can do it, we will do it, we'll make it happen. Trust, we're going to trust each other, we're not going to second guess each other. If you say it, I believe you and we'll do it, and pride. Sick and tired of working for a loser. This is going to be the greatest god damn company. There was not a Silicon Valley then, but in the peninsula, in Sunnyvale, we're going to show them. People latched on to that. We had STP caps and we did all this hokey stuff; and people showed up and put out. These barrels of parts got tested and a lot of them got shipped. And Callahan, it took him 3 or 4 months, and he fixed the god damn fab and the yields were going up, and I don't know how long it took but it didn't take long, maybe 6 months before we broke into the black again. Never needed any more money. We did it with the people we had. We had no other products, no new equipment, no new people. The same people who were going down the tubes took it out of the tubes. It was a great learning experience. It was a great learning experience.

**Hendrie:** No cash inclusion?

**Federman:** We got cash afterwards.

**Hendrie:** Once you could show you could do it, but you don't need it?

**Federman:** We needed it because Bank of America had the leases on our fab equipment, and they kept threatening to pull the plug. They wouldn't give me a variance until the end of the month. They wouldn't give it to me in advance. They'd give me a variance if we made our numbers at the end of the month. They were really harsh, and it put a lot of pressure on me.

I had worked with Tom Perkins at Optics Technology. I called Tom and he was a leading venture capital light at that time, and I said, "Tom we don't really need it, but life will be much easier if we had a couple, or 3 million bucks," and I told him the story and he led the round, 750 thousand from Kleiner Perkins, this was small money times. 750 thousand from Kleiner Perkins, Sutter Hill was there, Venrock was there, a few others. We did a 3 million-dollar deal. For almost all those venture firms, this is one of the highest returns they ever had. Not the most dollars they've ever made.

**Hendrie:** But in multiples?

**Federman:** In multiples, because we closed the deal, we shook hands on the deal in December of '79, we closed the deal in December '79, we got the money in January of 1980, and we went public in August of 1980. , it was a terrific deal for them and it took the financial pressure off of us. Our revenues and profits, we started to make money and the revenues were on a ramp. In the course of that, I went to visit a number of customers because I had a tough message that I had to impart to them. I went to Data General, I forget the guy who was head of purchasing at data general at that time, He was a tough guy. I went to him and Hewlett Packard, and DEC, and others, and I told him "Here's the problem I have. We have yield problems and we can only get so many wafers out. It's getting fixed but for the next three or four months, we're going to have a real problem, and I need X dollars of revenue per wafer in order for the company to survive." I just laid it out for him. There was no nonsense. I said "I need X dollars of revenue per wafer. If I'm going to make a wafer for you," and I'm talking to Hewlett Packard now, they were using 16-bit ROMS and we were sole supplier. "If I'm going to make a wafer for you, and I'm getting 25 die per wafer, I got to charge you \$40 bucks a part in order to make money." These are phony numbers. I don't remember the exact numbers.

**Hendrie:** You'd done the math.

**Federman:** And he said "That's triple what we have on a purchase order." I said, "Yup, it is. But I'm charged with getting this company to survive. I can't deliver those parts at \$12 or \$15," whatever price is. "I can't deliver those parts. You can sue me, but we don't have anything, you're not going to get anything, and you're not going to get your parts. What I have to do, my highest priority here is saving the company, so I've got to get \$40 bucks for those parts, or no parts." They look at me, and said "Get the lawyers in here." I said, "You can get the lawyers in here. It isn't going to help." This is, when you have nothing to lose, you're fearless. You can't intimidate me. You're not going to get me for criminal activity. This is civil,

and civil you can only get financial reparation, and we have no financial. We're broke. We're bankrupt. You got to bet on us to survive. So help us survive, and as soon as we can, we'll get the price down. Well, the guy at Data General, he brought a lawyer in and I said, "Look, I got a lot of people I have to talk to. This is not very pleasant for me. Either that guy leaves this room and we talk about what we have to do together, or I leave and you don't get any PALs." He says, "You're intimidating me. You're threatening me," or, "You're extortion." I said, "It's not. Read my lips," or whatever I said to him, "Listen to me. They made me the CEO. I gotta be-- well, they made me the president not the CEO. I gotta save the company. This is the way I have to do it. You gotta-- give me a better-- tell me how to do it.

**Hendrie:** Yeah, give me a better idea.

**Federman:** Give me a better idea. So the lawyer left and HP signed up. They-- HP was very angry. It was triple-- we tripled the price on HP. They were very angry and they put terms in it that the price goes down if we don't deliver on this. So we didn't start this until we built up a little inventory so I wouldn't have to pay any penalties. But the upshot with HP is we delivered exactly-- we hand delivered the parts every week. HP, it was a few blocks away. We hand delivered the parts every week. And one day, one fine day, our-- the rep who handled HP and a local guy who worked for us went into HP and he said, "We got some news for you." When the-- my guy said, "What do you-- what now?" and they said, "We're gonna lower the price by 50 percent." He said, "What?" Said, "We're lowering the price by 50 percent. It was \$40 and now it's \$20 what it was."

**Hendrie:** Still higher than the original price?

**Federman:** Yes, never heard of it before. I got a letter from the V.P. of material at HP. Said it was the first time in his entire career that a vendor unilaterally lowered the selling price. We were the fair haired boys at HP. We had tripled the price at 'em and then lowered the price by 50 percent without anybody asking 'em. Still higher than their initial price, and they loved us.

**Hendrie:** That is absurd.

**Federman:** There's another great lesson there.

**Hendrie:** Yes?

**Federman:** Fixing a problem is better than never having had one. You get so much recognition for even-- they forget who caused the problem. But you come in and fix it, the relief of having the attention, you get-- so sometimes, when things are going really well, if you had the courage, you create a problem just so you could show 'em that you could fix it really fast. I tell ya I'm not kidding. If I had the balls to do it, I would do that because that's when you really get credit. Nobody gives you credit-- they take you for granted if it's just boom, boom, boom -- everything's working like clockwork. And, as soon as you fall outta bed, you're disturbing 'em so much, "How could you do this to me?" But the guys who fix problems fast get a lotta credit.

