



Oral History of Michael Slater

Interviewed by:
Douglas Fairbairn and Jeff Katz

Recorded: May 16, 2016
Mountain View, CA

CHM Reference number: X7807.2016

© 2016 Computer History Museum

Douglas Fairbairn: Okay. My name is Doug Fairbairn. I'm sitting here with Jeff Katz as my fellow interviewer. Our interviewee is Michael Slater who has joined us to talk about his history in the microprocessor related business and other things that he's been involved in. And so, welcome Michael. Glad to have you here.

Michael Slater: Thank you.

Fairbairn: So the first thing we'd like to do is just let you introduce yourself and talk about your life in the very early days. Where were you born? Where did you grow up?

Slater: Sure.

Fairbairn: Tell us a little about your upbringing, especially in terms of family life, parents or whatever that might have influenced you or not. And then we'll progress from there, so why don't we just start with that, Michael.

Slater: Okay, great. Yeah, I was born in Los Angeles, 1955.

Fairbairn: The real Los Angeles?

Slater: Yeah, sort of in the middle of I guess it's West Hollywood. Actually an area that was a pretty dense Jewish ghetto at the time between Fairfax-- next to Fairfax between Beverly and Melrose.

Jeff Katz: I know that neighborhood <laughs>.

Slater: I remember one of the more shocking things of my childhood was noticing the women working at the bakery had numbers on their arms and asking how come they had numbers tattooed on their arms. But it was a very, actually a very safe place. I think from the time I was seven or eight, I was walking ten, twenty blocks to go get a taco or something or go to the drugstore. Not what I think parents let their kids do in Los Angeles today, but I enjoyed growing up there. My father was a school psychologist and my mother was an artist. And they also ran a summer camp called Camp Roosevelt down near Idyllwild, California, so every summer I was there. So I'd be in the summers up in the mountains and back into LA for the rest of the year. And I was always a really curious kid. I'm still a really curious person. And the first thing I remember, and my guess is I was six or seven, about my interest in electronics and electricity is that we had this dining table and next to the dining table there was a little shelf that had a toaster on it. And then the power chord for the toaster was stapled into the wall and then plugged into the thing and I was looking at it and saying, "Why does it have two wires? All it's doing is delivering electricity to the toaster where the toaster turns it into heat?" And my family was completely flummoxed. Nobody was prepared to answer that question, but that's sort of my earliest deep electrical curiosity question that I remember. And then another thing I remember from, again I'm terrible at sort of figuring out was I five or ten or twelve, but somewhere in there. Our TV broke and we took it to this maybe six blocks away and there was a guy who had converted his garage behind his house into this TV repair shop. And I thought, "Wow, this is what I want to do. This is it." And I remember being really shocked when I left, when as we were leaving, my father said, "No, no. This is not what you're going to do. You're going to go to college. You're going to get a degree. You're going to work for a big company. This is.."

Fairbairn: Be a doctor or a lawyer something..

Slater: No, no, engineering..

Fairbairn: Just engineering, okay.

Slater: ...but you're not going to be the guy in the garage. You're not going to be the guy fixing TVs. So I don't think I quite knew how to make sense of all that at the time, but-- and certainly from the time I was a teenager, I was reading Popular Electronics and Popular Science and building some of those kits. I remember building a theremin, which I never got to work and I built a Heathkit oscilloscope, which I did get to work and I built a Heathkit vacuum tube shortwave receiver. And my most vivid memory of that was having finished the whole thing and then found out that I was numbering the pins on the tube sockets in the wrong direction, so I had to go remove every wire and completely rewire it, but it did ultimately work.

Katz: Had you burned out the tubes?

Slater: No, no, it worked. The tubes were not in the sockets yet.

Fairbairn: So what year were you born, just to sort of set the..

Slater: 1955. Another memory from my childhood, and I don't know too much about what this thing was, but down the street towards the drugstore that I used to walk down to, there was this glass building that had these classical TV mainframe computers in it. It had the two wheels that would jerk back and forth and it was like this mysterious shrine. I had no idea what it was, but these were computers and so it was like this other attractive and mysterious thing. And then my father really tried to do everything he could to support my hobby, even though he couldn't understand it very well. He even went and took a class to try to learn a bit of electronics and I remember him coming home one day and telling me that thyristors were the future. I don't even remember what they are. And then I would go through the Popular Electronics magazines and I would come up with this parts list and then he'd take me to the local electronics store where the guys would sort of roll their eyes. And I think I way stretched his financial abilities, but he did not want to say no when I wanted to build something. So I built a lot of stuff and some of it worked. And then the other thing he found for me is, because he worked for the school district, there was some sort of a surplus electronics distribution system. And it was only available to employees of the school districts. And it was all this equipment, I think most coming out of the military or government research and stuff, and everything was five cents a pound. So I got all kinds of equipment and..

Fairbairn: But it wasn't the newest technology.

Slater: No, nor was most of it even working. In fact, most of what I did through my 13, 14-- maybe a little younger than that, because once girls came into play, I probably did less of it. But I basically would just take them apart and I just had boxes and boxes and I would just decompose them into their pieces. I still have at home some of those 50 year old capacitors and stuff. So that was sort of my pre-college environment. I did grow up during the Vietnam war and I was certainly-- I had long hair. I was certainly part, identified with the whole counterculture movement and all that. I went to a private high school out in North Hollywood where everybody was anti-war. Looking back on it now, I realize I had no idea why I was anti-war. In fact, I didn't

really understand the war at all, but it was clear what the right thing was to choose. And going to demonstrations in San Francisco, and so that was a big part of that scene. So I had some feeling of sort of being part of a counterculture and I went to Berkeley and I think I was-- my hope was that there was this sort of merging coming up of the counterculture world and the business world and the technology world and that I was going to somehow be part of all that. It sort of happened.

Fairbairn: So what drove you to Berkeley? Was it the counterculture aspect of the school? Was it the electronics?

Slater: What drove me to Berkeley was that Stanford rejected me and so did MIT <laughs>. So those were the three schools that I applied to and Berkeley is where I got in.

Fairbairn: And were there any-- you said your father did his best to support you, were there other teachers or whatever in high school or whatever that supported your activities or helped you along or was it you were pretty much on your own?

Slater: Not directly in electronics. There was a guy there name Mr. Zimmermann who did teach the sort of more advanced math classes and so he really encouraged relatively advanced thinking. We were doing second year college level calculus by the time I graduated high school. So he was just a real free thinking guy who would really support everybody's interests. And then there was a guy named Saul Rubenstein who was the science teacher who was just a charismatic guy and I think he did a good job instilling in me a respect for science and an interest in science. My clearest memory of high school science is breeding drosophila and doing genetics experiments. That was pretty cool, but we-- I don't think there really was any electronics to speak of or even electricity, really, in that.

Fairbairn: So what year did you graduate high school?

Slater: '73. So I went to Berkeley from '73-77.

Fairbairn: And what was it like entering Berkeley? Did you feel like this was a perfect place for you to be? What was your..

Slater: Yeah, I really liked Berkeley. And the first year or so I found it very easy. Physics, at least lower level physics, came very naturally to me. I think I was one of the only people out of the class of 500 to get a perfect score on the first semester physics class, which excited me. And the basics-- physics just always made total sense to me. I also took a lot of math classes and I had a harder time with the more advanced math classes. Actually, the first year was okay and then the second year, I started getting sort of tired of the conceptual abstraction of all the math. And another shift that I-- this was just as digital was really coming on, right? So I had gone to college thinking I was going to learn how to build radios and TVs, right? And had only this tiny little understanding at all of computers. But once I started getting into classes that were digital, it might not have been until my second year, I said, "This makes way more sense to me." It's logic instead of math and it just feels right and is intuitive. And there were a couple of professors who were important to me, Al Despain who ran the SETI project I think for years after that, was a computer architect and who really encouraged me in that sort of hardware oriented path. He did-- about half way through this, I started writing

some software. I think we were-- what were we using? We were using teletypes with paper tape hooked up to a PDP 11 at Lawrence-- what is it? The lab that's right there on the hill above Berkeley?

Fairbairn: Lawrence Radiation Labs?

Slater: I don't think it's the radiation lab. There's like a museum or something up there in the hills, yeah.

Katz: Livermore, maybe.

Fairbairn: No, that's-- not there's...

Slater: No, it's much closer. It's right up there in the Berkeley Hills. But they had a bunch of time shared..

Katz: Oh, the Hall of Science, they call it.

Slater: Yeah, that's probably what it is. It's the Hall of Science, yeah. So I remember writing a program that could play crazy eights. And I wrote a program that would generate magic squares of any size, where all the dimensions added up to the same thing and I think it was all Basic. It was all in Basic and then you punch out your paper tape and put a rubber band around it and carry your paper tape home, so the next time you could load the paper tape in and you could edit your program.

Katz: On what computer was that running?

Slater: It was a PDP 11, I think. And then, in the main university, I think that was a DECsystem-10, which you couldn't even see. You had those old IBM punch card machines and you had to sit there and punch out your whole deck and then you submitted it and then you waited an hour to get your big printout back and find out you had a typo and then you'd go find that card. And that was an unbelievably tedious way to program, but once I got onto the teletypes with the PDP 11, it's like, "Okay, now this has gotten fun." And for better or worse, I was ready at that point to switch to a programming career and it was Al Despain who convinced me that hardware was the real stuff and I should stick to hardware. I'm not actually sure that was good advice, but I ended up doing a fair amount of both.

Fairbairn: So were you becoming aware of-- the microprocessor was just appearing on the market at that time, right?

Slater: Yeah, absolutely.

Fairbairn: And how did that come into your view? In the college career or was that later?

Slater: Yes. I think it wasn't until my junior year. We had a lab where I believe we were using [Intel] 4040s and then maybe [Intel] 8008s. This would have been '76-'77. And so I got to write some machine code for those things and build little things, so I was exposed to them at that time. And then I remember reading there was Processor Technology Company and there were all these very, very early personal computer companies selling memory boards and stuff. George Morrow was still around then selling stuff. And I remember that I had a really hard time making any sense out of it. There's all of these things, but it didn't

really aggregate to anything that I could figure out that I could do anything with. So the hardware side of computing, I didn't do-- I never really got into doing architecture design. I was always focused on applications. And that was, actually, I would say, the one frustration I had with Berkeley is that I wanted to build stuff and they wanted to talk theory. And there was no class at Berkeley that would explain to you how a television worked. They said, if you want to know that, go to vo-tech school. So I felt a little starved by Berkeley in that they really wanted to send people down a deep theoretical path and I was always really practically oriented. What's always thrilled me more than anything else is building things. And I think what kept me out of being interested in like semiconductor physics and all that, it's like I'm never going to be able to build anything with this, right? Maybe I can become part of some multi-billion dollar corporation that's building something with this, but it's completely beyond what an individual can do. So for whatever reason, and I think part of it goes back to that guy in the garage fixing TVs and part of it goes back to my mother who was always an independent artist working out of a studio behind our house.

