

STEVE JOBS ORAL HISTORY

COMPUTERWORLD HONORS PROGRAM INTERNATIONAL ARCHIVES

Transcript of a Video History Interview with
Steve Jobs
Co-Founder, Apple & NeXT Computer

Interviewer: Daniel S. Morrow (DSM)
Executive Director
Computerworld Honors Program

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DSM: Steve, I'd like to begin with some biographical information. Tell us about yourself.

SJ: I was born in San Francisco, California, USA, planet Earth, February 24, 1955. I can go into a lot of details about my youth, but I don't know that anybody would really care about that too much.

DSM: Well they might in three hundred years because all this print is going to disintegrate. Tell me a little bit about your parents, your family; what are the earliest things you remember? In 1955, Eisenhower was still President.

SJ: I don't remember him but I do remember growing up in the late 50's and early 60's. It was a very interesting time in the United States. America was sort of at its pinnacle of post World War II prosperity and everything had been fairly straight and narrow from haircuts to culture in every way, and it was just starting to broaden into the 60's where things were going to start expanding out in new directions. Everything was still very successful, very young. America seemed young and naive in many ways to me, from my memories at that time.

DSM: So you would have been about five or six years old when John Kennedy was assassinated?

SJ: I remember John Kennedy being assassinated. I remember the exact moment that I heard he had been shot.

DSM: Where were you at the time?

SJ: I was walking across the grass at my schoolyard going home at about three in the afternoon when somebody yelled that the President had been shot and killed. I must have been about seven or eight years old, I guess, and I knew exactly what it meant. I also remember very much the Cuban Missile Crisis. I probably didn't sleep for three or four nights because I was afraid that if I went to sleep I wouldn't wake up. I guess I was seven years old at the time and I understood exactly what was going on. I think everybody did. It was really a terror that I will never forget, and it probably never really left. I think that everyone felt it at that time.

DSM: Those of us who were older, such as myself, remember making plans of where we would meet if the country was devastated. It was a strange time. One of the things we're trying to get a handle on is passion and power. What were the early things you were passionate about, that you were interested in?

SJ: I was very lucky. My father, Paul, was a pretty remarkable man. He never graduated from high school. He joined the coast guard in World War II and ferried troops around the world for General Patton; and I think he was always getting into trouble and getting busted down to Private. He was a machinist by trade and worked very hard and was kind of a genius with his hands. He had a workbench out in his garage where, when I was about five or six, he sectioned off a little piece of it and said "Steve, this is your workbench now." And he gave me some of his smaller tools and showed me how to use a hammer and saw and how to build things. It really was very good for me. He spent a lot of time with me . . . teaching me how to build things, how to take things apart, put things back together.

One of the things that he touched upon was electronics. He did not have a deep understanding of electronics himself but he'd encountered electronics a lot in automobiles and other things he would fix. He showed me the rudiments of electronics and I got very interested in that. I grew up in Silicon Valley. My parents moved from San Francisco to Mountain View when I was five. My dad got transferred and that was right in the heart of Silicon Valley so there were engineers all around. Silicon Valley for the most part at that time was still orchards--apricot orchards and prune orchards--and it was really paradise. I remember the air being crystal clear, where you could see from one end of the valley to the other.

DSM: This was when you were six, seven, eight years old at the time.

SJ: Right. Exactly. It was really the most wonderful place in the world to grow up. There was a man who moved in down the street, maybe about six or seven houses down the block who was new in the neighborhood with his wife, and it turned out that he was an engineer at Hewlett-Packard and a ham radio operator and really into electronics. What he did to get to know the kids in the block was rather a strange thing: he put out a carbon microphone and a battery and a speaker on his driveway where you could talk into the microphone and your voice would be amplified by the speaker. Kind of strange thing when you move into a neighborhood but that's what he did.

DSM: This is great.

SJ: I of course started messing around with this. I was always taught that you needed an amplifier to amplify the voice in a microphone for it to come out in a speaker. My father taught me that. I proudly went home to my father and announced that he was all wrong and that this man up the block was amplifying voice with just a battery. My father told me that I didn't know what I was talking about and we got into a very large argument. So I dragged him down and showed him this and he himself was a little befuddled.

I got to know this man, whose name was Larry Lang, and he taught me a lot of electronics. He was great. He used to build Heathkits. Heathkits were really great. Heathkits were these products that you would buy in kit form. You actually paid more money for them than if you just went and bought the finished product if it was available. These Heathkits would come with these detailed manuals about how to put this thing together and all the parts would be laid out in a certain way and color coded. You'd actually build this thing yourself. I would say that this gave one several things. It gave one a understanding of what was inside a finished product and how it worked because it would include a theory of operation but maybe even more importantly it gave one the sense that one could build the things that one saw around oneself in the universe. These things were not mysteries anymore. I mean you looked at a television set you would think that "I haven't built one of those but I could. There's one of those in the Heathkit catalog and I've built two other Heathkits so I could build that." Things became much more clear that they were the results of human creation not these magical things that just appeared in one's environment that one had no knowledge of their interiors. It gave a tremendous level of self-confidence, that through exploration and learning one could understand seemingly very complex things in one's environment. My childhood was very fortunate in that way.

DSM: It sounds like you were really lucky to have your dad as sort of a mentor. I was going to ask you about school. What was the formal side of your education like? Good? Bad?

SJ: School was pretty hard for me at the beginning. My mother taught me how to read before I got to school and so when I got there I really just wanted to do two things. I wanted to read books because I loved reading books and I wanted to go outside and chase butterflies. You know, do the things that five year olds like to do. I encountered authority of a different kind than I had ever encountered before, and I did not like it. And they really almost got me. They came close to really beating any curiosity out of me.