Anyway, I got that from Hewlett Packard. It was incredible. Until MMI was merged into AMD-- it was sold to AMD-- we were HP's favorite guys. We had created a relationship in that period, and it came down--

we lowered the prices back to the original purchase price for everybody over time. Callahan fixed the fab. We finally ran out of parts in the little barrels. We didn't have any more parts in the barrels. The attitudes that the people had developed in this five/six month period carried on. Our existing people recruited people who had left, and there's nothing better for morale than getting somebody who left back, especially if they're highly regarded.

We started to bring people back. It was like a college campus. It was "Rah rah." We had changed the culture of the company and people were feeling very good. In the course of this called "turnaround", we had very frequent all-hands meetings because people worried about their jobs and the company-- the plight of the company was apparent to everybody. And at one of those meetings, George Hunter, who was head of production control-- he was a real-- he also has passed away prematurely. George was a real cheerleader, was a wonderful guy. As an aside, George Hunter was a-- he grew up as a ragamuffin. He was into drugs and all kinds of stuff. And Mike Callahan hired him in shipping and receiving. He had a long ponytail, was scruffy looking. I mean, even his socks didn't match, and he smoked and he always smelled of alcohol and he was really in-- I asked Mike, "Why did you hire a guy"-- he said, "Well, there's good stuff there. There's good stuff." So-- and he finally wound up running production control. Didn't smell like alcohol anymore. He got rid of the drugs and Mike sent him to college at the-- what is the University of-- they have campuses in all...

**Hendrie:** Phoenix.

**Federman:** Phoenix, University of Phoenix. The University of Phoenix and George got a B.A. or a B.S. or something. And so George loved Mike and Mike loved George and, at any rate, that was just a side story. But George was a great cheerleader in our company. He was a really terrific guy. So, he gets up at one of these meetings and said-- he said, "Irwin, what's your vision for this company?" So, I said-- and I don't know. I'm paraphrasing myself. I said, "George. I'm thinking about next week's payroll. That's my vision. I wanna make the payroll. But you're right and somebody was running a company, a president of a company, should have a vision. So I'm gonna work on it and I'll let ya know when I come up with a vision. But you're right. I should have a vision."

So sometimes later, whenever it was, I was at one of these meetings. We started off having no host and then, as things were getting better, we bought the pizza and beer. So things went-- it was a sign that things were getting better when it's on us and you didn't have to pay for your own beer. And we had this meeting and I answered the questions and I told 'em what's going on. And I said, "Oh, by the way, George Hunter asked me some time ago if I had a vision and I've come up with a vision. I've thought about that and I do have a vision, and my vision is that, whenever an MMI employee walks into the Wagon Wheel in the evening"-- the Wagon Wheel is a local saloon.

**Hendrie:** Yes, uh-huh.. I know about that.

**Federman:** "Walks in the Wagon Wheel, everybody stands up and applauds." Well, I'll tell ya. Everything went silent and then it was great screaming and the tears were coming out. I mean, everybody. I was crying and they-- because that's what it was all about. You know?

**Hendrie:** Yeah.

**Federman:** It wasn't about money and getting rich. We had been excoriated in the community. People thought we were bankrupt.

**Hendrie:** As being idiots, yeah.

**Federman:** We were bankrupt. Every company was making it and we were going down the tubes and, "Why would you wanna work there?" And, "I'll tell you what. We're gonna make this the company you always wanted to work for. We're gonna be from worst to first and we're gonna do it with the same bunch of s guy-- we may not be much but we're all we've got and we're gonna make it happen." And when I said that and it came to me-- I don't wanna take credit for this. This came to me like everybody was talking to me and I was just putting it into words. I had the sense that this is what we wanted to hear and what-- I wanted to hear that. And the notion that you walk into the bar and everybody stands up and applauds, and you have that kinda recognition that...

**Hendrie:** And respect.

**Federman:** ...and respect. And it was just terrific. It was an emotional turning point to the company.

**Hendrie:** Wow.

**Federman:** That particular thing, it was overwhelming...

**Hendrie:** That's wonderful.

**Federman:** ...emotionally. It was terrific.

**Hendrie:** Yeah, I can see that, yeah.

**Federman:** And then we went on and on and we were consistently profitable. Once we broke into the black, we never lost money again. Through two subsequent semiconductor downturns, we never laid off anybody. We had a lotta cash. I raised money whenever we could. We had three primary offerings and so we-- at that time-- when we merged with AMD, we had over \$100 million in cash. We were doing \$400 million in revenue by that time, which is not bad even now, but that was big money. We're a \$400 million rate, about \$35 million a month and we had a lotta cash at that time.

And so we played accounting tricks. We-- in one of the downturns, it wasn't an accounting trick. Well, we did. It was an accounting trick. We said, "Okay, we're gonna put-- we're gonna be on four-day work weeks." <Inaudible. I said, "Look, when I went through tough times with my family, I had four kids. I didn't throw one of the kids away. We just ate less. We just made it work. So this is what we've got. We're gonna make it work. We want everybody to stay. I recognize that some of you have mortgages and with a 20 percent pay cut, you can't make it. You gotta do what you gotta do. But we gotta do what we gotta do. Here's the deal. The deal is that we wanna keep everybody in place so, when things turn around, we can instantly increase productivity and we'll be ahead of the pack. Everybody will be scurrying to hire people



they have laid off. They caused ill will. We're gonna stay together as a family and we're gonna be ready to go when things-- and that's the deal. Now if you can't handle that, what we'll do is advance vacation to a certain level 'cause we have the cash to do it." We didn't have a cash problem. We had a P&L problem. So, "We have the cash to do it. So we'll advance you the pay you're losing against vacation. So you lose your vacation for some years in the future. And, of course, if you leave the company, you're gonna have to pay it back 'cause it's gonna be in accounts receivable. We're advancing you this money." So some people took advantage of that and some didn't. Some just bit the bullet and some left, but not many. And then, when things really got better-- I'm making it up. A year later, six months later, two years later, who remembers? We bonused out the receivables, and we gave it all back to 'em and-- 'cause we had the cash to do it and then we had the P&L to do it. So we played accounting games and we stayed profitable and we kept all our people.

**Hendrie:** Ah, so that's what you did during the-- when...

**Federman:** Few pe...

**Hendrie:** ...after the first recovery.

**Federman:** After the first recovery, that's how we went through the downturns.

**Hendrie:** You went through the downturns, which always come and everybody has to lay off and...

**Federman:** Downturns and we were the only guy-- Intel was laying off. Everybody was laying off. We were not laying off a person; didn't lose a nickel. Didn't lose a nickel in any month subsequently now. The most consistently profitable...and we were because everybody understood the game. Everybody understood that it was one for all and all for one. I mean, it's not bullshit <inaudible>...