Fairbairn: Was she painter?

Slater: She was a ceramic artist.

Fairbairn: Ceramic artist.

Slater: She was a ceramic artist. I always-- that was always sort of my model. The big company thing never quite made sense to me and I just wanted to be making stuff and relatively independent.

Fairbairn: So speaking of that, was your counterculture ideas were fueled at Berkeley, did you get involved in any of the activities..

Slater: I didn't get too involved..

Fairbairn: ...or you got into your..

Slater: I wasn't very political, no. Certainly, those of us who were the longhairs tended to hang out together, but I think it was really much more social than political. And by then, the protests were fading away.

Fairbairn: So you got a BSEE in what '77? And the focus there-- you had done microprocessor work, but sort of what direction do you think you were going at that point?

Slater: So at that point, I was pretty much focused on embedded microprocessor applications. I felt like general purpose computers were uninteresting, because who needs a computer, right? Until they became communication devices, they actually were sort of uninteresting. But I loved making things, building something where in the end, it moved..

Fairbairn: You build stuff, yeah.

Slater: ...it does something or-- so I was focused on embedded stuff or sort of instrumentation kind of applications. Actually, for my last year, where I wanted to do something practical, I did an independent study product through Al Despain and I built, I think this was 8080 based, with about five cards, I built a

computer system. I had a card full of 2102 1k memory chips and 1702, I think, they were, those EPROMS and there was a little monitor program in there and I actually built a logic analyzer. It was pretty-- it was somewhat primitive, but it basically had a bunch of probes and at each clock it would capture the state of all the probes and then it had an MSI based CRT display driver that would draw little ups and downs based on that. I had a terrible time getting it to work. It was really flakey and then I had to go and show it to Professor Despain - and it all worked and it's the only time it ever worked.

Fairbairn: So you came out with a BSEE and what was the next step? Do you...?

Slater: So I had-- I had a summer job at Ampex in Redwood City that gave me a little glimpse into what the industrial world was like. It was a pretty interesting place at the time. They were actually working on a government contract where they were building an optical computer that they could fly around in an airplane that would capture the full broadband radio spectrum and find the stations and decipher them. And I guess they do that today, but now they can do that with electronics. But at the time, it was something like Optical Fourier Analyzer or something. It made no [sense] to me at all. But the other thing we built there was a frame store. And it would store one TV frame and it was a box like that with like 15 boards covered with memory chips and that was part of something feeding some of their video recording business. But I found it only mildly interesting there. And Hewlett Packard, for whatever reason, had just always been my iconic company. I believe it was actually the only place I applied for a job after I graduated and I was completely ignorant of economics and politics at that point, but I guess 1977 was not a good year. I was the only person they hired out of Berkeley that year, so I was very lucky. And I spent three years at HP down in Santa Clara and I think, because I had some writing skills, and I guess it was just the project that it was there waiting. What I did for them first was they had developed-- well, they had had a problem as now they'd started putting microprocessors into all their instruments. The people that used to fix the instruments no longer understood how they worked. When you had a volt meter and it was all analog, that was one thing. Now that I've got this digital thing, the technicians had a hard time fixing them and until-- HP, of course, made a whole bunch of tools. So they have this thing called signature analysis that they invented and then they had logic probes and pulsers and current tracers, right. So I wrote a self-instructional text. We designed a briefcase computer that had places where you could hook in all those things and where you could induce faults. And then I wrote this self-instructional text that walked people through how to induce a fault, use the trouble shooting tools to track it down, fix it. So I..

Fairbairn: So the Santa Clara division was the instrument division, right? They were doing..

Slater: Yeah. The part I was in was the test equipment things. Actually, right down the hall was the GPS group, Charlie Trimble, where probably one of HP's poorer decisions. They had built a fully operating GPS unit and I think they had put a couple million dollars into it and they decided to discontinue it and Charlie Trimble bought the whole thing from them for a couple hundred thousand dollars, I think, all the rights to everything they had developed And Trimble ended up being a significant company in the GPS business. At the time there actually-- there was a semiconductor fab there. And then the computer people were down the street up at Wolfe Road. So we were definitely the instrument people. It was all one company then, but we were definitely the instrument people. So really that was most of what I worked on through my three years at HP. And while there were a lot of great things about HP, it's just-- I just had trouble feeling like an ant in a maze. I just felt like nothing I could do was really ever going to have any meaningful impact. And I didn't

really understand management or any of that. And I had always liked to teach and I had somehow gotten connected with University of Santa Clara doing continuing education courses there. And then I'd seen an ad for McGraw-Hill at the time was running seminars around the world where they would get technical experts and I responded to one of their ads and ended up teaching seminars for them on microprocessor interfacing. It was really the main thing I was focused on then was how to connect it to the real world. And then, it was actually..

Fairbairn: The teaching path was just sort of came out of your own self-interest. There wasn't really..

Slater: Yeah. And looking for work, looking for things to do and just enjoying it.

Fairbairn: So during this three years at HP were there any outside groups or activities that caught your interest or were you mainly sort of buried in the..

Slater: No, I regret that I never fully engaged in it, but I was there for a few of those home brew computer club meetings and I remember People's Computer Company Dennis Allison's thing down in Menlo Park. So I was sort of around the fringes of all that, but it's like it somehow didn't quite gel with me.

Fairbairn: Did you have any vision of what the microprocessor was to come? It was just a tool of the day, did you...?

Slater: So I certainly viewed it as the most important tool of the day and probably of a long time to come, because it had just become this universal building block for building whatever you wanted to build. But I was still really thinking about devices at that point. I had no vision of the web or the internet or any of that for sure. Or even, I think until I became an analyst, I didn't really absorb the meaning logarithmic or exponential growth and how if you sort of looked at things incremental on a linear curve, you wouldn't have expected microprocessors or memory chips to go very far. And it's really when you get the fact that this is doubling every period, not increasing by the same amount every period that you start having to really shift how you think about it to envisioning entirely new kinds of things.

Fairbairn: Yeah, I think everybody struggles with grasping exponentials. We always look at sort of a few years or whatever and during that period or periods of time. And during that period. But when the exponentials take over, you really go to be cognizant of that. Okay, so you started teaching. You were working with McGraw-Hill, you were at university..

Slater: Yeah, I think it was Ford Aerospace hired me to do a bunch of classes for them. And about at this point, I was just way too busy and I said, either I need to stop my freelancing or I need to quit my job and I quit my job. I just really self-identified with being a freelancer. It was oddly early in my career to do that. I was three years out of college, but I had these teaching jobs that I figured would sustain me at some level. And then started looking for-- we called it consulting back then. I think freelance engineering is probably a better name for it. One of my first clients was a guy named Horace Enea who ran a company called Heuristics that made the very first speech recognition board for PCs. Didn't work worth a damn, but if you spoke really well on a few words, it would work. So I did some work for him and I had a decent freelance engineering business, small. And then I ended up..

Fairbairn: So were you still teaching as well? You were doing some engineering work and teaching?

Slater: Yup, particularly for McGraw-Hill. I was basically designing embedded microprocessor things and at that point it was mostly Z80. And in general I did end up writing all the software as well, so I became a pretty adept Z80 assembly language programmer, wrote lots and lots of code. Went off..

Fairbairn: So you went freelance in about 1980?

Slater: Yes. And then after just about a year of that, I was getting some work subcontracted by a company called Logical Services. It was down in Santa Clara run by Bob Ulrickson and John Nichols and so they hired me to be their manager. So I worked there for a few years, still doing consulting but under their purview, but again, just ultimately, I wanted to be on my own. So I left there after three years, continued to do that sort of consulting work for another several years. Aehr Test Systems, A-E-H-R, was one of my major clients. They build these IC burn-in ovens and I built a control system for them, built some stepper-motor based control systems for some sort of medical thing that had to go squirt a little drop of something into each of these little buckets. That was the sort of stuff I loved doing where it's like you make something move and it does something. I did a hardware and software for a 35 mm recorder back like when you make your slide presentation and you then needed to image those on to 35 mm slides and then take the film to get developed so you could put the slides in the projector to show your thing. That's this thing with a very high resolution CRT and electronics that drove it to image the slide. So that was the sort of work that I was doing. And I did that through the 80s. And I was having a pretty good time. I was making decent money. I was working with a few colleagues. I was still pretty much a one man shop with the occasional coworker. But I'd always wanted to build a company, build a product, do something. So I started looking around at a bunch of things. I actually looked at piano tuning devices and guitar tuners and I was fairly naïve, I think, at that point about what it meant to really build a company, but I liked this idea of hardware devices.

Fairbairn: So were you musically oriented? Did you play instruments or anything?

Slater: No. It was just an opportunity. And the thing was none of those things-- I couldn't get over the hump of feeling like I could really do this. And so the other thing I'd done during those years is I wrote a textbook, because I'd always liked writing and once I was out of HP and that was done, I said, "Well, I've sort of learned a way to approach building microprocessor based systems and analyzing the timing and making them reliable and I just-- most of the things I've done in my life, I've done not because there was any rational explanation from them, but because something bubbles up and tells me to do it and I can't stop. And the book was one of those things. But as soon as I finished the book, it was like, "Okay, well, like in a year this is all going to be marginally obsolete, so maybe I could do a newsletter that would be a series of ongoing updates to the book." So that was the beginning of an idea to have a newsletter.

Fairbairn: So did you get the book published by a major publisher?

Slater: Yeah, the book was first published by a little publisher in Mountain View right here. I'm trying to remember what it was called, but I think they disappeared and sold it to Prentice Hall, so it was published by Prentice Hall. It did reasonably well for many years, called "Microprocessor Based Design." So once I started looking into the idea of a newsletter and actually remember going down to the Palo Alto library and

picking books off the shelf and, sure enough, it turns out there was a newsletter association and there was a book from the newsletter association on starting a newsletter. And then I started looking around for other computer industry newsletters. And I found Stewart Alsop and Esther Dyson. So I started looking at their businesses and I thought, "They seem to be having a pretty good time." So they're running a conference, they're doing this newsletter. But these are like \$3,000 events, industry executives, super lavish. So there's no way that technical people are going to do that. But then you go to the IEEE conferences and you got rubber chicken at lunch and stale popcorn at the break and uncomfortable chairs through the whole thing and it's \$250 and super technical with no-- very little caring about the marketplace. So these are some of the ideas that were going around in my head was that while their newsletter and conference model was really different in some way than what my market would take, there was something that I felt like was sort of halfway to what they were doing that would be appreciated by the microprocessor industry. So that led really first to doing the newsletter. The conference came later, just about a year later. And..

Katz: When was that roughly when the spark came to do the newsletter?

Slater: It was probably early '87 or late '86, because the first issue was September of '87. And it really had no strategic plan. There was no business plan, really, to speak of. I didn't really even understand who was going to be reading it. It was really all about writing about what I was interested in. And it was fortuitous that that happened to match what some community of people wanted to read.