By the time I was in third grade, I had a good buddy of mine, Rick Farentino, and the only way we had fun was to create mischief. I remember we traded everybody. There was a big bike rack where everybody put their bikes, maybe a hundred bikes in this rack, and we traded everybody our lock combinations for theirs on an individual basis and then went out one day and put everybody's lock on everybody else's bike and it took them until about ten o'clock that night to get all the bikes sorted out. We set off explosives in teacher's desks. We got kicked out of school a lot.

In fourth grade I encountered one of the other saints of my life. They were going to put Rick Farentino and I into the same fourth grade class, and the principal said at the last minute "No, bad idea. Separate them." So this teacher, Mrs. Hill, said "I'll take one of them." She taught the advanced fourth grade class and thank God I was the random one that got put in the class. She watched me for about two weeks and then approached me. She said "Steven, I'll tell you what. I'll make you a deal. I have this math workbook and if you take it home and finish on your own without any help and you bring it back to me, if you get it 80% right, I will give you five dollars and one of these really big suckers she bought and she held it out in front of me, one of these giant things. And I looked at her like "Are you crazy lady"? Nobody's ever done this before and of course I did it.

She basically bribed me back into learning with candy and money and what was really remarkable was before very long I had such a respect for her that it sort of re-ignited my desire to learn. She got me kits for making cameras. I ground my own lens and made a camera. It was really quite wonderful. I think I probably learned more academically in that one year than I learned in my life. It created problems though because when I got out of fourth grade they tested me and they decided to put me in high school and my parents said "No.". Thank God. They said "He can skip one grade but that's all."

DSM: But not to high school.

SJ: And I found skipping one grade to be very troublesome in many ways. That was plenty enough. It did create some problems.

DSM: This seems like such a good place to talk about your experience in the fourth grade. Do you think that had a major impact on your own interest in education? I mean if there is anyone in the computer industry that is associated with computers and education it has got to be you and Apple.

SJ: I'm sure it did. I'm a very big believer in equal opportunity as opposed to equal outcome. I don't believe in equal outcome because unfortunately life's not like that. It would be a pretty boring place if it was.

But I really believe in equal opportunity. Equal opportunity to me more than anything means a great education. Maybe even more important than a great family life, but I don't know how to do that. Nobody knows how to do that. But it pains me because we do know how to provide a great education. We really do. We could make sure that every young child in this country got a great education. We fall *far* short of that. I know from my own education that if I hadn't encountered two or three individuals that spent extra time with me, I'm sure I would have been in jail. I'm 100% sure that if it hadn't been for Mrs. Hill in fourth grade and a few others, I would have absolutely have ended up in jail. I could see those tendencies in myself to have a certain energy to do something. It could have been directed at doing something interesting that other people thought was a good idea or doing something interesting that maybe other people didn't like so much.

When you're young, a little bit of course correction goes a long way. I think it takes pretty talented people to do that. I don't know that enough of them get attracted to go into public education. You can't even support a family on what you get paid. I'd like the people teaching my kids to be good enough that they could get a job at the company I work for, making a hundred thousand dollars a year. Why should they work at a school for thirty-five to forty thousand dollars if they could get a job here at a hundred thousand dollars a year? Is that an intelligence test? The problem there of course is the unions. The unions are the worst thing that ever happened to education because it's not a meritocracy. It turns into a bureaucracy, which is exactly what has happened. The teachers can't teach and administrators run the place and nobody can be fired. It's terrible.

DSM: Some people say that this new technology maybe a way to bypass that. Are you optimistic about that?

SJ: I absolutely don't believe that. As you've pointed out I've helped with more computers in more schools than anybody else in the world and I absolutely convinced that is by no means the most important thing. The most important thing is a *person*. A person who incites your curiosity and feeds your curiosity; and machines cannot do that in the same way that people can. The elements of discovery are all around you. You don't need a computer. Here - why does that fall? You know why? Nobody in the entire world knows why that falls. We can describe it pretty accurately but no one knows why. I don't need a computer to get a kid interested in that, to spend a week playing with gravity and trying to understand that and come up with reasons why.

DSM: But you do need a person.

SJ: You need a person. Especially with computers the way they are now. Computers are very reactive but they're not proactive; they are not agents, if you will. They are very reactive. What children need is something more proactive. They need a guide. They don't need an assistant.

I think we have all the material in the world to solve this problem; it's just being deployed in other places. I've been a very strong believer in that what we need to do in education is to go to the full voucher system. I know this isn't what the interview was supposed to be about but it is what I care about a great deal.

DSM: This question was meant to be at the end and we're just getting to it now.

SJ: One of the things I feel is that, right now, if you ask who are the customers of education, the customers of education are the society at large, the employers who hire people, things like that. But ultimately I think the customers are the parents. Not even the students but the parents. The problem that we have in this country is that the customers went away. The customers stopped paying attention to their schools, for the most part. What happened was that mothers started working and they didn't have time to spend at PTA meetings and watching their kids' school. Schools became much more institutionalized and parents spent less and less and less time involved in their kids' education.

What happens when a customer goes away and a monopoly gets control, which is what happened in our country, is that the service level almost always goes down. I remember seeing a bumper sticker when the telephone company was all one. I remember seeing a bumper sticker with the Bell Logo on it and it said "We don't care. We don't have to." And that's what a monopoly is. That's what IBM was in their day. And that's certainly what the public school system is. They don't have to care.

Let's go through some economics. The most expensive thing people buy in their lives is a house. The second most expensive thing is a car, usually, and an average car costs approximately twenty thousand dollars. And an average car lasts about eight years. Then you buy another one. Approximately two thousand dollars a year over an eight year period. Well, your child goes to school approximately eight years in K through 8. What does the State of California spent per pupil per year in a public school? *About forty-four hundred dollars. Over twice* as much as a car. It turns out that when you go to buy a car you have a lot of information available to you to make a choice and you have a lot of choices. General Motors, Ford, Chrysler, Toyota and Nissan. They are advertising to you like crazy. I can't get through a day without seeing five car ads. And they seem to be able to make these cars efficiently enough that they can afford to take some of my money and advertise to other people. So that everybody knows about all these cars and they keep getting better and better because there's a lot of competition.