**Hendrie:** Yeah, yeah, I know. It isn't.

**Federman:** ...this is real. This is real. We tried to take care of one another and, at the same time, make good products and make 'em to spec and all of that stuff was getting better as time was going on too. And then, finally, the reason we sold ourselves to AMD. Then we're going, "Well, we had very large market share," probably 65 percent market share. T.I. had 25 percent, National had 10 or something.

**Hendrie:** Yeah, well, but the PALs had been very successful.

**Federman:** Very successful and we owned the market. But what happened along the way was Cypress Semiconductor got started. And I knew T.J. and he was telling me, he says, "Bipolar is gone. It's history." I said, "What are you talking about?" He says, "A few years from now. There won't be any bipolar. CMOS can be just as fast and the power is much less. And people are not gonna-- as performance keeps going up and you keep drawing more and more power, the cost of heat sinks and power budgets, you're not gonna be able to do it." And he convinced me that that was correct.

So I said, "Look, T.J., you guys are using"-- I forget what fab they were using. "You're using some crap. We got a fab that's hardly being used because"-- this was during a down time. "We got a fab that's hardly

being used. Why don't you"-- it was just a startup. He was-- he had no revenues yet. I said, "Why don't you do..."

**Hendrie:** He'd started Cypress though.

**Federman:** He had started Cypress.

**Hendrie:** He'd left, yeah. He'd left to...

**Federman:** He had left it-- AMD and-- "Why don't you use our fab to do your development work? We'll take some stock for that. We don't need the cash. We'll also guarantee your leases and you'll give us stock for that, and you'll teach us how to make CMOS." Done. A deal. He loved it. We had a brand new beautiful Fab. It was a-- what was it? A four-inch fab or a five-inch. I don't remember. Four-inch and he loved it. It was great. <Inaudible> he had a little sandbox that he could play in. There was nobody else there and he could do that. Our guys would not buy-- "CMOS is bullshit. It's a toy. It's for watches. It's low power. It's low-performance, never get there, never be anything." And they were actually dragging their feet and they wouldn't seriously address this. That's the only time that I wish I was a Bob Noyce or something. I coulda gotten them in a room and gotten on a chalkboard and shown 'em why.

**Hendrie:** Yes, exactly.

**Federman:** But I couldn't, but I believed T.J. and he was right.

**Hendrie:** Yeah, of course.

**Federman:** So, when Jerry and I met one evening at an event, he said, "Irwin, maybe we oughta talk." And I said, "Jerry, I've been thinking the same thing." We had very complementary things. We had hardly any overlap. And, if our guys had adopted CMOS, we'd be Altera or Xilinx today. The chip innovations would've come and-- but they wouldn't do it. They wouldn't do it and I don't-- I'm telling you this not pejoratively. Those guys-- it was amongst the most wonderful time of my life, and I was surrounded by the most wonderful people I've ever been in. And they were loyal and they were honest and they were hardworking and they all made it happen. It couldn't have happened without hardly any small bunch of 'em. Everybody put in enormous amount of emotional and intellectual and physical energy into it. So, it was a great experience but they were just captive of their own preconceived notions. So, we wound up selling to AMD with successful-- it was a successful merger as a matter of fact. Jerry [Sanders] didn't lose any market share in PALs. He had some PAL business...

**Hendrie:** Yeah, I know he had some.

**Federman:** ...that was...

**Hendrie:** Yeah, on his own.

**Federman:** ...That was pretty good, and he didn't lose any market share. We had a guy, Rich Forte, who went to Texas and fixed his EPROM business. He was losing-- it was bleeding. His EPROM business in

Texas was bleeding. Rich went in there and fixed it. Rich was the terrific operations guy that we had at that time. Worked for Mike Callahan. So we had a hundred million dollars in cash. Jerry was outta cash. He had never had a market leading product. PALs were his first market leading product. So, everything worked and I have great affection and high regard for Jerry and-- but, unfortunately, my wife suddenly died shortly after that and I just <sound effect>. I left. I...

**Hendrie:** Yeah, okay, I was wondering because you were m-- you-- the merger, you were vice chairman.

**Federman:** I was vice chairman and-- but I told Jerry one of the reasons that it worked between Jerry and me is I told Jerry I am not gonna be a competitor with him for his job. My job is to make him as successful...

**Hendrie:** Look good, yes.

**Federman:** ...and look as good as possible, and he really liked that. I was serious about it. I didn't wanna run that combined company and I didn't know what I was gonna do next. But then, when my wife died, I just left, and I stayed on furlough.

**Hendrie:** Yeah, it was-- yeah.

**Federman:** It was-- she died.

**Hendrie:** Yeah, it was just-- yeah.

**Federman:** She was 50 years old. She died of a heart attack. I mean, just-- she did.

**Hendrie:** I know. How can that happen?

**Federman:** How can it happen? And she was 50. She looked 35 or 40. She was vital and she was a wonderful lady and she just died. Unfortunately, tragedy happens. It comes to everybody's life in one form or in one time or another. So, I left and Jerry was very kind and understanding. And the fellows who represented us in the transaction, Dillon, Read & Company, which is an old white shoe firm-- John Birkelund, who was the chairman of that company, he came, visited me at home in Saratoga and he convinced me to get outta my rut and get outta my mourning and go to work for Dillon Read. And I went to work for Dillon, Read for two years as a managing director of Dillon, Read.

**Hendrie:** Yeah, now what were you doing there? Whatever.

**Federman:** I was a-- Phil Young, who's been my partner here at USVP since 1990, he was with Dillon, Read, running their venture capital operation.

**Hendrie:** Didn't they have something in Concord?

**Federman:** Concord Partners.

**Hendrie:** That's what I thought, Concord Partners.

**Federman:** Concord Partners in-- so I joined Phil as a co-manager of Concord Partners and also we were both also managing directors of the firm. We brought in a little Silicon Valley business here and there. And John recognized that Dillon, Read didn't have a footprint in technology. So he thought that maybe I could help doing that. And I did a little bit of that but mostly it was venture capital, which we did okay. And then we came to USVP.

**Hendrie:** All right. Now, did you also at MMI, at the-- I know you did a deal with Cypress. Did you do anything with Altera and Xilinx?