Katz: By that time did you consider yourself an analyst or a book author or an engineer or a what?

Slater: I really considered myself an engineer who could write. And it was really the feedback I got from the first few issues of Microprocessor Report that this was really something special that I think kept me down that path. I didn't really go into it believing that I could do anything special or having any special plan. Now when I look back on it, I can see that we sort of-- because of all of the landscape changes that were going on, we filled a couple of niches. As I've been meeting lately with some of the people I used to know years ago, a number of them pointed out to me that, while there was all this microprocessor activity going on in the late '80s and early '90s, it didn't function as a community until my conference, that the conference was the thing that sort of brought the community together. I had no idea that's what I was doing. And then in the newsletter, we would write these long-- we'd go to see Intel about this new microprocessor. And everybody else writes the sort of one-page summary about who they're going to sell it to. And we'd write six pages about the micro-architecture and the pipeline design. We were like the only people who were even asking Intel any of those kinds of questions. So, we had information that nobody else really had. And again, it was no careful plan. It's just what seemed like an interesting thing to do. And then all of the RISC stuff happened. So, SPARC came out, MIPS, all of these things. And each of them would come visit me and give me their spiel. And I'd write the article. And the genesis of the microprocessor forum was sitting there talking to some of these guys. I think the two archetypes for me were Dave Ditzel and John Mashey from the SPARC and MIPS camps, and saying okay, these guys can't both be right. They're telling mutually contradictory stories. But I don't have enough depth to make a judgement here. So, let me put them both on stage. So, that was really where the microprocessor forum came from is that there were so many of these RISC architectures coming out, and so many claims being made, and so many perspectives being presented that it was really hard to sort it all out. And so I thought okay, well let's get everybody together. And it was amazingly successful.

Fairbairn: Okay, so let's back up a bit. You're an engineer doing individual consulting. And you started writing. And you wanted to write Microprocessor Report. You can do that. You can write it on your own. But now you need someplace-- somebody to send it to.

Slater: Right.

Fairbairn: And you also-- it was-- you were talking about we. There were other contributors. So--

Slater: Right.

Fairbairn: There is a step here in terms of the community, even if it was a small community, that was already formed or whatever--

Slater: Right.

Fairbairn: So, tell me about that. Who did you-- how many copies did you print? And who did you send it to? And how did that actually happen?

Slater: Okay. So, that's a great reminder. So, let me go back a few years on something called the Asilomar Microcomputer Workshop, which is still going on today. It's been around for-- it must be thirty-something years now, maybe forty. And it's always been sort of a slightly off the record IEEE event. It's not-- it's like a-- it's sort of an official-- I'm not sure where it is today. But it was sort of an official event except they don't like to cover-- follow any of the rules. So, it's always been by invitation only. And so, it's sort of a social club. And there were just a lot of great people that went there, Stan Mazor, and John Wharton. John ran it for a long time. Marianne Mueller I think runs it now. They were just a lot of really great people, Nick Tredennick, John Wakerly, Fred Terman Jr. And that-- so, I started actually, I think it was my first year at HP. Somebody else in the group had an invitation to go to that conference and gave it to me. And I went to the conference and sort of liked all those people. And then I think it was the following year, they were looking for volunteers to help organize the conference. So, I joined their planning committee. And the way the planning committee worked was basically to get together for dinner once a month and talk about what to do. And so, I basically got to know a pretty exceptional group of people really just by being at that Asilomar Microcomputer Workshop year after year. And even though I only saw most of those people three days a year, after five years of three days a year, they start to feel like your friends.

Katz: How many people would typically attend those forums?

Slater: It was right around a hundred.

Katz: About a hundred, so there was a cadre in the middle of less than a dozen probably that were making that happen.

Slater: Right. And I think they're still there for the most part. It's definitely gone from being a group of twenty-somethings to group of gray hairs.

Katz: It's the same people? There's no new blood?

Slater: I actually haven't gone in about five years. I'm sure there's some new blood, but there's an awful lot of names I recognize that still go. So, that sort of gave me both a set of really knowledgeable, experienced people from the microprocessor industry who knew me and I got along well with, and it gave me a model of, through a series of seven-hundred-dollar dinner meetings to be able to incent a group of people to help you do what you wanted to do. So, that was really the key resource I had in terms of group of people. None of them were ever paid. They just enjoyed doing it. And--

Fairbairn: Doing it? You mean writing for--

Slater: Either writing for it or participating in the meetings, or-- we had a very meticulous, painful review cycle. I did not come from journalism. And so, from my point of view, everything had to be right. And these were highly technical articles, and both highly technical and sometimes fairly strong technically based opinions. And so, we--

Fairbairn: So, they were peer-reviewed by that cadre?

Slater: So, we faxed every issue to about ten people. We collected all those comments. And we incorporated many, many changes. So, it was an extremely painful review cycle. And something that was again almost unknown in the tech journalism industry is we sent the people we were writing about the drafts too. And we usually ignored their comments on our opinions. But we wanted to at least correct our facts.

Fairbairn: So, how often-- you know, in the beginning, you wrote the first one. How often did you plan to publish it? How often did you publish it?

Slater: I think we started as a monthly. And then after some amount of time, a year or two, we decided to go to every two weeks. And then after about a year of that we just couldn't sustain it with our editorial cycle.

Fairbairn: I was about to say doing the peer review thing even every month would be difficult, right.

Slater: Was our editorial cycle-- so, for most of the newsletter's history, it was actually on a three-week cycle. It may be the only publication in the world that ever published for an extended period of time on a three-week cycle. But it just turned out to be what we could do. Two weeks was more than we could do and a month felt too slow.

Fairbairn: So, again you say, "We." You were making some money at this. This was your livelihood?

Slater: Sort of, yeah. So, I-- my wife Irene was working with me at that point. And we were making our living off of this. It wasn't a fantastic living at that point. We had borrowed some money. And you asked about finding subscribers. That's of course the big challenge with any business. It's getting customers.

Fairbairn: Especially people to pay.

Slater: Yeah, so the newsletter association, through their books, they sort of taught a method, very traditional direct mail. You've got your lift note. You've got your, you know, the little hand-written thing on the outside of the envelope and the six pieces inside. And then they had people who professionally wrote

that crap. And then there were all the EETimes, and IEEE computer, and all those magazines whose lists you could rent. And so, I think we sent about a million pieces of mail over the first five years of the newsletter. And that's what built the circulation of the newsletter.

Katz: What was the circulation growth pattern? The first year, were you selling dozens, or hundreds, or thousands?

Slater: I think we got to a hundred and something the first year. And I think we probably got to a thousand after maybe five years. And I don't think it ever got much beyond a few thousand.

Fairbairn: And the prices was?

Slater: You know, I think it might have been-- in the beginning, it might have been like ninety-seven, two ninety-seven. The newsletter association likes sevens. Then I think it got up to four ninety-five, or five ninety-five, something like that. So, one of the things that I was completely ignorant about when I started this was that the semiconductor manufacturers were going to be the heart of the economics of this business, that they were the ones who were going to pay--

Katz: They were the source and the ones who wanted to read it.

Slater: Exactly, they were the ones who were going to pay for this information and that their level of price sensitivity was almost zero. So, that's why we-- what we learned very quickly in the first few years is that we couldn't get as many subscribers as we wanted. But the ones who would subscribe would pay a lot more than we thought they would pay. My archetype of the subscriber was somebody like me who is the freelance microprocessor user, but that in fact, those people wouldn't pay. They read somebody else's copy.

Katz: I was a subscriber. And I would send my copy around to my staff of a dozen people. And I think they probably sent it places, too.

Slater: Right. I'm sure there's a lot of circulation. And that is the Achilles heel of the high priced newsletter business. And I don't really know how that business has fared. I think that the web has radically changed it for sure. But I don't think there's anybody writing the kind of articles we were writing back then.

Katz: Well, there are many self-proclaimed analysts.

Slater: Yeah, but they're--

Katz: That blog everything.

Slater: But they don't go as technically deep.

Katz: That's true.

Slater: And I mean that was sort of the aberration of what I did was that I considered myself completely ignorant of marketing and business at the time. I was only interested in the technology. And so, this idea of

what it would mean to be an analyst, I didn't even quite get. And I started talking to all these financial analysts because when Intel announces a bug in the floating point multiplier, whatever that was, it's like I had become the guy who one, would spend hours on the phone talking to them, or two, understood the truth of what it was and could put it into terms that they could understand. So, I spent hours a day with reporters, typically. And I think that drove a lot of our circulation, too. I was by far the most widely quoted person in the microprocessor industry. And so, that was another whole element to the business was sort of serving the rest of the journalistic press. But when they say analyst, they really are talking usually about like a Dataquest sort of analyst who typically is technically shallow but has all kinds of market numbers. And I didn't have any market numbers. I didn't know who was selling how many of what or how to get any of that. I wanted those numbers, but to me, that was completely alien. I had no idea how to do that. And then there were all of the financial analysts that were really oriented around the economic health of these companies, which again, I started out completely uninterested in and then sort of got engaged with through talking to all these Wall Street analysts who would call me all the time. So, I think the Microprocessor Report analyst was not an analyst like any other kind of analyst. It was sort of a-- it was just more technical than a Dataquest sort of analyst role and not anything financially oriented like a financial analyst role. So, it was like an industry analyst. So, I'd say it's probably not too dissimilar from the Dataquest sort of analyst except it was more technical. And there's--

Katz: I was a Dataquest subscriber as well. I looked at them to find out who my customers were. I looked at the Microprocessor Report to find out who my competitors were and what was good and bad about them. And that's a-- both of them were viable markets.

Slater: Yep, absolutely. You know, and there were a number of us out there. We certainly weren't the only game in town. Andrew Allison was out there with his RISC! newsletter. Dean McCarron and Mike Feibus, who at one point worked for me and then at one point worked for In-Stat and at one point ran their own thing. And now, I think they're each running their own thing. You know, probably one of the guys who was closest to me in terms of orientation who actually I think just died a couple days ago is Richard Doherty.

Katz: I remember that name.

Slater: He's a really outstanding analyst, just died of a heart attack. Tim Barron who's, again, more market oriented. So, there were a bunch of us out there, and we were all sort of friends. But I was the hardcore techie.

Fairbairn: Did you ever have a discussion with yourself or your compatriots about well maybe we could-- I could get somebody to add a more business oriented flavor to it and try to cover more of the waterfront?

Slater: You know, bewilderingly to me now, I did not have that thought until years after I'd left. As I look back on it now, I completely self-identified as the technical microprocessor guy and maybe a little bit as the business microprocessor guy. But I certainly saw myself as pigeonholed in microprocessors. And I left that business at the end of '99. There were many reasons I did that. But looking back on it--

Katz: I want to discuss those as we move along, but--

Slater: Looking back on it now, I think, why did I not see that we should have added Internet analysis? I was completely fascinated with that. And clearly, it was the huge growth area. But just the way I thought about myself, and the way I thought about the business, it never occurred to me that we could do that sort of lateral extension.