DSM: There's a warranty.

SJ: And there's a warranty. That's right. But in schools people don't feel that they're spending their own money. They feel like it's free, right? No one does any comparison shopping. A matter of fact if you want to put your kid in a private school, you can't take the forty-four hundred dollars a year out of the public school and use it, you have to come up with five or six thousand of your own money.

I believe very strongly that if the country gave each parent a voucher for forty-four hundred dollars that they could only spend at any accredited school several things would happen. Number one schools would start marketing themselves like crazy to get students. Secondly, I think you'd see a lot of new schools starting. I've suggested as an example, if you go to Stanford Business School, they have a public policy track; they could start a school administrator track. You could get a bunch of people coming out of college tying up with someone out of the business school, they could be starting their own school. You could have twenty-five year old students out of college, very idealistic, full of energy instead of starting a Silicon Valley company, they'd start a school. I believe that they would do far better than any of our public schools would. The third thing you'd see is I believe, is the quality of schools again, just in a competitive marketplace, start to rise. Some of the schools would go broke. A lot of the public schools would go broke. There's no question about it. It would be rather painful for the first several years

DSM: But deservedly so.

SJ: But far less painful I think than the kids going through the system as it is right now. The biggest complaint of course is that schools would pick off all the good kids and all the bad kids would be left to wallow together in either a private school or remnants of a public school system. To me that's like saying "Well, all the car manufacturers are going to make BMWs and Mercedes and nobody's going to make a ten thousand dollar car." I think the most hotly competitive market right now is the ten thousand dollar car area. You've got all the Japanese playing in it. You've got General Motors who spent five million dollars subsidizing Saturn to compete in that market. You've got Ford, which has just introduced two new cars in that market. You've got Chrysler with the Neon.

DSM: So you're spending thirty-two thousand and getting a five hundred dollar car in some cases.

SJ: The market competition model seems to indicate that where there is a need there is a lot of providers willing to tailor their products to fit that need and a lot of competition which forces them to get better and better. I used to think when I was in my twenties that technology was the solution to most of the world's problems, but unfortunately it just ain't so.

I'll give you an analogy. A lot of times we think "Why is the television programming so bad? Why are television shows so demeaning, so poor?" The first thought that occurs to you is "Well, there is a conspiracy: the networks are feeding us this slop because its cheap to produce. It's the networks that are controlling this and they are feeding us this stuff but the truth of the matter, if you study it in any depth, is that networks absolutely *want to give people what they want* so that will watch the shows. If people wanted something different, they would get it. And the truth of the matter is that the shows that are on television, are on television because that's what people want. The majority of people in this country want to turn on a television and turn off their brain and that's what they get. And that's far more depressing than a conspiracy. Conspiracies are much more fun than the truth of the matter, which is that the vast majority of the public are pretty mindless most of the time.

I think the school situation has a parallel here when it comes to technology. It is so much more hopeful to think that technology can solve the problems that are more human and more organizational and more political in nature, and it ain't so. *We need to attack these things at the root*, which is people and how much freedom we give people, the competition that will attract the best people. Unfortunately, there are side effects, like pushing out a lot of 46 year old teachers who lost their spirit fifteen years ago and shouldn't be teaching anymore. I feel very strongly about this. I wish it was as simple as giving it over to the computer.

DSM: I'm really glad we had a chance to talk about it. To talk about other things, so much has been written about you rather than go over a lot of those stories I was going to ask which one you think is the best and the fairest and if there are aspects of your career that you think have been left out.

SJ: I have to tell you truly that I'm pretty ignorant about it because I haven't read any of them. I skimmed one one time and read the first ten pages and they got my birthday wrong by a year. If they can't even get this right then this is probably not worth reading. I don't even remember the name of the one I skimmed. I always considered part of my job was to keep the quality level of people in the organizations I work with very high. That's what I consider one of the few things I actually can contribute individually--to really try to instill in the organization the goal of only having 'A' players. Because in this field, like in a lot of fields, the difference between the worst taxi cab driver and the best taxi cab driver to get you cross-town Manhattan might be two to one. The best one will get you there in fifteen minutes, the worst one will get you there in a half an hour. Or the best cook and the worst cook, maybe it's three to one. Pick something like that. In the field that I'm in the difference between the best person and the worst person is about a hundred to one or more. The difference between a good software person and a great software person is fifty to one, twenty-five to fifty to one, huge dynamic range. Therefore, I have found, not just in software, but in everything I've done it really pays to go after the best people in the world.

It's painful when you have some people who are not the best people in the world and you have to get rid of them; but I found that my job has sometimes exactly been that to get rid of some people who didn't measure up and I've always tried to do it in a humane way. But nonetheless it has to be done and it is never fun.

DSM: Is that the hardest and the most painful part of managing a company from your point of view?

SJ: Oh sure. Of course. At times I've been pretty hard about it and a lot of times people haven't wanted to leave and I haven't given them any choices. If somebody wanted to write a book about me, most of my friends would never talk to them but they could go find the handful of a few dozen people that I fired in my life who hate my guts. It was certainly the case in the one book I skimmed. I mean it was just "let's throw the darts at Steve." Such is life. That's the world I've chosen to live in. If I didn't like that part of it enough, I'd escape and I haven't so I'm willing to put up with that. But I certainly didn't find it very accurate.

DSM: I've got a couple of questions I'd like to ask you about specifically about your experience at Apple. Looking back at the years you were there, what were the accomplishments you are most proud of? Are there a couple of Apple stories you really like to tell?