**Federman:** Oh, we invested in Xilinx. The guys...

**Hendrie:** Yeah, tell about that. How'd that happen?

**Federman:** Well, Tim Propeck was our V.P. of marketing, and he came in my office one day. He says, "These guys at Xilinx, they're coming up with a programmable gate array that is something. It's an architecture that is-- first of all, it's CMOS, which we don't have. And secondly, it's an architecture to which our architectures do not scale. It's a different..."

**Hendrie:** It's a different approach to...

**Federman:** Different approach...

**Hendrie:** Solving somewhat the same design problem but a different approach.

**Federman:** The same applications.

**Hendrie:** Yes, same application.

**Federman:** Same applications but in greater density. So I asked-- I brought some of our guys together and said, "Educate me." And they all agreed. They agreed that our approach, Super PALs, wouldn't scale. We would double the density-- double the size of the chip for a 25 percent increase in transistor count. It was a trip to nowhere.

**Hendrie:** Yeah, I understand.

**Federman:** It was a trip to nowhere.

**Hendrie:** Yes, exactly.

**Federman:** So they said, "These guys have-- they have something which scales and is gonna be important. So I talked to Bernie Vonderschmitt who was running the company and we invested. It was simple as that. It made sense. We tried to come up with arrangements that we could sell their product, but he didn't want that. He didn't want any polluting of his brand. He didn't want the leader in PALs to be selling..."

**Hendrie:** His product too.

**Federman:** ...PGAs. And so, nothing worked. So we just invested and AMD made a lotta money on that investment when they went public. Altera was another story. Altera was in violation of our patents.

**Hendrie:** Ah, ooh.

**Federman:** And so we had a very strong case on Altera. So, we're sitting around saying, "What should we do about these guys? We can't let 'em off the hook because they're gonna eat some of our business, number one. And, number two, they're just walking on our patents and it's gonna disaffect the value of our I.P. So, Altera was doing very well, and they were gonna go public. So we agreed that we won't lay it on them until they file and we put 'em in a process where they were in a time window..."

**Hendrie:** Yes, they committed...

**Federman:** ...and they committed to it and they-- and if they're gonna go public at this point, they've gotta get us off of their backs in a-- because we would be going for-- when we did file, we were asking for an injunction.

**Hendrie:** Okay. Ooh.

**Federman:** We weren't talking about royalties.

**Hendrie:** Yeah, you were just saying...

**Federman:** We were saying, "You're outta..."

**Hendrie:** ..."Shut down your business."

**Federman:** We're gonna shut you down. So we were really nasty so we got 5 percent of the company.

**Hendrie:** Oh, as a settlement. Okay.

**Federman:** And it was a quick settlement. Rodney Smith called me up and he was very unpleasant. He called me a son of a bitch. Rodney is also dead. Rodney had a terrible accident. He was riding his bicycle down Sand Hill Road and for some reason he made a turn right into a car.

**Hendrie:** Wow.

**Federman:** That's what I understand, just terrible error of judgement. Just-- and he got killed.

**Hendrie:** Oh, my god.

**Federman:** Rodney was a tough son of a gun but-- and he was really angry. But I told him on the phone, I said, "Rodney"-- I'm sounding like the Godfather, "It's only business." I said, "Rodney, come on. If you were me, what would you do? You're trampling on our patent. You're violating our patent. So what should I do in order to get your attention? Ask you for 2 percent royalty. Screw you, Rodney. No, not 2 percent royalty. We're gonna shut your doors. So either you give us something of consequence or meet the

attorneys and throw your IPO out the window.” So he says, “Okay.” We settled it. I think we had one face to face meeting.

**Hendrie:** That's...

**Federman:** We settled it between us. It was easy for him; 5 percent was no big deal, and for us it was a very big deal. We had-- it was another source of non-dilutive cash and it worked that way for AMD. So it was a balance sheet deal, not a P&L deal. And the same thing with Xilinx.

**Hendrie:** Xilinx, yeah.

**Federman:** The same thing with Xilinx. I would've loved to do P&L deals, but the P&L deal that we had to do was to learn CMOS, and we didn't get that done.

**Hendrie:** Yeah. Yeah, that was the-- that would've been a big win.

**Federman:** It's life. It's life but everybody made out well and the half-life of what was created in that company and what was created-- not what I created. What we created. The half-life was enormous. For 15 years, I think, sin-- '87, '02. Call it 15 years till after 2000. They were still publishing our company newspaper and everyone buying newspaper. Where the news of the babies and the deaths and the marriages...

**Hendrie:** Oh, really?

**Federman:** ...still, we were every month. We had the reunions on a regular basis.

**Hendrie:** Wow.

**Federman:** George Hunter did the reunions and so the half-life of the culture we created continued and the careers were-- we created a number of CEOs and people had very successful executive careers and professional careers, a lot of 'em. So altogether it worked. The whole thing worked.

**Hendrie:** Yeah, it was good.

**Federman:** Yeah.

**Hendrie:** All right, very cool. Okay, so the-- you go spend a little bit of time at Dillon, Read and then what-- talk to me about what you did there and what-- what's the...

**Federman:** That was a bleak period for me because...

**Hendrie:** Yeah, clearly.

**Federman:** ...it was-- I hadn't-- for the entire period I was at Dillon, Read, I hadn't gotten over my wife's passing. And I was drinking too much and my kids were worried about me and I wasn't there for them. I

was so swamped by my own grief that I didn't ha-- I wasn't there for my kids. That all got resolved over time but, at that time, it was a very unhappy time and...

**Hendrie:** Yeah, I can imagine it, with no time to deal with it or say goodbye or any of it. That's awful.

**Federman:** Yeah, it was a bad time. Yeah, but you get through it. People have worse and there's always stories that are worse. But that was my tragedy...

**Hendrie:** That's pretty bad.

**Federman:** ...and so we worked in venture capital. We did a couple of deals for Concord. I relied upon Phil a lot. He's the guy walking around here.

**Hendrie:** Really? Okay.

**Federman:** We've been partners forever. And Phil was very compassionate to me and I said, "Okay, Phil, or we'll do whatever you wanna do. I just-- don't bother me. Let me just molder here." And I got Cyrus's-- what's the FPGA company up in Oregon [Lattice Semiconductor]?