Fairbairn: So, what were the major milestones? So, you started the newsletter in '87 was the first issue? And then you continued with it until '99?

Slater: End of '99, yeah.

Fairbairn: So, there was twelve years or something. So, what were the major developments, issues, discussion points throughout that? What were the big things? You mentioned the RISC/CISC thing. I'm thinking of sort of major things like that. What were the other-- that and other items?

Slater: It may not have been quite as much, but what it feels like now is ninety percent of it was Intel versus everybody else. And there were a few other things like the emergence of multimedia processing, something the processors were now fast enough to do. But certainly at the microprocessor architecture point of view, the big issue was the x86 architecture versus the RISC architecture, how much does architecture really matter. And then all the integration, right. We started-- the headline of the first issue was something like, "P9 may make 386 obsolete". And this was the other part that I really fun about it is it was a leak that somebody sent me. The P9 had not been-- It's the 386SX. It had not been announced. But somebody slipped me something. And so now, I had a headline. And then one of the later ones was the 386 had a load all instruction that would let you push data to a bunch of the internal registers and make it do things that were completely undocumented. And somebody slipped me the documentation for load all. So, that was sort of one of the fun parts of it.

Fairbairn: Did you actively solicit that-- those sorts of things? Is that--

Slater: Yeah. I mean just not personally, but in the newsletter we'd say, "Hey, if you have anything you want to share, send it in." And I think there were enough people resentful at Intel that it was easy.

Katz: What was your stable of contributing editors? And did it change over time? Did it grow? Did it shrink? Did it--

Slater: It did change and grow over time. But there are a number of them that were there for most of the time. For my employees, Linley Gwennap worked for me for a number of years. He still publishes the newsletter through his own company now. John Wharton did a lot of the early writing. Nick Tredennick did some of the early writing and continued with it. Anything that was funny was either John or Nick. Brian Case is a really outstanding micro architect who brought a whole other level of technical sophistication to it. He had been I think one of the AMD 29000 architects. And he was a really very, very deep microarchitecture guy who I think-- I think what got Brian involved is Nick was like the most vocal of the anti-RISC people. And he had a very opinionated and humorous way of saying things. And Brian called me out of the blue one day and said, "Can I write an article for you to dispute that crap that Nick Tredennick wrote?" So, that--

Katz: I was going to get to that point. You had these people who worked I guess for you. Were they employees?

Slater: No.

Katz: Independent contractors?

Slater: So, Linley was an employee. Tom Halfhill worked for us as an employee. There were half a dozen people on and off over the years who were full-time employees as editors and writers. And then we paid a per page rate to the--

Katz: And what attracted all those per page authors? Was it-- did you pay well or--

Slater: No.

Katz: Did they just love your reputation or what?

Slater: I think they like the soapbox. It was an opportunity for them to say what they wanted to say to a community that they cared about.

Katz: Interesting. What a delightful way to staff your business.

Slater: Yeah.

Katz: With people who are beating down the doors to do your work.

Slater: Yeah. And it was really fortuitous that I ended up in that Asilomar group because there were a lot of just really exceptional people there that my chance of connecting with otherwise was probably very low. And I think part of what made the newsletter work so well in its early years was the mix of people. Some of them like John Wharton, who ultimately, he and I had something of a falling out and didn't manage to stay friends, which I regret. But he's the funniest person I've ever known. And he had this ability to write these funny, technical articles, as did Nick Tredennick. And I think that also gave us sort of a special flavor that--

Katz: The audience loved it.

Fairbairn: So, what-- again, going back to the beginning in terms of how you really got this launched, you said either they called you or you called them. How did you get the audience with the Intels or whomever? Did they know who you were? Did you use your contacts from the Asilomar? How did that-- how did your reputation build to the point where they wanted to meet with you and--

Slater: You know, I don't recall if I had any interaction with them before that first issue. I think the headline of the first issue got Intel's attention since it was the first leak of their most important new product. And so, I'm sure that generated a whole bunch of subscriptions right there. It was hard figuring out how to start from nothing. And so, it was really based mostly on those rented mailing lists where I was just picking job titles and company sizes and things like that. In terms of getting pitched by the companies, I vaguely remember that I made a form letter saying we're a new publication, please add us to your press lists. And I sent it to

every known semiconductor company. And I did for many years get hundreds of printed press releases in the mail every week. I used to go through them and summarized what seemed like the most important ones. And then I don't really recall the early days of building that relationship with Intel. But I think we did-- I mean really the thing I'm most proud of out of that whole thing is I think I quickly built a relationship of somebody who yes, was opinionated, but was also-- didn't shoot from the hip, and was knowledgeable, and could be trusted. That relationship did not last with Intel. But early on, that was the case. And I think the architects at Intel, and all the other RISC companies, and all the other semiconductor companies loved the fact that finally there was a reporter who actually cared about any of the details they were so proud of because nobody else was asking them the kinds of questions we were asking them.

Katz: Right. How did you bootstrap the business from a business point of view, manage the circulation, and printing, and that--?

Slater: Yeah, it was tough. It was tough. I had no capital and no savings. There were a few people who made small investments. Rich Belgard was one. And John Wakerly I think was one. Bernard may have put in a little bit of money. There was a little bit of capital. I did borrow some money. I did what I think is the only flat out fraudulent activity of my life, which is we had actually financed the first year of the company by not paying ourselves and living on credit cards. Then, when I went to get a second mortgage on my house, I discovered that by doing that it would have-- they were not interested in a tax return that showed no income. But I discovered I could go down to the stationary store and buy a blank W-2 form and put whatever I wanted on it. And so, I created a W-2 and a tax return for what I thought they wanted to hear and got a second mortgage. That was in 1988.

Katz: I guess the banks aren't allowed to go to the IRS for verification are they?

Slater: Well, I don't think you could get away with that today. I don't think you could get away with that today. And then I found a guy through the newsletter association, a guy named Gary Strickler, who had a company in Canada. And he had-- it was basically a financing scheme where he would pay all the costs of dropping your direct mail in the mail. He then got all the money that came back until he had gotten everything he put in plus ten percent. And you did owe him if it didn't all come back. But at least in the early days, every one of those campaigns did cover itself. He had a great business because he made ten percent interest on like sixty days. But he was willing to provide me capital in a way that nobody else was because, in an odd way, he sort of took the value of that mailing campaign as his equity. He had to look at it and believe there was going to be enough orders coming back. Over the years, I think as we saturated the market, we were unable build circulation profitably through promotion. So, the promotion largely stopped and became word of mouth.

Katz: Was the peak in the thousands of subscribers?

Slater: I think so. Yeah, I think it was a few thousand.

Katz: And how long did it sustain at that level?

Slater: I think through the second half of the '90s. And actually, by that point, I had sold the business. So, I actually ran it much longer than I owned it. So, I started the business in '87. In 1990, we moved to Sonoma County. And I adopted my first kid. And about three months into raising a child, I said you know, I don't really want-- and there was like a payroll that I had to borrow money-- we were like we're using money from-- the fact that we were in between houses. We were using that money to cover a payroll. And I said you know this doesn't feel good. Why don't I sell it? And so, we actually did sell the business to Ziff Davis, which at the time-- this was back when Computer Shopper was like that thick. And PC Magazine was this giant business. We were the technical experts. But they never really quite knew what to do with us. And after a few years, they sold us to Cahners, which owned In-Stat. I think the Ziff Davis sale was '92. And the Cahners sale was '98. So, through all that, the owners changed. And the sources of capital changed. But pretty much the business kept going as it was.

Katz: So, how was it that you decided to move the business to Sonoma County instead of here in the Valley?

Slater: Because I couldn't afford five acres in Woodside. That is, I was determined to live in the country. And the business had not been nearly successful enough to live in the country anywhere near Silicon Valley. And so, we actually looked at moving south toward Santa Cruz. I think it was all those summers of my childhood being on a beautiful camp up in the mountains. And it just-- I liked a lot of things about the Valley. But the density and the lack of sort of natural beauty around you, I just-- something in me just wanted to live in the country. So, we ended up moving to Sonoma County in 1990, as I said. And I have to say that while, as a lifestyle location, it is a better place than I ever could have imagined, and I absolutely recommend it. I think it's a totally wonderful place to be. However, if you want to do startups, I wouldn't go there.

Katz: It must have been a strain to get back and forth to all your customers and your sources.

Slater: Well so, by that point, I had Linley down here. So, he was in an editorial office down here. So, my model was he can be here. He can do all the sort of frequent stuff here. I can do phone and fax. I can come down every week or two. And it sort of worked, but it is different. And I think the main thing you lose is you don't have frequent spontaneous meetings. And if there's a talk one evening, and you say well that might be sort of interesting, well driving ten minutes and driving two hours are very different thresholds for deciding to go to that talk. And so, that sort of thing did make it hard.

Fairbairn: So, let's talk about the Microprocessor Forum. You sort of touched on it. Talk more in detail about how it actually got started, what actually pushed you over the edge, and how did you decide sort of between the executive and the IEEE low end model. How did that all evolve?

Slater: It was one of these ideas that just wouldn't go away. I decided to do it and then decided it was way too much for me to cope with at least three times. But it just wouldn't go away. And so, actually the first one we did we called-- so, Stewart called his conference Agenda '89. So, the conference in '88 was called Agenda '89. So, not being super-creative, called mine Microprocessors '89. So, the very first microprocessor forum, which was in '88, was called Microprocessors '89. Then in '89, I think we just switched to calling it Microprocessor Forum '89, not having this confusing year thing. Really, the genesis of

that was all these RISC microprocessors and feeling like without being able to put those people up on stage together, it was really hard to sort anything out. And then a couple of my colleagues had said you know the microprocessor industry just doesn't have a decent conference. I don't think Hot Chips existed at that point. Hot Chips is sort of the only other thing that's close. But I felt like having gone to the executive conferences and having gone to the engineering conferences that there was just this huge gap in terms of how pleasant they were to attend and how much of a sort of quality social function they were. And so, I felt like you could do something in the middle and also in terms of the content. You can go to ISSCC, and you can see every last intimate detail about some new chip and have no idea why anybody would want it or who they're going to sell it to. Or, you can go to the conferences of the other extreme that are just all marketing fluff. And so, content-wise I also wanted to do something different. And another one of these radical things we did that I didn't think of as a radical thing that was just seemed to me like the natural thing to do is we told all the companies that we would not accept marketing people as presenters and that we wanted to review their slides. And so, that led to a lot of fights because we said that you could have a slide or two of the marketing values here. But it has to be fundamentally a technical presentation given by a fundamentally technical person. And that really did give it sort of a special character. And for whatever reason, none of the other conference producers had the guts or the desire to tell the semiconductor companies that we weren't going to let their marketing people speak.

Fairbairn: So, what did the first one look like? How many people? How long? Did you decide this was a one day, five day--?