SJ: Apple was this incredible journey. I mean we did some amazing things there. The thing that bound us together at Apple was the ability to make things that were going to change the world. That was very important. We were all pretty young. The average age in the company was mid-to-late twenties. Hardly anybody had families at the beginning and we all worked like maniacs and the greatest joy was that we felt we were fashioning collective works of art much like twentieth century physics. Something important that would last, that people contributed to and then could give to more people; the amplification factor was very large.

In doing the Macintosh, for example, there was a core group of less than a hundred people, and yet Apple shipped over ten million of them. Of course everybody's copied it and it's hundreds of millions now. That's pretty large amplification, a million to one. It's not often in your life that you get that opportunity to amplify your values a hundred to one, let alone a million to one. That's really what we were doing. If you look at what we tried to do, it was to say "Computation and how it relates to people is really in its infancy here. We are in the right place at the right time to change the course of that vector a little bit." What's interesting is that if you change the course of a vector near its origin, by time it gets a few miles out its course is radically different. We were very cognizant of this fact.

From almost the beginning at Apple we were, for some incredibly lucky reason, fortunate enough to be at the right place at the right time. The contributions we tried to make embodied values not only of technical excellence and innovation--which I think we did our share of--but innovation of a more humanistic kind.

The things I'm most proud about at Apple is where the technical and the humanistic came together, as it did in publishing for example. The Macintosh basically revolutionized publishing and printing. The typographic artistry coupled with the technical understanding and excellence to implement that electronically--those two things came together and empowered people to use the computer without having to understand arcane computer commands. It was the combination of those two things that I'm the most proud of. It happened on the Apple II and it happened on the Lisa, although there were other problems with the Lisa that caused it to be a market failure; and then it happened again big time on the Macintosh.

DSM: You used an interesting word in describing what you were doing. You were talking about art not engineering, not science. Tell me about that.

SJ: I actually think there's actually very little distinction between an artist and a scientist or engineer of the highest caliber. I've never had a distinction in my mind between those two types of people. They've just been to me people who pursue different paths but basically kind of headed to the same goal which is to express something of what they perceive to be the truth around them so that others can benefit by it.

DSM: And the artistry is in the elegance of the solution, like chess playing or mathematics?

SJ: No. I think the artistry is in having an insight into what one sees around them. Generally putting things together in a way no one else has before and finding a way to express that to other people who don't have that insight so they can get some of the advantage of that insight that makes them feel a certain way or allows them to do a certain thing. I think that a lot of the folks on the Macintosh team were capable of doing that and did exactly that.

If you study these people a little bit more what you'll find is that in this particular time, in the 70's and the 80's the best people in computers would have normally been poets and writers and musicians. Almost all of them were musicians. A lot of them were poets on the side. They went into computers because it was so compelling. It was fresh and new. It was a new medium of expression for their creative talents. The feelings and the passion that people put into it were completely indistinguishable from a poet or a painter. Many of the people were introspective, inward people who expressed how they felt about other people or the rest of humanity in general into their work, work that other people would use.

People put a lot of love into these products, and a lot of expression of their appreciation came to these things. It's hard to explain.

DSM: It's passion in the truest sense of the word.

SJ: The computer industry is at a very critical juncture where those people are clearly leaving the field.

DSM: What are they doing?

SJ: Hard to say. They're not being attracted by something else. They're being driven out of the computer business. They're being driven out because the computer business is becoming a monopoly with Microsoft. Without getting into whether Microsoft gained its position legally or not--who cares? The end product of the position is that the ability to innovate in the industry is being sucked dry. I think the smartest people have already seen the writing on the wall. I think some of the smartest young people are questioning whether they'll really get in it. Hopefully things will change. It's kind of a dark period right now or about to enter.

DSM: Apple had a reputation as a company that absolutely broke the mold and set its own course. Looking back from where you are today with NeXT, do you think that, as Apple grew larger, it could have sustained that original approach? Or was it destined to become a big standard American company?

SJ: That's a funny question. Apple did grow big and sustain that approach. When I left Apple it was a two billion dollar company. We were Fortune 300 and something. We were 350. When the Mac was introduced we were a billion dollar corporation; so Apple grew from nothing to two billion dollars while I was there. That's a pretty high growth rate. It grew five times since I left basically on the back of the Macintosh. I think what's happened since I left in terms of growth rate has been trivial compared with what it was like when I was there. What ruined Apple wasn't growth. What ruined Apple was values.

John Sculley ruined Apple and he ruined it by bringing a set of values to the top of Apple which were corrupt and corrupted some of the top people who were there, drove out some of the ones who were not corruptible, and brought in more corrupt ones and paid themselves collectively tens of millions of dollars and cared more about their own glory and wealth than they did about what built Apple in the first place--which was making great computers for people to use.

They didn't care about that anymore. They didn't have a clue about how to do it and they didn't take any time to find out because that's not what they cared about. They cared about making a lot of money so they had this wonderful thing that a lot of brilliant people made called the Macintosh and they got very greedy and instead of following the original trajectory of the original vision--which was to make this thing an *appliance*, to get this out there to as many people as possible--they went for profits and they made outlandish profits for about four years. Apple was one of the most profitable companies in America for about four years.

What that cost them was the future. What they should have been doing was making reasonable profits and going for market share, which was what we always tried to do. Macintosh would have had a thirty- three percent market share right now, maybe even higher, maybe it would have even been Microsoft but we'll never know. Now its got a single digit market share and falling. There's no way to ever get that moment in time back. The Macintosh will die in another few years and its really sad.

The problem is this: no one at Apple has a clue as to how to create the next Macintosh because no one running any part of Apple was there when the Macintosh was made--or any other product at Apple. They've just been living off that one thing now for over a decade and the last attempt was the Newton and you know what happened to that. It's kind of tragic, but as unemotionally as I can be, that's what's happening. Unless somebody pulls a rabbit out of a hat, companies tend to have long glide slopes because of the installed bases. But Apple is just gliding down this slope and they're loosing market share every year. Things start to spiral down once you get under a certain threshold. And when developers no longer write applications for your computer, that's when it really starts to fall apart.