**Hendrie:** Oh, now you got me.

<speaker restarts answer>

**Federman:** But whatever it was, Dillon, Read was the-- I got that deal on. I got 'em a few pieces of business here and there and I enjoyed it very much. To tell you the God's honest truth, in the midst of all my weeping. This was a bunch of high class people that had a consultative investment banking practice, similar to the old time firms where bankers were invited into board meetings as consultants. They didn't have to compete for the business. You were my banker. I treat you as if you are a part of the family and the...

**Hendrie:** And I rely on your opinions and-- yeah.

**Federman:** I rely upon your counsel and I need you hear. It was that type -- it was that kind of a firm. It was very much like the old Lehman Brothers or any of the old line firms. So it was quite a pleasure to work there. It was a very white-shoe firm. I might have been the first Jewish MD at that firm. It was a-- they had three secretaries and a treasury in their history, a hundred plus year old firm. . They owned-- I forget the name of the chateau in Bordeaux. The Brady family-- Nick Brady was-- he was the chairman when I was there, and he became Secretary of the Treasury. Dillons had been the Secretary of the Treasury before. It was a very classy place to work.

I mean, we had a managing directors dining room up on a, God knows what, floor. Fiftieth floor-- I don't think it was that high, but it was close to that high, overlooking Madison and 54th Street. And they-- we drank first growth burgundies at the MD lunches. They smoked cigars, and it was like a page out of a Mad Men or something. It was a different world and a dif-- and I felt like I didn't belong there. I felt like a real outsider. I mean, what am I doing here? I should have my nose pressed against the window and here I

am on the inside with all these guys. They were all extremely well-educated. They had gone to finishing schools. They had gone to intermediate school. They didn't go to public schools. They went to-- and then they went to Yale and Harvard and Princeton and whatever. And I would go to call on customers with these guys and they were all tall and good looking and had a lotta hair and wore nice suits and they just looked the role. And I always felt a bit disheveled in their presence. And they'd put out cards, and I'd look at their cards and F. Robert Johnson, III, Thomas J. S. Machelhoney, II or some-- and I was gonna make cards to say "Irwin Federman, the First" and put a Roman numeral next to my name. I said, "God almighty. It's one thing to feel less but it's another thing to advertise yourself as less."

But I got over that in the two years I was there and I came to appreciate the experience very much. These guys were not only classy, they were smart and, at least to the extent-- I don't wanna give 'em too much credit. I don't wanna give 'em credit where I'm not sure where I'm coming from. But, to the extent that I had exposure, there were ethics there and I think-- although I have a lot of issues with Bernie Sanders, he's got some points. He's got some points. Doesn't mean I'd vote for him. It doesn't mean that he's the right guy for the President, but everything he's talking about Wall Street is not wrong. These guys are conflicted up the gazoo. Up the gazoo. And they're conflicted in virtually every transaction. They've got the buyer and the seller in the same-- buyer in one hand and the seller in the other hand. Which hand do you favor? But at Dillon Read we had so much consulting business, as financial consulting, we-- it was very clear who the client was. The client wasn't the trader out there somewhere. The client was...

**Hendrie:** Yes, right. In their backrow-- wasn't in a trader in their backrow.

**Federman:** Right, they had-- they didn't have a big trading room. They had a trading operation. Everybody had to have it, but they basically were bankers. That's what their basic business was, and they were very ethical to the extent that I was able to-- I was the low man on the totem pole. I was the least junior of all their managing directors. But it was-- I felt at the time, and increasingly over time, that I was very privileged to work there, very, very privileged to know John Birkeland, who is now a much older man and he's not doing so well, but he was a real class act -- and what you would kind of idealize as the head of an investment banking firm. He had the persona. He had the gravitas. He had the looks. He was a naval officer during the second world war. He just had it-- all the credentials.

**Hendrie:** Okay. Alright. Good. Okay. So, you did a few things, and then what happened?

**Federman:** And then USVP was in trouble. The original three partners in USVP, Bill Bowes, Stu Moldaw, and Bob Sackman, Bill was the only of the-- one of the three who was physically still in good shape. The other two were declining. They had raised three funds and two of them were underwater, and they had mismanaged the firm. They had started the firm as kind of a hobby after they had complete-- each completed their respective successful careers, and they didn't treat it like a business, and they didn't run it well, and then it got away from them. So, Bill recruited-- I knew Bill for years just in the community and so did Phil Young, and Bill recruited us to come in and fix USVP.

**Hendrie:** Okay. Both of you?



**Federman:** Yeah. We came together, and we did. We were on- Funds USVP II and III we turned around and we got those two funds out of trouble. We got them to make money. Not great, but we got them to make money.

**Hendrie:** Yeah. You at least want to return the capital.

**Federman:** We did that plus. We surprised everybody.

**Hendrie:** Good.

**Federman:** And that was USVP 2 and 3, and now they just raised 11.

**Hendrie:** So, they're going.

**Federman:** Yeah. They're going. I'm not--

**Hendrie:** --they made it--

**Federman:** --I'm not a GP in this fund. It's the first one I'm not a GP in. So, they just tolerate my presence here. I just hang around, but they're a great bunch, and it's been lovely to be with this firm over that period of time with these people. They're fine people. I'll tell you a story that I mentioned earlier about Gordon Moore.

**Hendrie:** Yes. Good for you.

**Federman:** The company SanDisk was started in my office.

**Hendrie:** Really?

**Federman:** Yeah.

**Hendrie:** I know you work-- chairman of SanDisk, right?

**Federman:** No, but it's there in my-- it started-- it actually started in my office. I knew Eli Harari.

**Hendrie:** In your office here?

**Federman:** No. At Concord.

**Hendrie:** Oh. At Concord. Got it.

**Federman:** And then USVP made an investment when we came here.

**Hendrie:** Yeah. Yeah. Okay.

**Federman:** But Phil and I were sitting in the office at Taso Street in Concord at-- Dillon Read, Concord, and I had known Eli in the industry. He was well known. I knew him when he was at Intel, and Eli is a

Princeton Ph.D. This is a really brainy guy, and then he started Wafer Scale Integration. He never did anything on a Wafer Scale base, but they made some products. They had some revenue. A guy I knew-- a VC I knew, Jim Swartz at Accel Partners, Jim was an investor. He asked me to come in and be chairman at the company and see if I can help turn it around or fix it. So, I went in and I was at Concord, but I went in as a temporary chairman, and I said--

**Hendrie:** --this is Wafer Scale--

**Federman:** --I said I thought that this company could be resurrected, but I'm not the guy to do it. I brought Mike Callahan from AMD, my friend Mike, and he became CEO of Wafer Scale, and he did turn it around and he sold it to ST Micro after a few years.