Slater: I think it was one day. We did it at what I think was then the Red Lion in San Jose right off the freeway. I think we had about two hundred people.

Fairbairn: And was it purely CISC versus RISC focus?

Slater: You know, I don't know that it was-- I think it was more about microprocessor architecture. And here's three different RISC ones. And here's a CISC one. And actually I haven't pulled up that first year's program lately. And a lot of it was also-- I mean really the majority of the presentations were product announcement focused. I mean we really also tried to maintain not quite as hard a line as ISSCC did for a long time where you couldn't have ever talked about it before. But we wanted it to be the first substantive disclosure.

Katz: How did you recruit your speakers if you couldn't go through the marketing department? Or you had to--

Slater: Well, everything was arranged through the marketing department. We just told the marketing department that the speaker we wanted was the chief architect. And they would usually push back. And then we'd say okay well, if you don't want to participate, that's fine.

Fairbairn: Did that effort detract from the newsletter because you were trying to do them both at the same time? The newsletter was still pretty young.

Slater: Well, I think it's always been my biggest challenge in my little businesses is that I do too much and one thing detracts from another, but I think we managed to pull it off and I think the newsletter built the audience that enabled the conference to be successful, and the conference...

Fairbairn: There's a lot of synergy there, yeah...

Slater: ...and the conference produced the profit that enabled the newsletter to keep going. So, they probably could not have survived independently.

Fairbairn: So, how did the conference evolved? Did it sort of grow and change and tell me about how it evolved?

Slater: Well, the conference evolved quite a bit. Of course, it went from one day to two days for the main conference program and then we started adding in a third and I think even a fourth day of seminars where we teach a half day or all day. One of our analysts or editors would present a whole presentation on something. The RISC stuff kept up for a long time. I think in the mid `90s we started getting into more DSP sorts of things and multimedia kinds of things and we actually had a lot of questions about should we have a section on DSPs, should we start a DSP conference, do the people who care about 486s care about DSPs, you know and I don't know that we ever really answered those questions. We did let the DSPs in a little bit, but not in a super comprehensive way. Jeff Bier at BDTI [Berkeley Design Technology, Inc.] another one of those sort of technical analysts became our DSP affiliate. We started getting a little bit more into sort of PC architecture really led by what Intel was doing right because Intel had completely changed the idea of what it meant to be a microprocessor company right. They'd taken it from we're building these chips and we ship them out the door and other people figure out what to do with them to we essentially own the computer industry and we're going to design the computers and these other people can build them and wrap sheet metal around them. And, so the whole design of the computer sort of became part of our coverage, but we actually did spinoff two other conferences neither of which survived, but we did spin off an embedded conference at one point because we felt like the embedded stuff was just too different.

Fairbairn: That was before it's time.

Slater: Yeah, and then we spun off a PC Tech conference and I think that one we just stretched ourselves too thin at that point and there were other players who had some caché in that so we've also pulled back out of that and the microprocessor forum is the thing that survived.

Fairbairn: How did you decide the spinoffs weren't going to work and you had to cut back, cut them off, they weren't attracting attendees or speakers or what?

Slater: Yeah, I think the amount of marketing we had to do for the people we got and by that point I was pretty burned out. The business I felt like never had great business leaders as Ziff-Davis didn't really know what to do with us and Cahners knew only slightly more, and the business was marginally profitable and each of these things required investments and Ziff- Davis-- and you know at the time we were ramping up the PC Tech Forum and Ziff- Davis was noticing that the PC industry was collapsing so they were sort of scaling back on a lot of their investments. So, it was just a combination, I think, of things, but probably a lot

of it was a lack of support from our corporate owners to invest in multiple years of building something up to the point where it was profitable. If you're lucky you can start a conference and have it be profitable the first year like we did.

Fairbairn: Did you personally or your gang who were trying to bootstrap these conferences have to build special relationships with the manufacturers or the people who invented and wanted to describe their products?

Slater: Yeah.

Fairbairn: How did those relationships work? Did you have an Intel specialist and a Smart specialist and a whatever?

Slater: Yeah, at that point, we'd already been engaged with all these companies to talk to them about articles so it was always through the PR Department who would then connect us with the marketing people, who would then connect us with the technical people. In the case of Intel, they actually were analyst relations people. Most semiconductor companies did not have those, but Intel did. They were about 50/50 on being helpful or hindrances, and so we basically said hey we're doing this conference, do you want to present something, here's the rules, and we were able to get everybody to participate because I think they didn't have a lot of options.

Fairbairn: Well, at one point the reputation of the newsletter was strong enough that it would support the same customer base doing it in person at a forum.

Slater: Right, and I think the events appealed to more people in some ways than the newsletter does because a lot of people, I think, came to the events more for the hallways than for the presentation. They come because the community is there, and so I think that's really what made the events take off, combined with the fact that it became the major place where new microprocessors were announced each year and for people who were looking for more training sort of content, we had seminars where we would give them a couple of days of intensive training. The pinnacle of the Microprocessor Forum was, I guess that was 1999 when both I-64 and Rambus were announced, two disasters, but they were a big deal at the time, which generated a lot of interest, and which also generated a lot of contention and ultimately led to my leaving. So, actually if I could take a quick pit stop and then I can go into that story.

Fairbairn: Yeah, I was about to say... So, where did we leave off. We were talking about...

Slater: We were talking about the microprocessor forum and Intel and I-64.

Fairbairn: Oh, the relationship that you were building up with all of the various...

Slater: So, one of the difficult things about this business was that our most important sources of information and our most important customers were the same, and yet a lot of our reputation came from being critical and being willing to call it as we saw it, right. So, this always made the semiconductor companies a little uncomfortable and I had some experience of it just sort of felt unclear to me, like I did some-- the semiconductor companies would hire me for consulting from time to time, but one of the consulting

arrangements I did I actually happened to see some papers that somebody had left on the table when everyone left the room. And, I went and looked at their agenda and found that the whole consulting agreement was really a sham, that they didn't care what I said, it was a way to pay me to try to influence my opinion, and at that point, I said, "You know, this doesn't feel quite right," and then Intel started getting more and more aggressive with us. One of the memorable meetings with Dave House was he called me up one day and asked me to come in and see him and he had there on the table everything we had ever printed, all of our compilations, all of our newsletters with post-its on all of it and a count of how many of them were about X-86 processors and how many of them were about RISC processors and showed me that I had three times as much content about RISC processors than about X-86 processors and clearly that showed that I was biased and it was totally bogus because that was not what the market was like and I said, "Dave, this is not about how many you sell, it's about architectures. You have one, they have 10," but that was just classic Intel right. They would look for any way to exert pressure and...

Fairbairn: Were there any other notably egregious...

Slater: Yes, we'll get there. And, there was a huge variation in how open the people at Intel were and sort of the PR analyst relations. There were a couple of really outstanding people, Karen Alter and Nancy Pressel were two people who both totally got it. They knew that we had to be critical to be credible and if I said something they thought was a cheap shot, they'd let me know right. But, then they wouldn't then stop breathing right. There were some other people who followed them, Mike Green is one of them that came to mind, who basically viewed his job-- appeared to view his job as controlling our opinions and what we could write and taking retribution when he didn't like what we did. And, that became very much a pattern and they would cancel subscriptions, they'd cancel conference presentations, you know Andy's take no prisoners style. I mean it was a real thing, and when they viewed us as the enemy they treated us like the enemy, and it was just unpleasant and I got to a point where I said I'm just not going to engage with Intel anymore and that's what ultimately led to me leaving Microprocessor Report because there was no way to do that and not engage with Intel anymore, although I was also really tired of feeling like a voyeur and wanting to be in one of these businesses, not writing about them. Also, it had gotten to a point where I'd felt like microprocessors had matured to a point where the further hardware advances were going to be valuable and enabling. Nothing at that point was being held back by hardware. Everything was being held back by software, user interface, and the microprocessor architecture, to me, ceased to be an interesting place. It was like a solved problem in some sense. But, so a couple of other microprocessor forum stories, I think it was '97 or '98. AMD has now gotten into the X-86 business. I was probably a little bit guilty of being an AMD cheerleader while I tried to keep things very balanced, and they had K-5, I think it was, they had some processor that they were announcing and we had Sanders as the keynote, and then he was the president of AMD at the time, and one of the industries' more colorful figures, and then the first thing on the printed program was an Intel microprocessor announcement, I forget which X-86 thing this was, but we'd always known, it was again where I just wasn't as sensitive as I should've been to the politics here. The AMD-- oh no, there was a new Intel so on the program it showed Sanders as the keynote and then this AMD K-5, I think it was, was the first presentation, but Intel was announcing 686 or something, something big. And, so we'd actually given them the first slot that was between Sanders keynote and the AMD presentation, but we didn't put it in the printed program because Intel didn't want the name of the thing published yet. So, it hadn't occurred to me that AMD, this was going to look to them like they had a keynote slot followed by a presentation and that

I was sliding Intel into the middle. And, so the day before the presentation I'm giving an all day seminar, somebody comes pulls me, one of my staff comes pulls me out of my seminar, which I'm in the middle of presenting and says Jerry Sanders wants to talk to you because the printed programs for the actual event had just come out showing this Intel talk in between his keynote and his microprocessor presentation. So, he gets me on the phone and he says, "I am just god damned tired of sucking hind tit to Intel," <laughter> and it took me about 15 minutes to calm him down to the point where they didn't pull the presentation. But, then the last straw with Intel was this must've been Microprocessor Forum '99, so this was the really big one where I-64 and Rambus were both getting big technical disclosures and Nick, he has an incredible talent for making fun of people, he was very skeptical of the whole IA-64 program and he also felt like it was really a management failure at Intel. It was not a technical failure, it was a management failure, and he wrote a fairly pointed article that mentioned nobody by name, didn't mention companies by name, but it was pretty easy to read through it as basically an attack on Albert Yu probably. I'm not sure that it was all Albert, but you know it was basically an attack on Intel technical management without mentioning any names. But, of course, Intel was somewhat incensed and so I had another one of these long series of conversations with upset people and getting them to calm down and they were going to pull the presentation. I finally convinced them to come do the presentation anyway and so it seemed like that had sort of calmed down. But, then one of the traditions of the Microprocessor Forum each year was that Nick Tredennick gave an award ceremony, which was a very tongue in cheek sort of humorous award ceremony and I had made the gigantic mistake of telling Nick that Intel had threatened to pull out of the conference when they saw his article, which he worked into his award ceremony. And, I happened to be standing there in the back of the room next to the reporter from the "Wall Street Journal," I forget who it was at the time, who saw an exit and looked at me and the Intel PR person was there too, like these two people are looking at me like you're in big trouble now, so again everybody seemed a little upset, but nothing much happened, and then the fact that Intel had threatened to pull out was in that reporter's "Wall Street Journal" column the next morning, and that's the last time I ever spoke to Intel. They cut us off from embargos, they would no longer brief Microprocessor Report under embargo. They generally wouldn't take phone calls. They just became completely opaque and at that point I decided I would never again have anything to do with Intel. So, it was just I could see it from their point of view, right, they were a very big business, a lot of money at stake, I was a thorn in their side and if you have a take no prisoners strategy you do everything you can to kill the thorn. But, that was...