DSM: There's obviously a lot of emotional attachment to Apple.

SJ: Oh sure. Apple could have lived forever and kept shipping great products forever. Apple was for a while like Sony. It was the place that made the coolest stuff.

DSM: Is there a user of Apple or a story that you could tell that in your mind exemplifies what the company stood for and its values at its best? What customers were using the Apple when you were there?

SJ: There were two kinds of customers. There were the educational aspects of Apple and then there were sort of the non-educational. On the non-educational side, Apple was two things; one, it was the first "lifestyle" computer and, secondly, it's hard to remember how bad it was in the early 1980's. With IBM taking over the world with the PC, with DOS out there; it was far worse than the Apple II. They tried to copy the Apple II and they had done a pretty bad job. You needed to know a lot.

Things were kind of slipping backwards. You saw the 1984 commercial. Macintosh was basically this relatively small company in Cupertino, California, taking on the goliath, IBM, and saying "Wait a minute, your way is wrong. This is not the way we want computers to go. This is not the legacy we want to leave. This is not what we want our kids to be learning. This is wrong and we are going to show you the right way to do it and here it is. It's called Macintosh and it is so much better. It's going to beat you and you're going to do it."

And that's what Apple stood for. That was one of the things. The other thing was a little bit further back in time. One of the things that built Apple II's was schools buying Apple II's; but even so there was about only 10% of the schools that even had one computer in them in 1979 I think it was.

When I grew up I was lucky because I was in Silicon Valley. When I was ten or eleven I saw my first computer. It was down at NASA Ames (Research Center). I didn't see the computer, I saw a terminal and it was theoretically a computer on the other end of the wire. I fell in love with it. I saw my first desktop computer at Hewlett-Packard which was called the 9100A. It was the first desktop in the world. It ran BASIC and APL I think. I fell in love with it. And I thought, looking at these statistics in 1979, I thought if there was just one computer in every school, some of the kids would find it. It will change their life.

We saw the rate at which this was happening and the rate at which the school bureaucracies were deciding to buy a computer for the school and it was real slow. We realized that a whole generation of kids was going to go through the school before they even got their first computer so we thought *the kids can't wait*. We wanted to donate a computer to every school in America. It turns out that there are about a hundred thousand schools in America, about ten thousand high schools, about ninety thousand K through 8. We couldn't afford that as a company. But we studied the law and it turned out that there was a law already on the books, a national law that said that if you donated a piece of scientific instrumentation or computer to a university for educational and research purposes you can take an extra tax deduction. That basically means you don't make any money, you loose some but you don't loose too much. You loose about ten percent. We thought that if we could apply that law, enhance it a little bit to extend it down to K through 8 and remove the research requirements so it was just educational, then we could give a hundred thousand computers away, one to each school in America and it would cost our company ten million dollars which was a lot of money to us at that time but it was less than a hundred million dollars if we didn't have that. We decided that we were willing to do that.

It was one of the most incredible things I've ever done. We found our local representative, Pete Stark over in East Bay and Pete and a few of us sat down and we wrote a bill. We literally drafted a bill to make these changes. We said, "If this law changes we will donate a hundred thousand computers at a cost of ten million dollars to us." We called it "the kids can't wait bill". Pete Stark introduced it in the House and Senator Danforth introduced it in the Senate and I refused to hire any lobbyists and I went back to Washington myself and I actually walked the halls of Congress for about two weeks, which was the most incredible thing. I met probably two-thirds of the House and over half of the Senate myself and sat down and talked with them.

It was very interesting. I found that the House Members are routinely less intelligent than the Senate and they were much more knee-jerk to their constituencies--which I found initially quite offensive but came to understand later to be a really good idea. Maybe that's what the framers wanted. They weren't supposed to think too much, they were supposed to represent. The Senators are supposed to think a little more. The Bill passed the House with the largest favorable majority of any tax bill in the history of this country. What happened was it was in during Carter's lame duck session and Bob Dole who was then Speaker of the House killed it. He would not bring it to the floor and we ran out of time. We would have had to have started the process over in the next year and I gave up.

However, fortunately something unique happened. California thought this was such a good idea they came to us and said, "You don't have to do a thing. We're going to pass a bill that says 'Since you operate in the State of California and pay California Tax, we're going to pass this bill that says that if the federal bill doesn't pass, then you get the tax break in California'. You can do it in California, which is ten thousand schools". So we did. We gave away ten thousand computers in the State of California. We got a whole bunch of the software companies to give away software. We trained teachers for free and monitored this thing over the next few years. It was phenomenal. One of my great experiences and one of my biggest regrets was that really tried to do this on a national level and got so close. I don't think Bob Dole even knew what he was doing but he really unfortunately screwed up here.

DSM: That's a great story.

SJ: That's part of what Apple was about.

DSM: On the business side, I was at the *Washington Post* when the Macintosh was introduced. The *Post* was an IBM Big Blue Shop and nobody was going to play with it and then the Macintosh infiltrated. There was almost a guerilla movement. It started with ad artists and now the whole front end of the newspaper is being done on Apple machines. Was that fairly common, this guerilla movement?

SJ: Actually we had no concept of how to sell to corporate America because none of us had come from there. It was like another planet to us. Unfortunately I had to learn all that stuff. If I only knew now what I know now we could have done a lot better. Our attempts to sell to corporate America were just bungled and we ended up just selling to people who just sort of buying a product for its merit not because of the company it came from. I mean everybody was very hooked on Big Blue back then and they bought IBM. There was that famous phrase "You never get fired for buying IBM." We fortunately were able to change a lot of that. And Apple as you know, I believe, is a bigger supplier of personal computers than IBM.

DSM: Tell me about what motivated you to establish NeXT and what were the goals you set out to accomplish when you set-up this new company?