But in that process, I got to know Eli. Eli had been chairman and CEO of Wafer Scale, the founder. He was an irascible guy then at that time. He screamed and yelled and he was stubborn, and everything was an argument, and they finally canned him as CEO. Then they finally brought in Callahan and made him chairman, and then Eli was such a pain in the ass on the board that they fired him for the board.

**Hendrie:** Oh, my goodness! Alright.

**Federman:** but Eli told me he said he had some ideas. He had some ideas for a new flash memory architecture. We could put more than one bit in a cell. He said this is a new idea where you're aiming for density, not for performance, and we're gonna make this. It's not gonna be a socket flash. It's gonna need a controller. This is a system flash. We need a controller, an external controller, but you're optimizing density here, and you can ultimately challenge rotating memory. Oh ho! Oh, man! It changed the world!

**Hendrie:** Yes, okay.

**Federman:** So, I said, "I don't know. Rotating memory sells for nothing right now."

**Hendrie:** Right, and keeps going down into half of nothing and a quarter of nothing--

**Federman:** --you know, it's like how many gigs can you get for \$75? You know? It's gonna keep jamming more and more and the price never goes up. It keeps going down, and at that time it wasn't \$75. It was \$400 or \$1,000, but whatever it was, say, "Oh, come on. Give me a break with the memory." He says, "But no. This is-- one day it could happen."

So, I said, "Okay. Work on it. We got a spare office here. Work on it." So, he was working on designs and notions, and I said, "You know, I know a guy who maybe can look at this and tell you if you've got something or if you're whistling Dixie." Jim Meindl.

**Hendrie:** Yeah. I don't know him.

**Federman:** Jim Meindl was at Stanford. He was the head of the Microelectronics Lab at Stanford, and he was one of the prominent device physicists in the United States. So, I knew Jim. I heard a talk by Jim

once. I used to go to these technical talks, not understanding 80 percent of it, or 90 percent of it, but just to get the relationship of the jargon, just to--

**Hendrie:** --well, you're learning-- learn as much as you can.

**Federman:** Yeah, just to get a sense of it. What's important--

**Hendrie:** --I'm sure you were learning a lot.

**Federman:** I was learning-- I got a sense of what--

**Hendrie:** --a lot of it's common sense. But you learned--

**Federman:** --what was important-- what the important trends were, what words they were using over and over again. So, I heard a talk by Jim, and I went up to him afterwards and I told him that it was the best technical talk I had ever heard because he made me understand what he was talking about. He took the pains for the people in the audience who might not have been at his level to go down and explain the acronyms and explain what these things were all about, and it made the whole subject so much more approachable. So many of these talks or discussions you have, people use acronyms, and if you ask them what it means, they won't even know. They don't even know. Some of them don't know what the-- they know what it refers to in concept, but they don't know what the letters mean. But when you know what the letters mean, you get some things formed in your head of what it's all about. So, I-- so, that began the relationship that I had with Jim Meindl.

So, I asked Jim if he would take a look at Eli's designs, and since Jim was a device physicist and could really put these designs into a process in his head. First, was this manufacturable, and what is the likelihood of the performance that he is claiming he's gonna get without simulations, without emula-- without, you know. So, Jim said, "I don't have much time," and particularly he was gonna spend an hour or two. He spent the day with them, and at the end of the day he said, "This could work."

**Hendrie:** Oh, wow.

**Federman:** I said, "Okay, Jim. You think it could work? We've got two people in the company now. I am chairman-- unpaid chairman, and he is CEO. How would you like to be head of the technology advisory committee of which you are the only member, and we'll have three of us?" And Jim said, "Okay. I'll sign up." As a result of signing on, Jim and his lovely wife now have a house on a lake in Georgia.

He went on to be head of the Georgia Tech microelectronics labs and head of the electrical engineering department, and he's a tenured, named professor there, and he bought this house on a lake with the SanDisk money. So, we started SanDisk, and that's a whole another story, but the company was going along and then things developed very slowly, and the company was probably saved by Al Shugart. You know the name Shugart? ( Al invented the floppy disk and started Shugart Systems)

**Hendrie:** Oh, I-- yeah. I know who Al is.

**Federman:** Al came in and he invested \$30,000,000. He thought that there was a possibility that the disk--

**Hendrie:** --it could be the next disk--

**Federman:** --so he put \$30,000,000 in, made a ton for Shugart later on, and never-- only now is it beginning to affect their business, but at that time it didn't. Al went on the board, and we're sitting around one day. We got a situation. Intel is violating our patents. Eli did a marvelous job on patents. The ideal building of a patent portfolio is like the walls around Tokyo. You have several concentric rings protecting something in the middle. You gotta bust through a lot of work in order to get to the middle, and Eli had done that. We had very powerful patents, and at Intel, they were violating them. So, we're sitting around and Eli, John Goodrich and me-- John Goodrich of Wilson Sonsini Goodrich & Rosati-- and John was our lawyer, very, very smart guy, and we said, "We gotta go after these guys." So, he says, "How do you go after Intel? I mean, they got all the money in the world. They'd would just bury us."

**Hendrie:** Yeah. They'll stretch it. They'll pay infinite amount for litigation protect-- five years.

**Federman:** Exactly. So--

**Hendrie:** --you'll be dead before you <laughs>--

**Federman:** --so, exactly. So, exactly. So, we had no choice. So, we sent them a letter. So, in due course what we get back from them, it says, "We're not violating your patents, and here, look at these 30 of ours. We think that you're violating these." So, we look at the 30. We're not even close. So, we sent them back a letter saying that "We're not touching any of this stuff. You're still violating our patent." They send us a letter back. "No, we're not. Look at these 50," and they are sending us by the carload.

So, we're sitting around a year later or whatever and say, "What are we gonna do with these guys? We've opened Pandora's box. They're giving us the back of the hand. They're stonewalling, and they're burying us, and we're gonna have to hire all kinds of people. Look at all these patents. They're gonna keep sending us these patents. They got thousands of patents." So, I said, "You know, I know Gordon Moore. Gordon Moore is intellectually honest."