Fairbairn: Well, you had a good run up until that point.

Slater: Yes, we did.

Fairbairn: And, as you said it was beginning to not be the issue of the day.

Slater: Right.

Katz: So, were the sales to-- you talked about the sale to Ziff- Davis as being sort of a practical economic kind of thing and then they sold it to Cahners, was the management of either company-- did they become an issue, did they try to control what you were doing in any way? Did you feel like you were still a relatively independent operation, how did that...

Slater: We were relatively independent, I think, but of course they control the capital and we were trying to do new stuff that required capital so their control really was in our ability to do new stuff, and the business was never a hugely profitable business. In fact, in the early days with Ziff-Davis owning it we were trying to launch new conferences and stuff, you know, it consumed a modest amount of cash. But, it was a substantially bigger business by the time Cahners bought it and they were actually a much better match against and the end stat [ph?] was at least conceivably a match for the right kind of firm, but I don't think they had any very strong management or really knew how to incorporate us.

Fairbairn: By the early 2000s, their leader and founder who's name was Jack...

Slater: Jack Beadle [ph?].

Fairbairn: ...Beadle, he had been starting to fade out of the picture too.

Slater: Yep.

Fairbairn: And, I think he managed to get...

Slater: Yep.

Fairbairn: ...how long did the Cahners thing stick with...

Slater: I think Cahners owned it for close to 10 years, I'm not sure, and then they sold it to Linley and when they decided to shut it down Linley bought it back from them, and he had been running his own little analyst firm since leaving Microprocessor Report, so he had his whole infrastructure there ready to just take it over. And, he has continued to run little conferences too although he's taken a different approach to it. You know, I took a very hard line, no sponsorship, no advertising, everybody who attends pays, purely editorial. He's doing somewhat more traditional semiconductor industry thing where people pay for the right to present and the attendees get to come for free, so it's a conference but on a completely different model.

Fairbairn: So, you left in '99?

Slater: The very end of '99, yeah.

Fairbairn: The major instigator was, well it sounds like a couple of things sort of the decaying change in innovation and so forth and you getting a little bit tired of the whole thing...

Slater: Yeah.

Fairbairn: ...the cutoff with Intel, so everything came together and you said this is the time to step aside, so was that with the idea of okay and here's what I'm going to do next or I'm getting out of this and then I need to figure out what the next step is?

Slater: Well, I already had an idea. You know, at the time in the last couple of years of Microprocessor Report information appliances were the big thing and everybody was saying we're going to have all these dedicated things that are going to different things for us. And, I had always been a hobby photographer and

actually built one of the sizable websites when my kids were young and we spent a couple of summers at Lake Tahoe and I built a website about Lake Tahoe and at that point this was all film and then getting it scanned and so then when I said geez this was sort of fun, but it's really tedious having to deal with the film and then digital cameras got up to a megapixel and I said oh wow they've now reached this magic threshold where the quality is good enough, but then the experience on the PC trying to do anything with digital photos was just horrifying. I mean even for me as a pretty technical guy I was having a really hard time figuring it all out. So, I said hey there's got to be an opportunity here for an information appliance to ease your photography world, right. You just connect your camera to it, it sucks in your pictures, it stores them, it'll send them off to get printed if you want, you can view them if you want, and Stewart Alsop, who had been a fellow newsletter publisher was now a venture capitalist at New Enterprise Associates and so he agreed to provide us with our initial funding and we started a company called Phototablet and if you look today at an iPad running Apple Photos, you have something very close to what we wanted to do, but we were a good decade ahead of the point at which it could be done at a price point that people would accept it. And, so after writing the core software and building some prototype hardware and doing some market research, we concluded what we could sell it for and what people would buy it for occurs were like many years out before those were going to go cross, and so at that point we said well while we really like the idea of an information appliance, we don't see it as an economically viable model at this point. Another interesting thing we found is we did consumer studies, so we did focus group sorts of things and when I was an analyst I had been there beating up on the PC saying these PCs are too hard to use and they have all these problems. The thing when we took ordinary, nontechnical people and we asked them about their PCs, they assumed that all the problems were theirs, not the PCs, they were just too dumb to figure it out, and they'd already made an investment in it, so they had no interest in investing in a device that was alternate to the PC.

Fairbairn: Mm-hmm.

Slater: So, that was another thing that said this is going to be a tough market.

Fairbairn: So, you were actually going to try to build a piece of hardware...

Slater: Right.

Fairbairn: ...a tablet, that's a major undertaking, a very different world in what you had been working in.

Slater: Well, it was always the sort of thing I liked to do, right, and it was at a time, right 1999, and there was a lot of venture capital available. There was a lot of enthusiasm for information appliances and...

Fairbairn: You'd have to hire a whole team.

Slater: Oh, yeah. We raised 2-1/2 million dollars. We had 15 people.

Fairbairn: Okay.

Slater: We were in business for about 22 months. We had done the standard venture capital thing of you raise enough money to sort of build the product and then you series B to bring it to market. Well, we needed

our series B in the Fall of 2001 when everything in the digital photo space was struggling and, in fact, the whole venture community was basically not doing B rounds for anything and we were very lucky that we had engaged with Adobe trying to get them to invest because Adobe had an investment arm, and then just about the time we were getting really frustrated trying to raise the Series B, Adobe came to us and said, "We really like what you're doing, but it's way too close to what we should be doing for us to invest in you, how about we just buy the company?"

Fairbairn: Mm-hmm, to do what, to continue it or to put it out of the competition.

Slater: No, so at that point, we had switched from it's not a tablet it's a piece of PC software, and so they had a huge franchise with Photoshop, but Photoshop is a one photo at a time sort of thing. It did nothing for you for the 10 thousand or the 100 thousand photos you might have, right. We were all photo organization oriented. So, the product actually got first marketed by Adobe as Photoshop Album, and I was the Product Manager on that, and then...

Fairbairn: So, you actually became an...

Slater: I worked for Adobe for five years.

Fairbairn: ...Adobe employee.

Slater: I got that first version of Photoshop Album out. It was my first real exposure to the job of a Product Manager in a big company, which I found very frustrating because this idea of well we listen to the customers and then the customers tell us what to build, and I came in from the point of view of I have a vision for what this product should be. And, so I was not a great cultural match with the Adobe Product Management world, but I got along really well with the guy who was running engineering at the time, Greg Gilley, who's now a senior engineering guy at Apple, and I said, "Look, you and I both know I've got a lot of ideas for features you're going to want in this, so let me build a little research team, and I'll just build these features for you even though Product Management isn't asking for them. And, then if when I'm done Product Management doesn't want to ship them then you should fire me." And, so we did some of the earliest work in organizing photos by visual similarity, doing stacks of similar photos, doing face recognition organized photos. You know, I went out and licensed the core technologies from other companies and then brought them in and had my little team build a user experience around them. And, I look back at that now and I kick myself for not having found a way to be happy at it because it paid me vastly better than anything I've done since and was easier than anything I've done since. But, again, there was just something about the big company environment where I felt like I couldn't get very much done that just tortured me, and the people who stay at Adobe for a long time tend to be the people who are comfortable with going to work and someone's telling them what they're working on. They're not sort of entrepreneurial. The more entrepreneurial somebody is, I think the shorter time they last at a company like Adobe because it's just a conflict of the way your mind works. And, I really wanted to get Adobe into the consumer photo sharing business and we built what I think would've been the killer system, it was code named Cloud Nine. It's very much like what the very best of the photo sharing stuff is today. We had this built in 2004 and at the time Adobe Management viewed the consumer market as uninterested. Their statement was all consumer price points trend to zero and we're going to be an enterprise software company. We're just milking that creative

pro market to build our enterprise software company, an effort that completely failed. They now, I think, pretty much bailed on being an enterprise software company and are back serving consumers in creative pros. We could have had them 10 years ahead of where they are today in the photo sharing infrastructure, but they just didn't see it and I found it too frustrating. You know, they ended up canceling our whole photo sharing project in order to do a premium skew of Photoshop, right. Basically, they looked and said what can we do that's going to give us a boost in next year's revenue numbers, right. And, the short term sort of drive by shooting was vastly more appealing than a strategic adventure.

Fairbairn: Can you describe how your own personal mindset changed from the enterprise serving Microprocessor Forum and Newsletter to the consumer serving photo sharing?

Slater: You know, now that I look back on it it's a pretty radical change for sure. I mean I've always just been a curious person and interested in things and I guess to me it was the same kind of thing in that because I was designing microprocessor based stuff I had this thing in my head of what I wanted that newsletter to be, and because I had been doing lots of digital photography and studying information appliances and photo management, I had this thing in my head of what I wanted it to be. I was not a good consumer guy in that I was not driven to go listen to other people.

Fairbairn: You were the consumer.

Slater: I was using myself as the proxy and I probably was not a great proxy. We did manage to build a really great team. Laurie Vertelney was our UI person. She's now back at Apple. She was one of the early people at Apple and she got us into doing consumer tests and actually really understanding what it meant to build things for a consumer and test it with them to find out if the dogs would actually eat dog food.

Fairbairn: So, did any of that actually make it. I mean Adobe eventually got into that kind of market, I mean whether it be Lightroom, or Elements or Cloud stuff, or whatever?

Slater: So, our actual software lives on today as the organizer mode of Photoshop Elements, only in the PC version. They didn't do it on the MAC version because they didn't want to compete with iPhoto.

Fairbairn: _____ did.

Slater: Yes, which is now dead. And, so basically they had from Photoshop they created Photoshop Elements basically to have an affordable price point product right.

Fairbairn: Right.

Slater: And, then with the consumer world they got once you've taken a couple of thousand digital photos the problem ceases to be what do I do with this one photo. It becomes where is that photo or I want to do something with 50 photos, how do I do that?

Fairbairn: Mm-hmm.

Slater: So, they had the editing thing, this became the organizing and sort of crafty thing. They went down a path that I found completely uninteresting, which is the sort of scrapbooky I'm going to add stickers around my pictures and little captions of what people are saying and all that. I'm much more of a traditional hardcore photographer. So, Lightroom is really the product I wanted to build. I think Lightroom's a fantastic product, I use it every day. And, Lightroom is way beyond the vision of what I wanted to build, and actually on my website now, I have a-- there is a Lightroom plug-in that has a matching Wordpress plug-in where you can actually create a collection in Lightroom and then in one click say I want this on my website and everything happens, and that is the core of what we were trying to do in 2004, except you didn't have to have your own website. But, the paradigm that I believe then and I believe now is the right one is that you want your photos stored locally and you want to manage them locally and when you want them shared somewhere on the web, you want to do that through a local interface, which knows how to talk to that stuff in the cloud and makes it all happen.