SJ: That's complicated. We basically wanted to keep doing what we were doing at Apple, to keep innovating. But we made a mistake which was to try to follow the same formula we did at Apple, to make the whole widget. But the market was changing. The industry was changing. The scale was changing. And in the end we knew we would be either the last company to make it or the first to not make it. We were right on the edge. We thought we would be the last one that made it, but we were wrong. We were the first one that didn't. We put an end to the companies that tried to do that. We certainly made our fair share of mistakes, but in the end I think we should have taken a bit longer to realize the world was changing and just gone on to be a software company right off the bat.

DSM: Right off the bat? The machine got great reviews when it came out.

SJ: The machine was the best machine in the world. Believe it or not, they're selling on the used market, in some cases, for more than we sold them for originally. They're hard to find even today. We haven't even made them for two, two and a half years.

DSM: What are the features that are on the NeXT machine that are still missing from machines today?

SJ: Well first of all it was a totally 'plug and play' machine. Except for Macintosh, that's hard to find. It's an extremely powerful machine, way beyond the Macintosh. So it sort of nicely combined the power of the workstations with the 'plug and playness' of the Mac. Second of all, the machine had a fit and finish that you don't find today.

DSM: It's beautiful.

SJ: I don't just mean in packaging; I mean in terms of operation, simple things to complex things. Simple things like soft power on and off. A trivial little thing but as you know one of the biggest reasons people lose information on computers is they turn them off at the wrong time. And when you get into a multi-tasking network system that could have much more severe consequences. So we were the first people to do that and some of the only people who do that where you push a button and you request the computer to turn off. It figures out what it needs to do to shut down gracefully and then turns itself off. Of course the NeXT Computer was also the first computer with built-in high quality sound, CD quality sound. Most people do that now. It took them a long time but most people do that. It was just ahead of its time.

DSM: NeXT Software: what makes it different? What trends does it respond to?

SJ: That's the real gem. I'll tell you an interesting story. When I was at Apple, a few of my acquaintances said, "You really need to go over to Xerox PARC (which was Palo Alto Research Center) and see what they've got going over there." They didn't usually let too many people in but I was able to get in there and see what they were doing. I saw their early computer called the Alto which was a phenomenal computer and they actually showed me three things there that they had working in 1976. I saw them in 1979. Things that took really until a few years ago for us to fully recreate, for the industry to fully recreate in this case with NeXTStep.

However, I didn't see all three of those things. I only saw the first one which was so incredible to me that it saturated me. It blinded me to see the other two. It took me years to recreate them and rediscover them and incorporate them back into the model but they were very far ahead in their thinking. They didn't have it totally right, but they had the germ of the idea of all three things. And the three things were *graphical user interfaces*, *object oriented computing* and *networking*.

Let me go through those. Graphical interface: The Alto had the world's first graphical user interface. It had windows. It had a crude menu system. It had crude panels and stuff. It didn't work right but it basically was all there. Objects: They had Smalltalk running, which was really the first object-oriented language. Simula was really the first but Smalltalk was the first official object oriented language. Third, networking: They invented Ethernet there, as you know. And they had about two hundred Altos with servers hooked up in a local area network there doing e-mail and everything else over the network, all in 1979. I was so blown away with the potential of the germ of that graphical user interface that I saw that I didn't even assimilate or even stick around to investigate fully the other two.

NeXTStep turned some of that vision into reality. It incorporated the world's first truly commercial object oriented system, and really was the most networked system in the world when it came out. I think the world has made a lot of progress in networking but hasn't yet crossed the hurdle into objects and what's happened with NeXTStep. It's starting to get adopted by some very large corporate customers. It is now the most popular object oriented system in the world, as objects are on the threshold of starting to move into the mainstream. The company last year recorded its first profit in its nine year history, and sold fifty million dollars worth of software. I think we're going to have some significant growth this year and it's fairly clear that NeXT can get up to being a few hundred million dollar software company in the next three or four years and be the largest company offering objects until Microsoft comes into the market at some point, probably with a pretty half-baked product.

DSM: Some people say that in the future object-oriented software is going to be the only kind of software.

SJ: Of course it's true. I remember being at Xerox at 1979. It was one of those sort of apocalyptic moments. I remember within ten minutes of seeing the graphical user interface stuff, just knowing that every computer would work this way some day; it was so obvious once you saw it. It didn't require tremendous intellect. It was so clear. The minute you understand objects, it's all exactly the same. All software will be written using object oriented technology some day. You can argue about how long its going to take, who the winners and losers are going to be, but I don't think a rational person will debate its significance.

DSM: Give me your thoughts on the current status and the future of the Internet and the commercial online services and how they're affecting computer development.

SJ: The Internet and the World Wide Web are clearly the most exciting thing going on in computing today. They're exciting for three or four reasons. Number one, ultimately computers are turning into communications devices and ultimately we're spending more and more of the cycles of the computer to not only make it easy to use but to make it easy to *communicate*.

The Web is the missing piece of the puzzle, which is really going to power that vision much farther forward. It's very exciting in that way. Secondly, it's very exciting because it is going to destroy vast layers of our economy and make available a presence in the marketplace for very small companies, one that is equal to very large companies.

Let me give you an example. A small three-person company in Phoenix, Arizona can have a Web server that looks identical if not better than IBM's or the GAPs or anybody else, any large company. They can gain access to this electronic distribution channel for free. They don't have to build buildings. They don't have to sign up a thousand distributors and have people to call on them, etcetera, etcetera. In essence, direct distribution from the manufacturer to the customer via the Internet, via the Web, direct contact, direct transactions and distribution via UPS or Federal Express--that's going to be cheaper than going through all these middlemen or building hundreds of stores around the country. It is going radically change the way goods and services are discovered, sold and delivered, not only in this country but eventually all over the world. As you know, electrons travel at the speed of light and so it tends to bring the world much closer together in terms of providers and customers. That's pretty exciting --the leveling of big and small--the leveling of near and distant.