<pause in thought>

**Federman:** "Why don't we do this. Why don't we ask Gordon if he would listen to the argument, and we tell Gordon that we'd live with his decision. If he says he's not violating, we'll go away. And we'll look at their patents if they wanna keep sending us patents. But if he says they are, if he agrees that Intel is infringing, that we'll have some kind of a financial settlement." So, we're talking about this and say, "Look, you know, this-- you're putting your faith in this situation entirely in this fellow's hands," and--

**Hendrie:** --and he works for Intel <laughs>.

**Federman:** --and he's a founder. He's the chairman. He's the president.

**Hendrie:** Yes, he's the chairman. Right.

**Federman:** But, in the end, we agreed that "what was the alternative?" We got a very honest guy who's bigger than lowering himself to do the wrong thing for a few dollars. That was the bet. That was my bet, that he was above that. He's intel-- he's a technologist. He's got the soul of a technologist. He's-- look gonna at it from a technical standpoint, and then if there's a price to be paid, whatever price has to be paid, they can afford. It wouldn't disaffect their business in the least. And the alternative of not doing that is just to keep doing what we're doing here. They'll bleed us to death, and we want to assert this patent. We want to tell the world that we got something that's of value here. So, I called Gordon, and he agreed to do it. I called Gordon, and Eli and I went up to Intel. Gordon had their attorney and the head of their flash business there. I just introduced Eli. I was just there for moral support for Eli. I could offer nothing to this conversation, and Eli went through on a white board/chalk board. Gordon asked a few questions, took a lot of notes. The meeting lasted longer than we had expected. I don't know, we expected one or two hours, and it lasted three or four or whatever it lasted, but it went-- nobody was paying attention to the clock. Gordon was not paying attention to the clock. We were just-- he asked us questions, and then it ended, and then we finished and Eli said, "Thank you very much," and I was staring and say, "What am I supposed to say now? What're we supposed to do?" I said, "Gordon, I'd like to hear from you whenever you're ready," or something. I gave him some kind of--

**Hendrie:** --you gave him an out.

**Federman:** I gave him something that we wanted to do something next. That we weren't just gonna go home. Well, to cut to the chase here, the settlement was \$10,000,000 from Intel. That was also a great lesson. You know, when you're dealing with quality, you put your CIA credentials away, and you've got an asset there. When you're dealing with people of integrity and quality, take advantage of it. People are trustworthy, and even though it'll-- might hurt them to say that they're wrong, you're gonna have to run to Vladimir Putin to get the contrary result. With Gordon, I was not-- I tell you, I was elated, we were all elated when we finally settled. They wouldn't pay us royalties. There was no way they were gonna pay us royalties.

**Hendrie:** They don't do royalties.

**Federman:** They don't do royalties, but they wound up writing us \$10,000,000 check, and while we were all elated and I was thrilled with that, I think I expected it.

**Hendrie:** Yeah. You thought-- you expected them to do the right thing.

**Federman:** I said, "Look, if-- Eli, if you're right, this guy will not tell you you're wrong."

**Hendrie:** Right, or try to argue that you're wrong.

**Federman:** "Or try to argue that you're wrong. He will not try to make-- he's gonna be honest about this if you're right. So, what-- this is gonna determine whether you're right or not." Well, Eli was right, and the upshot is for the last 10 or 15 years, Sandisk has been getting over \$400,000,000 a year in royalties, not from Intel. Samsung was the-- is the major contributor, but the whole lineup \$400,000,000 a year.

**Hendrie:** A year, because...

**Federman:** Because we took that position, and Intel validated the fact that we had those patents and gave us the courage to go after everybody.

**Hendrie:** Yes. Okay, and the fact that they said, "No," that "Yes, we do."

**Federman:** "We do."

**Hendrie:** Then Samsung has a big mountain to climb.

**Federman:** Well, that give us-- what we did with Samsung is we didn't-- we talked to them and they said, "No," and "Go away. Don't bother us," so, we went to the IT suit, and we shut them down. They couldn't import that stuff in the United States. That got their attention.

<laughter>

**Hendrie:** That's a good strategy. Yes, I like that.

**Federman:** Yeah. That was good.

**Hendrie:** Good.

**Federman:** That was good. But what happens is once you get your-- once your position is confirmed by-- then you get all sorts of courage. Then you say, "Oh, man! We-- if these guys signed up, we got the goods."

**Hendrie:** Yeah. Oh, that was a great story.

**Federman:** That's a good story.

**Hendrie:** That's a great story.

**Federman:** That's a good story.

**Hendrie:** And...

**Federman:** And that's a Gordon Moore story, and that's-- when you put Gordon Moore and Bob Noyce together, it's no wonder that Intel is what it is. You have two founders like that, man--

**Hendrie:** --that are close--

**Federman:** --it's quality. It's God bless 'em, boy. They created jobs for hundreds of thousands, millions of people.

**Hendrie:** Yeah. Yeah. The-- you're right, and...

**Federman:** Holy mackerel! It's four o'clock. What? Did we spend three hours?

**Hendrie:** I'm not surprised. You may be, but I'm not.

<laughter>

**Hendrie:** 'Cause I figured you had some good stories. Okay. Are there any other companies that-- that was also a company story as well as a Gordon Moore story. Any other companies you've become involved with that you feel good about and that you feel you've helped?

**Federman:** I-- look, I've-- I'm a camp follower for technologists. I became acquainted with technology through being hired by Monolithic Memories, and I came to have an-- just extraordinary respect for the guys who created the magic that I was privileged to see and to preside over, and not only to see. When I was chairman of the SIA, I was chairman of SIA for two years. I'm a bean counter, for Christ sake!

**Hendrie:** Yeah. How did that happen?

**Federman:** And I'm chairman of SIA, and I have Bob Noyce on my board, the guy who started it all. I used to pinch myself. I'd say, "How could this-- only in America. How could this happen?" You got an accountant running the SIA? Not running it. We have a guy running it, don't get me wrong, but this chairman, and you have these luminaries, especially Noyce on this board, and now reporting to me, so to speak. I couldn't get over it. I still can't get over it. I'm over it, but I'm not over it. I think it's just-- it-- what it speaks to-- it is not a self-serving remark-- what it-- it speaks to the meritocracy of this community. That it's not where you went to school, or who your parents were, what you came from. It's what you bring to the party. And it's not that I brought anything particular to the party, but that if it was appropriate that I should be chairman, then I should be chairman, and that I don't have to have had a Ph.D. or whatever. And that has just given me so much gratification, to be part of growing up in this community where that kind of stuff exists, and I may be emoting here a bit, but I'm telling you, it's sincere.