Fairbairn: Were the seeds of Lightroom extant at the time you were working on your idea or did you have interaction with the people who planted those seeds?

Slater: Oh a little bit, just a little bit, very, very early. Lightroom was started by a guy named Mark Hamburg, who was the engineering manager for Photoshop for many, many years, or the technical leader or something, and I think the impetus for Lightroom came from the fact that Photoshop had been fairly widely adopted by photographers, but it really turned into a graphic arts tool, and 90 percent at least of what was in it was irrelevant to most photographers, yet all that complexity got in the way of learning to use it and then it wasn't solving a lot of problems the photographers had - like dealing with more than one picture at a time, and Mark was an active photographer and Greg Gilley who's the Engineering Director, they shared a vision for this product that could be built.

Fairbairn: Turn it off.

Slater: So, in the early days of our product, Lightroom was like a science experiment, so there were a few people working on it. It had no real strategy, it was being written in Lua, which was the first thing that Adobe had done in a long time. It wasn't C++, so it just had this very science experiment sort of feel to it. There were pieces of it that were working, they had a bunch of ideas, clearly my photo organizer had been relegated as the consumer hobbyist thing. There was Bridge, which is really a file browser and I think should've been killed and replaced with our stuff and there was one attempt to do that, but we lost. And, then there was Lightroom going on, and we were maybe two or three years into it when Apple announced Aperture, which was going after exactly the same concept as Lightroom, and it was fascinating to be inside Adobe then because there were a certain group of people within Adobe, I think predominately engineers, that said, "It's over, we're screwed. Apple got there ahead of us, it's going to be theirs." And, much to their credit the senior product management people came in and said, "Bullshit, this is our market to win. We're going to kill them." Adobe preannounced Lightroom six months before it was ready to ship, they'd never done that before, but they had to do something to blunt Apple's entry and here we are how many years later, Lightroom is the premier product, Apple has abandoned their product and the guy who was the Director of Engineering of Adobe is now the Director of Engineering at Apple.

Fairbairn: Deeper pockets.

Slater: And, Mark Hamburg who created that product originally actually became a Microsoft fellow. I think it lasted between one and two years before he ended up back at Adobe and Mark Bolger who was the Engineering Manager for many years on Photoshop after. Mark is now in one of the senior engineering people at Google.

Fairbairn: Have you maintained relationships with these...

Slater: Yeah, Facebook level relationships for the most part. So, Adobe was a really interesting experience. You know, I think I could've accomplished a lot more there if I had been a big company guy, but I really didn't understand how to operate within a big company, and didn't really get it until I left that I think if you're really going to be successful at a big company you have to not be pursuing your vision, but their vision. And, I was always trying to pursue my vision.

Fairbairn: So, before we get on to the next stage, is there-- I want to step back and make sure that on the whole Microprocessor Report and that sort of thing, is there any stories, people, events, situations, transitions that we glossed over, completely missed? We talked about the evolution of the Microprocessor Report, maybe you could relate sort of what happened you left Microprocessor Report. We found out what you did next. What happened to Microprocessor Report? Give us a summary and sort of wrap that up.

Slater: So, Microprocessor Report, we kept looking for ways to build more revenues and we tried to spin off these other conferences. We ended up doing a lot of sort of reprint books where we'd compile a bunch of our articles into one thing, and then we tried to do some of these one, two, three thousand dollar book-like things like Dataquest would do, right, where it seems like if it's of lower quality and poorly printed then instead of selling it for \$50 dollars you can sell it for five thousand. And, we made some progress on that. The company was decently profitable. At the time I left, I really sort of lost track. It was really being run as part of End Stat and I think Microprocessor Forum kept going for a few years, but then they shut it down and then the newsletter kept going for a few years more and then they shut it down. So, I didn't really stay very engaged with it. It was really sort of remarkable to me how I'd cared so much about microprocessors for so long that it's like overnight I didn't care at all. They were just completely irrelevant and it really drove home also to me the point that all the reporters were making this, nobody really cares what a microprocessor is anymore because I found that I didn't even care. I'm going to buy the next Apple thing that's the model that I want you know. And, then it's phones and iPads and I don't even know what processor is in these things.

Fairbairn: As a computer architect or an intellectual purist, did bother you when Apple chose Intel over their own and their others?

Slater: Well, I think Keith Diefendorff is part of that. Keith worked for me for awhile. He was the architect of the Motorola 88000 and then ended up as a microprocessor guy at Apple. You know, one of the things that I came to realize towards the end of my career at Microprocessor Report is that Intel's strength was fundamentally economic, not technical. While there was a tremendous amount of technical strength there, the investment that they had in fab capacity, but that they were going to win no matter what. If some other design turned out to be the winning design they'd go buy it, right. But, nobody else could actually service all the customers or go build the things. If I were to have continued with Microprocessor Report I think I

would've ended up getting more and more business oriented because that was what was becoming to me the interesting part of it. I'd stopped caring about pipelines, right, particularly once it started becoming evident that okay, so if you do everything right and you follow all these RISC things and it in fact really is all better that maybe you gain a 2X speed improvement, which Intel can gain if they can get to the next process with an old architecture 18 months sooner. No amount of microarchitecture was going to make you win, and then furthermore as people started looking more deeply at can I use all of the smart implementation techniques that the RISC guys came up, but build a machine that does X86 instructions. I said, "Yeah, I can do that," right, so the whole reason for the battle sort of went away.

Fairbairn: Intel ended up imbedding most of those good ideas in their architecture?

Slater: Right, right, I mean what it came down to is you could use those ideas as internal architecture and they don't really need to necessarily be there in your instructions and that the value of compatibility in the instruction set overwhelms everything else. Sorry, I was thinking of something else that it was leading me to other things about Microprocessor Report.

Fairbairn: Now Microprocessor Report, I mean what is Linley Group publishing now?

Slater: So, Linley Group publishes the Microprocessor Report and they run a number of conferences and then he does a number of these sort of multi-client study sort of reports I think, more oriented around things like network infrastructure, processors, and embedded processors, and DSPs. Peter Christy, who actually was president of MDR for a while, when I was trying to get somebody else to run the business. He runs a firm called Netsedge Research Group or something. He has an analyst firm now that does Internet, web, same sort of thing we used to do for Micro-- the same sort of thing I used to do for Micro, the same sort of thing I probably should've kept doing. So, there've been people that have taken it in various directions.

Fairbairn: So, the Report never died, it just moved from one owner to another?

Slater: Right.

Fairbairn: It changed, is the attrition rate roughly the same?

Slater: I think this is its 29th year, which is pretty amazing in that.

Fairbairn: And, it's still running in 10s of thousands or...

Slater: Yeah.

Fairbairn: ...or hundreds?

Slater: I would bet it's lower than it used to be and I don't know what the price currently is.

Fairbairn: Well, sure because the issue of the day is Apps.

Slater: Right. Well, they're not for the people who are making...

Fairbairn: Indeed.

Slater: ...silicon for embedded things.

Fairbairn: There are silicon people, but there's a lot more Apps people now.

Slater: Right, right.

Fairbairn: Okay, so we covered the MPR and that sort of thing so you went to Adobe, but you're living in Sonoma County...

Slater: Yes, we moved to Sonoma County in '90, so I lived there for 10 years doing Microprocessor Report and then we started the company in Sonoma County, partnering with colleagues Ken Rothmuller and Bernard Peuto, it was originally called PhotoTablet and it was renamed Fotiva once we decided that tablets weren't going to be a part of it, and that business only lived for two years once we sold that to Adobe so it was the end of 2001 that we sold that to Adobe. So, we had an office with about 15 people in Santa Rosa and I would come down typically for two or three days every two weeks, additionally because I felt like if I wasn't physically present at a meeting in San Jose, I had very little influence like being the one guy on the TV in a room full of 12 people. It was really hard. By the end of my five years, I concluded I didn't have any influence no matter how often I went to San Jose.

Fairbairn: So, you continued to work out of the office?

Slater: And, that was when I left.

Fairbairn: Yeah, and never actually occupied the downtown headquarters.

Slater: No, not more than a couple of days, every couple of weeks.

Fairbairn: Was that just a remote site or was it telecommuting?

Slater: The Adobe Santa Rosa?

Fairbairn: Yeah.

Slater: Yeah, I mean originally it was just us, but then they bought a company in Novato [and they moved them up there and so it was like a little Adobe remote office. It's now been closed and the few people that were still Adobe employees worked from home, and then all the products that that group built are now being maintained in India.

Fairbairn: Interesting. Okay, so the day came you said I can't handle this anymore, time to move on. Do you know what you're moving on to or are you just leaving?

Slater: I did not know what I was moving on to. So, this was 2006, and so I started out as a really hardcore technical guy. I mean at one point I could write 8080 machine code. I didn't need an assembler, and I'd gotten as far as 68 thousand, but by the time I'd gone into the Microprocessor Report, Microprocessor

Forum, I was not actually building my own stuff anymore right, and then when I hired software people for Fotiva, they were writing C++, which I didn't know at all and so all I could do is advise them on what it should do it, not how they should write it, and then Adobe was that same sort of thing. But, as we had gone down this path of building online services, I mean ever since the birth of the web I've had a huge passion for the web and so I got involved with trying to say what can we do here with the web in all of this and get my train of thought back again.

Fairbairn: So, you're leaving Adobe and...

Slater: Yeah, okay so through being engaged with the online services stuff at Adobe I had become exposed to the Ruby on Rails technology and through my hobby web work I had built a bunch of database driven websites called BoatingSF, which was a big resource site...

Fairbairn: Oh, so the one that's on the bay, it figures out where everything is.

Slater: Yeah, it's got a whole bunch of stuff. I actually sold that a year ago, but that's...

Fairbairn: I had heard that was instrumental in the tanker hitting the archives there had useful information that nobody else did.

Slater: That's right, that's right. I had a receiver that was recording ship positions. So, I'd gotten to know the Ruby on Rails technology and gotten myself a little bit technical enough that I could build stuff again. And, to me that was really important to satisfaction because I found it a sort of frustrating place to be to be trying to define a product and then have an engineering team whose code I couldn't touch when I wanted to just go tweak things or just go build something. So, basically after I left Adobe I immersed myself for about six month trying to become a basically competent Ruby on Rails developer. I thought I got to be reasonably competent. I built Apps for a couple of local companies, still found it somewhat discouraging that it seemed that the 25 year olds were a lot better than I was.

Fairbairn: Two minutes 20 seconds on Ruby on Rails. What was it unique about it? What was interesting about it?