The third reason its very exciting is that Microsoft doesn't own it and I don't think they can. It's the one thing in the industry that Microsoft can probably never own. I think one of the things that's essential is that the government continue to fund the Internet as a public trust, as a public facility and remove any of these ridiculous notions of privatizing it that have been brought up. I don't think they're going to fly, thankfully. The Internet cost the U.S. Federal Government about fifty to seventy-five million a year. This is peanuts for what its doing right now and even if that cost someday escalated to half a billion a year which of course you could build the whole Internet each year from scratch if you had to, you could replace all the equipment, etcetera. That would be an extrodinarily small price to pay for keeping it from getting into the hands of any one company and thereby starting to destroy and control the innovation that could take place around the Internet. It's the one last bright spot of hope in the computer industry for some serious innovation to happen at a rapid pace. What's also great about it, again, is that the U.S. is in the forefront here. That's what's great about the whole person computer software industry. This is another example where the U.S. is in the forefront. It should be kept open. It should be kept free.

DSM: The World Wide Web is literally becoming a global phenomenon. Are you optimistic about it staying free?

SJ: Yes, I am optimistic about it staying free but before you say it's global too fast, its estimated that over one third of the total Internet traffic in the world originates or destines in California. So I actually think this is a pretty typical case where California is again on the leading edge not only in a technical but cultural shift.

So I do expect the Web to be a worldwide phenomenon, distributed fairly broadly. But right now I think it's a U.S. phenomenon that's moving to be global, and one which is very concentrated in certain pockets, such as California.

DSM: 85% of the world doesn't have access to a telephone yet. The potential is there and you're pretty optimistic. Tell me about Pixar.

SJ: This story is very interesting. I got hooked up with some folks. Again a friend of mine told me I should go visit these crazy guys up in San Rafael, California who were working at Lucasfilm. Now George Lucas, who produced the Star Wars film trilogy, was a smart guy, and at one point when he had a lot of money coming in from these films he realized that he ought to start a technology group. He had a few problems he wanted to solve. I'll give you an example of one. When you make a copy of analog audio recording, like tape cassette to another tape cassette, you pick up noise artifacts, in this case hiss. If you make a second-generation copy it gets worse exponentially. The same is true of optical analog copies. You take a piece of film, make an optical copy, you pick up noise artifacts, in this case optical noise which comes across as blurriness in some cases, comes across as other noise artifacts in other cases.

Now George, to make Star Wars actually had to composite together up to thirteen pieces of film for each frame. The matt paintings for the backgrounds might be a few pieces of film, the models might be a few pieces of film, the live action might be a few pieces of film, some special effects might be a few pieces of film and every time he'd make a copy to composite two together and then add a third, then add a fourth, he was adding noise artifacts with each generation. If you go buy a laser disk of any of the Star Wars Films, if you stop it on some of the frames, they are really grungy, incredibly noisy, very bad quality. George being the perfectionist he was, said, "I'd like to do it perfectly", do it digitally; and nobody had ever done that before.

He hired some very smart people and they figured out how to do it for him, digitally with no noise artifacts. They developed software and actually built some specialized hardware at the time. George had at some point decided that this is costing him several million dollars a year and decided that he didn't want to fund it anymore so I bought this group from George Lucas and I incorporated it as Pixar and we set about revolutionizing high end computer graphics. If you look at the ten most important revolutions in high end graphics, in the last ten years, eight of them have come out of Pixar. All of the software that was used to make Terminator, for example--to actually construct the images that you saw on the screen--or Jurassic Park with all the dinosaurs, was Pixar Software. Industrial Light and Magic uses it as the base for all of their stuff.

But Pixar had another vision. Pixar's vision was to tell stories--to make real films. Our vision was to make the world's first animated feature film--completely computer synthetic, sets, characters, everything. After ten years, we have done exactly that. We have developed tools, all proprietary, to do this, to manage the production of this thing as well as the drawing of this thing, computer synthetic drawing. We are finishing up making the world's first computer animated feature film. Pixar has written it, directed it, producing it. The Walt Disney Corporation is distributing it and it's coming out this year as Walt Disney's Christmas Picture. It's coming out November 11, I believe, and it's called "Toy Story." You will hear a lot about it because I think it's going to be the most successful film of this year.

DSM: Fantastic.

SJ: It's phenomenal. Tom Hanks is the main character's voice. Tim Allen is the second main character. Randy Newman's doing the music for it. It's just phenomenal.

There's a lot of hoopla about Hollywood and Silicon Valley converging. They call it "Sillywood" I think. Pixar is really going to be the first digital studio in the whole world. It really combines art and technology together, again in a very wonderful way. Pixar's got by far and away the best computer graphics talent in the entire world and it now has the best animation and artistic talent in the whole world to do these kinds of film. We have the second largest group of animators in the world outside of Disney and we think the most talented in the world working side by side with these computer scientists, the best graphics people in the world. There's really no one else in the world who could do this stuff. It's really phenomenal. We're probably close to ten years ahead of anybody else.

DSM: It sounds really exciting. The question I was going to ask--and you've partially answered it--was about start-up companies. As I look around the facility here and your literature, there are alliances written all over the walls literally. You're aligned with Hewlett-Packard, Sun, Oracle and Digital and all the systems integrators. Communications companies and information technology companies are merging. And becoming one. Do you think it will ever be possible for a new major start-up company to develop if they're going to focus on major applications or software? Will there ever be another?

SJ: I think yes. One might sometimes say in despair no, but I think yes. And the reason is because human minds settle into fixed ways of looking at the world and that's always been true and it's probably always going to be true. I've always felt that death is the greatest invention of life. I'm sure that life evolved without death at first and found that without death, life didn't work very well because it didn't make room for the young. It didn't know how the world was fifty years ago. It didn't know how the world was twenty years ago.