**Hendrie:** Yeah. No, I under-- I mean, I get it. When I think about other cultures that I've known people in where there's such class stratification.

**Federman:** Exactly.

**Hendrie:** And it isn't a meritocracy.

**Federman:** It isn't, and it is-- it has been here in the valley as long as I've been there, and it is today, even though today in the venture capital community you've got these companies that are being valued at multiple billions of dollars, and, unfortunately, humility escapes some of these entrepreneurs. They forget it's-- not only is the H silent, everything is silent. All the letters are silent.

<laughter>

**Hendrie:** I like that.

<laughter>

**Hendrie:** That's good.

**Federman:** But in those days, when getting the capital you needed for your company wasn't easy and you had to prove yourself every step of the way, there was a meritocratic culture here, and I'm not-- believe me, I'm not saying things aren't the way they used to be. I mean, there's a great quote from Thomas Wolfe, "Things aren't the way they used to be and never were."

**Hendrie:** <laughs> Oh, good.

**Federman:** And every time you talk about the past, you should think of that quote because we tend to aggrandize the past, the--

**Hendrie:** --we idealize it.

**Federman:** We idealize it, and it wasn't that. But-- so, I'm not really making that comparison. I'm just saying that in that period, there was so much technological innovation. The things that are being done now, there be volatile high out-- great ideas built on a technology platform, but not technology. None of them are technical experiments or dives into the unknown. There are applications that are—some are quite bright and some are even brilliant, but they are applications, and the people, 20, 30 years ago, created the platform on which this is possible, and they've made all this possible. It's-- and those people are just extraordinary. The EE's were building fabs. How does an EE come to build a fab? A fab is chemistry. It's physics. It's material science. It's everything but an EE. An EE knows how to design circuits, right? How do these guys come to build a fab and know what kind of temperatures and what kind of chemicals and the water and the materials and all? How do they-- trial and error. These were extraordinary people. Extraordinary, and it's just-- you gotta be blessed to have a career among people like that, and I felt blessed.

**Hendrie:** Yeah. Okay. Alright. Very good. Can I ask you just a little bit about the-- you've obviously done well with the ever-expanding economy here in Silicon Valley. I know you've been quite philanthropic, but what sort of philanthropies, when you think about it, have you chosen to sort of focus on?

**Federman:** We haven't been particularly organized about that. We're in a lot of different areas, and we don't have a particular focus. Part of the monies that we give away, we give away to disadvantaged kids, primarily--

**Hendrie:** --you give back--

**Federman:** --and to support education right here at home in East Palo Alto. We do a lot in East Palo Alto. And on the other hand, I believe that even though you can't draw the lines directly, supporting the arts in a community raises-- is a tide that raises all ships, and it brings the right kind of people into the community. It improves the education. It doesn't only increase the number of good restaurants and whatever, but it is artisans who build the stage settings and whatever. So, I have been a supporter of the



Museum of Modern Art. I'm a trustee of the Museum of Modern Art in San Francisco and the opera for a long time, 'cause I believe that those things inure to the quality of the community, and they have- it's just like throwing a rock in the Pacific Ocean. Sooner or later, a little wave comes up in Japan. There are residual impacts of that, but my wife is much stronger for direct impact. So, we do things for abused children and then the East Palo Alto community, and it's-- those are the two areas.

**Hendrie:** Yeah. Okay. Okay. I'm always curious as to how your experiences and your thinking mold what you end up finding are appealing. Okay. I had just a couple of general questions.

<pause in thought>

**Hendrie:** One is sort of a career question. You've gone through your career. I've got the good feel of it. If you could change one decision you made during your career, is there one that you would say, "Yeah. If I was gonna do it again, this is what I would've done."?

<pause in thought>

**Federman:** I have to really think about it. I've never thought about what I would change, because the question has come up, not to me, but in just general conversation. "What would you change?" And the reaction I've always had to that, well, you find that it's like a fab process. If you change one thing, it has an effect on a million other things. So, you never have the luxury of just changing one thing and everything else remaining in place. It-- if you did that differently, a lot of other things would be different. If Gore-- if the Supreme Court didn't stick their two cents in it and Gore won the presidency, not H. W. Bush, we wouldn't have had Iraq and the entire Middle East would look different today.

**Hendrie:** That's true.

**Federman:** And that's just one thing. "What would you do differently?" Well, I wouldn't do that, and then God knows what it would look like--

**Hendrie:** --what-- yeah. We don't know what it would look like--

**Federman:** --we don't know, but it would--

**Hendrie:** --but it would've been different--

**Federman:** --hugely different--

**Hendrie:** --we're sure of that.

**Federman:** And that's all the result of one thing that the Supreme Court probably wishes they didn't do. I don't know what I've done that I wish I had done differently. What I wish is that I knew how to keep Monolithic Memories as an independent company, or I could still be running it. Well, not running it today. I'd be too old, but that I could run it for another 10 years after that, because I love that so much. So, I wish I had figured out how to do that, but I never did.

**Hendrie:** Yeah. Alright. Okay. Well, still. You did pretty darn well <laughs>.

**Federman:** Oh, I've made-- yeah. I feel I'm the luckiest guy in the world. I mean, or close to it.

**Hendrie:** Okay. One last question. What advice would you give to a young person who thinks that some day they might want to start a company? Seems to have some ambitions.

**Federman:** I'm in a minority in my thinking on entrepreneurialism. We are living in a community where all these kids are exhorted to become entrepreneurs. And I tell you, if everybody became an entrepreneur, where would we get the workers? I would say that there's a very low success rate to entrepreneurs, and you can give up the file of your life in pursuing something that really doesn't have much merit or much chance of success.

The best times that have happened to me in my life is when I've associated with people I've considered to be really good at what they do and put my faith in them -- like putting my faith in Callahan, putting my faith in Gordon Moore, that-- you make those choices. Well, you're not only gonna be gratified, you're gonna have good results, however you measure those results, financially or in achievement or however. Whether or not you're running something is gonna be of second importance. I think to be a great employee for a great leader is just as great as being a terrific CEO and much better than being a failed CEO, which would-- most of them will be. So, I would concentrate on associating with quality in whatever role. Pick the church, not the pew.

END OF INTERVIEW