It saw it as it is today, without any preconceptions, and dreamed how it could be based on that. We're not satisfied based on the accomplishment of the last thirty years. We're dissatisfied because the current state didn't live up to their ideals. Without death there would be very little progress.

One of the things that happens in organizations as well as with people is that they settle into ways of looking at the world and become satisfied with things and the world changes and keeps evolving and new potential arises but these people who are settled in don't see it. That's what gives start-up companies their greatest advantage. The sedentary point of view is that of most large companies. In addition to that, large companies do not usually have efficient communication paths from the people closest to some of these changes at the bottom of the company to the top of the company which are the people making the big decisions. There may be people at lower levels of the company that see these changes coming but by the time the word ripples up to the highest levels where they can do something about it, it sometimes takes ten years.

Even in the case where part of the company does the right thing at the lower levels, usually the upper levels screw it up somehow. I mean IBM and the personal computer business is a good example of that. I think as long as humans don't solve this human nature trait of sort of settling into a world view after a while, there will always be opportunity for young companies, young people to innovate, as it should be.

DSM: And that was going to be my closing question before I gave you chance to sort of free associate on your own. That is to talk to young people who sort of look to you as a role model. Opportunities for innovation you think they're still possible. What are the factors of success for young people today? What should they avoid?

SJ: I get asked this a lot and I have a pretty standard answer which is, a lot of people come to me and say "I want to be an entrepreneur". And I go "Oh that's great, what's your idea?" And they say, "I don't have one yet". And I say "I think you should go get a job as a busboy or something until you find something you're really passionate about because it's a lot of work".

I'm convinced that about half of what separates the successful entrepreneurs from the non-successful ones is pure perseverance. It is so hard. You put so much of your life into this thing. There are such rough moments in time that I think most people give up. I don't blame them. It's really tough and it consumes your life. If you've got a family and you're in the early days of a company, I can't imagine how one could do it. I'm sure it's been done but it's rough. It's pretty much an eighteen hour day job, seven days a week for awhile. Unless you have a lot of passion about this, you're not going to survive. You're going to give it up. So you've got to have an idea, or a problem or a wrong that you want to right that you're passionate about otherwise you're not going to have the perseverance to stick it through. I think that's half the battle right there.

DSM: You're talking made me think of the other side of that. You talk about the passion side. What would you say, there's passion and then there's power. What you would say about the responsibilities of power, once you've achieved a certain level of success?

SJ: Power? What is that?

DSM: You need passion to build a company like Apple or IBM or any other major company. Once you've taken the passion to that level and built a company and are in the position like a Bill Gates at Microsoft or anybody else, yourself, what are the responsibilities of those who have succeeded and have economic power, social power? I mean, you've changed the world. What are your responsibilities within that?

SJ: That question can be taken on many levels. Obviously if you're running a company you have responsibilities but as an individual I don't think you have responsibilities. I think the work speaks for itself. I don't think that people have special responsibilities just because they've done something that other people like or don't like. I think the work speaks for itself. I think people could choose to do things if they want to but we're all going to be dead soon, that's my point of view.

Somebody once told me, they said "Live each day as if it would be your last and one day you'll certainly be right." I do that. You never know when you're going to go but you are going to go pretty soon. If you're going to leave anything behind it's going to be your kids, a few friends and your work. So that's what I tend to worry about. I don't tend to think about responsibility. A matter of fact I tend to like to on occasion pretend I don't have any responsibilities. I try to remember the last day when I didn't have anything to do and didn't have anything to do the following day that I had to do and I had no responsibilities. It was decades ago. I pretend when I want to feel that way. I don't think in those terms. I think you have a responsibility to do really good stuff and get it out there for people to use and let them build on the shoulders of it and keep making better stuff.

DSM: So the responsibility is to yourself and your own standards.

SJ: In our business, one person can't do anything anymore. You create a team of people around you. You have a responsibility of integrity of work to that team. Everybody does try to turn out the best work that they can.

DSM: Any final comments or thoughts either for the record or off the record?

SJ: No. Not really. Timeframe's an interesting thing when you think about people looking back. I do think when people look back on this in a hundred years, they're going to see this as a remarkable time in history, and especially this area believe it or not.

When you think of the innovation that's come out of this area, Silicon Valley and the whole San Francisco Berkeley Bay area, you've got the invention of the integrated circuit, the invention of the microprocessor, the invention of semi-conductor memory, the invention of the modern hard disk drive, the invention of the modern floppy disk drive, the invention of the personal computer, invention of genetic engineering, the invention of object oriented technology, the invention of graphical user interfaces at PARC, followed by Apple, the invention of networking. All that happened in this bay area. It's incredible.

DSM: Why do you think it happened? Why here?

SJ: Two or three reasons. You have to go back a little history. I mean this is where the beatnik happened in San Francisco. It's a pretty interesting thing. This is where the hippy movement happened. This is the only place in America where Rock 'n Roll really happened. Right? Most of the bands in this country, Bob Dylan in the 60's, I mean they all came out of here. I think of Joan Baez to Jefferson Airplane to the Grateful Dead. Everything came out of here, Janis Joplin, Jimmy Hendrix, everybody. Why is that? You've also had Stanford and Berkeley, two awesome universities drawing smart people from all over the world and depositing them in this clean, sunny, nice place where there's a whole bunch of other smart people and pretty good food, and at times a lot of drugs and all of that. So they stayed. There's a lot of human capital pouring in. Really smart people. People seem pretty bright here relative to the rest of the country. People seem pretty open-minded here relative to the rest of the country. I think its just a very unique place and its got a track record to prove it and that tends to attract more people. I give a lot of credit to the universities, probably the most credit of anything to Stanford and Berkeley, UC California.

DSM: Well, I cannot tell you how much we appreciate this.

SJ: Sure, I hope it's helpful.