Slater: So, Ruby on Rails is two things. It's a language called Ruby and a framework called Rails. The language came out of Japan. The framework came out of 37 Signals, which they created this framework originally to build Basecamp, which is a software as a service product. And, Ruby is a completely object-oriented relatively unstructured language, so unlike Java and for example a typical web application has like a third as many lines of code and Ruby has than Java and can be written in a half to a quarter of the time. So, they'll be writing online stuff in Java, Ruby was like the new thing that made it so much easier and let you build stuff of equal sophistication and reliability with smaller teams. It also has sort of an opinionated approach to how to build things, right, so it's a model view controller architecture, and instead of well you could do this this way or you could do this that way like when you're doing Java you can build it any way you want, you just have to write all these XML configuration files that explains how it all works. Well, with the Ruby On Rails approach it just says this is how it works. You put this here, you put this here, these are the defaults. All the software will just assume those defaults if you just use those defaults just do it like this

and everything works. You know, so I think it was a brilliant way to structure it. But, as I started, I would've actually been happy writing little apps for local businesses. I found it really fun to do to just go in and understand their needs and build something, but it increasingly became apparent that there was an economics mismatch, but a typical small business might see five or 10 thousand dollars of value in a custom app, but they would see 20-50 thousand dollars in cost to build it. And, the original kernel of the idea for what turned into Webvanta was can we build some kind of a general purpose platform that will be a big multi-tenant Ruby On Rails app that many different things could be built on so they didn't need their own infrastructure, but all the common stuff was already done. And, this time actually our original thought was for Christopher Haupt who had been the Engineering Director on these photo sharing projects as well as other things at Adobe. He left about six months after I did and so we joined up to build Webvanta really on this idea that Ruby On Rails was a big opportunity, software as a service was a big opportunity. There was a lot of buzz at the time for a couple of smart guys building some little thing that takes off and we were a little bit of probably too much of the if you build it they will come school. And, so we did a bunch of things together. We did a Ruby On Rails training course, we did some live training sessions because we both liked to teach, and then we built an information portal for the Ruby On Rails community because one of the hard parts about open source communities is there's tons of information out there, but 80 percent of it's crap and it's really hard to find the good 20 percent, especially because Google values age over freshness usually for technical information, which is exactly the opposite of what you want. And, so we built this sort of portal, we were doing these classes. It was totally self-funded, we were sort of resistant to the whole investment world, sort of listening to all the stories from David Heinemeier Hansen, and 37 Signals about this new way to build businesses. So, we really just had this vision that we wanted the software as a service something and we would build it on Ruby On Rails and I think there were a couple of things that made that business really, really hard. The first one was that my timing for raising money seems to be impeccable so we did ultimately decide to go out to Angels, but we decided to go to Angels. The day of my first Angel presentation, the headline in the "Wall Street Journal" was, "Worst Financial Crisis Since the '30s, No End in Sight" and that was as Wall Street was just totaling melting down.

Fairbairn: What 2008?

Slater: 2008, and so through a great deal of effort we managed to raise about a million and a quarter dollars. We really needed about twice that so we both got diverted into spending a lot of time raising money that should've be spent building product when we didn't have as much money as we should've had, and then frankly I don't think we had as good a product idea as we should've had and we knew how to build the stuff. We knew how to run the company. We didn't know how to connect with customers. And, it is such an obvious classic engineer running a company mistake that I kick myself and wonder how I still did it. But, I think we believed that the world was moving to software as a service that just as CRM had moved there led by sales force that web development would move there. In fact, it hasn't happened. The general WordPress as a self-hosted platform dominates the web today, and for a variety of reasons the idea of I'm going to let someone take care of all that infrastructure for me because it's been popular for simple websites and blogs, but has not ever really moved into the large sophisticated website world, which is where we wanted to play. So, at Webvanta we ended up building a really nice content management system that was a fully multi-tenant hosted application so you could go sign up and in minutes you're building a site that had great database capabilities way better than what Word Press had at the time. This was before Word Press had

custom post types. It was really a blogging platform whereas we were a platform for sites with rich information architectures and lots of interconnected information. But, we never really found a go to market strategy that would get us enough customers quickly enough. And, while we started off as saying we want to be a platform player and everyone else is going to build stuff on our platform, what we found was that the only way we could make money was people coming to us saying it's great you have your own platform, but we want you to do everything, build the whole thing for us.

Fairbairn: Right, just build it.

Slater: So, we sort of ended up going down this slippery slope into essentially becoming a web agency that has its own platform.

Fairbairn: Did any other web agencies choose your platform?

Slater: Yeah, there were about a dozen around the world, and there are about half a dozen still using it today, but they tended to be agencies that would do 10 sites a year, and we were viewed as a small part of the value so we got a small part of the revenue. So, on that initial business strategy we needed tens of thousands of customers and we just weren't going to have a capital for tens of thousands.

Fairbairn: So, that would've been mom and pop companies that wanted to have a web presence.

Slater: Yeah. Well, we were typically working for small design agencies which were typically three, four, five, ten person companies that were then working for some mom and pop, some medium size businesses. As time went on and we stopped working primarily through designers and started working primarily directly with companies. We focused on the larger organizations, you know I mean I always thought-- you know what I mean 37 Signals has this pitch of Serve Small Businesses, there's millions of them out there, no one customer can hurt you. It certainly was just started talking to the investment community, they hate small business for the most part. But, I kept saying no this really is an opportunity, but I now totally understand why they hate them, they're really hard to sell to and then they don't want to pay very much. And, so we have moved up to working for educational institutions and mission driven nonprofits where there is more value in what they're -building and they have-- they want more from us. I mean we just completed a project for a part of the University of California called Agriculture and Natural Resources that runs things like the 4-H program and Farm Advisors and Master Gardener program and the California Naturalist program, and they've got a gigantic web presence that really needs to be totally revamped. So, in that case we went and did a half year mid five figure project that actually didn't include any technology or any development at all, just understand what's there, understand all of the stakeholders and make recommendations of what to do. We've also done work for companies like the Nature Conservancy where we built a database driven site that takes all the salmon conversation data and presents it in a very accessible easy to understand way. So, while we still have done sites for all kinds of businesses from hardwood lumberyards to health centers to cannabis dispensaries. What we found was that in order to market ourselves more effectively and move up to higher price points we needed to become narrower, so in the last year or so we've really been focused on the education.

Fairbairn: Is the business thriving and growing?

Slater: It's doing okay. It's doing okay. You know, because I'm not able to really devote myself to it at this point because of my health, we are looking for an exit for it.

Fairbairn: What's the gang size? How many work here?

Slater: Oh, there's about seven of us, a couple of freelancers.

Fairbairn: Do you each work out of your own home, do you have a place?

Slater: No, we have a little office in Sebastopol. We have a couple of people in Sebastopol. My cofounder is up in Auburn, he's just very part-time with us. We have somebody else out in North Carolina. She used to be out here, but moved there, so it's a typical scattered...

Fairbairn: The miracle of modern space age communications...

Slater: Virtual sort of business. That's right. And, we've done a lot of work with UC Berkeley. We've done sites for the Art History Department, the Astronomy Department, the Redirect Department, the Film and Media Department.

Fairbairn: Do you have to capitalize on your legacy of being there?

Slater: You know, a little bit, a little bit. I think they like the fact that I went there and I like being there and it's just been pleasant being in sort of the collegial academic environment versus the get me more clicks.

<laughter>

Fairbairn: There's not as many interesting protests anymore.

Slater: So, that is Ruby On Rails application. Webvanta is a Ruby On Rails app so in some sense we have stayed on that technology path that I got on when I left.

Fairbairn: So, you've gone from hardware purist, to business person, to consumer guy, to software guy.

Slater: Yeah.

Fairbairn: You've covered the whole computer spectrum.

Slater: In some way, yeah. Now, I really think of myself primarily as a writer.

Fairbairn: All along you've been a writer just about.

Slater: Yeah, so I mean it's been an amazing ride and I think it's great to be here at the Computer History Museum because one of the things I've really come to appreciate is just how the sort of centuries of people standing on other people's shoulders is what's gotten us here. It's like nobody invented anything that could've gotten us here. It's like a thousand incremental things from Paschal built a machine that could add

and subtract and the Babb stuff goes back more than a hundred years, right, and then you've got transistors and first vacuum tubes and then transistors and then...

Fairbairn: There are people still...

Slater: ...and then VLSI and then software, you know, it's just awe inspiring I think how deep this stack is and that today you can pull out your phone and you can browse the web and you're completely unaware of all of that, but the richness and depth of the amount of technology that's in that device is just stunning and it's hard to even think about if you look back 50 years from now how different the world was. Then you try to project forward 50 years from now...

Fairbairn: You never can do it.

Slater: I feel like you just don't have a chance. I mean other than Vannevar Bush, who was going to predict the web in 1945. I mean he pretty much did, but for the most part I think things are changing so fast. I mean even when the web came out I would be a rich man today if only I had realized in 1995 that owning domain names was a valuable thing.

Fairbairn: Yes.

Slater: And, I look back and that and I say why did I not get it right. I mean I went and bought MSlater.com, but why didn't I go buy sex.com right. And, that's just 20 years ago, right, and there was no concept that domain names were a valuable thing or that you could have a phone that would let you browse the web anywhere you were or that digital communication would become the primary thing that teenagers use to talk to each other. It's just so much has changed and it's had so many profound impacts. In some ways, I'm not close enough to the semiconductor technology to know, in fact in some ways I never was, but I mean I know people talk about actually hitting that Mohr's Law. We're getting to the point where we're just not going to keep doubling every year. I'm not sure that matters that much, right. I think you could freeze hardware technology for the next 50 years and software wouldn't catch up with the opportunities that are there. So, I think it's going to be just incredibly exciting to see what happens, not for me, but for everybody else who was able to be there for that next 50 years. Clearly we're going to have just ample access to any kind of information you want, right. Everything, you're going to be able to talk to all your machines. A lot of this stuff if you go back to like Apple's early Knowledge Navigator videos, almost all that is now ordinary, it's like iPhone does almost all that. One of the things that back early '90s, everyone was saying people are going to keep buying faster and faster processors because we're going to have these-- you know we've done 2D, now we're going to go to 3D right. Well, nobody actually came up with a 3D user interface that anybody cared about, and so it seems that like speech recognition has become that next thing with Siri and all that sort of thing.

Fairbairn: But, that took a lot of hardware capability to be able to pull off.

Slater: Yeah, yeah, so it's that mix of the hardware and the...

Fairbairn: Yeah, both hardware and software.

Slater: And, the software, but I feel like my imagination is just not up to the task of trying to look more than about 10 years out because things just change so radically and I mean it's such an enigma because in one sense you could say almost all the change is incremental, right, if you look at each little thing, it's incremental. Yet, you look at now versus 20 years from now and it feels wildly and conceptually different. So, there's some way in which all these incremental changes just like phones got to a point where all the sudden they were this completely different thing, which by the way had much less to do with the technology and more to do with the fact that Apple just intermediated the carriers from being able to control the phones.

Fairbairn: So, if you were that young person again, that 21 year old or whatever or going to the university, what would you pursue in order to prepare yourself for this unknown future, unpredictable future?

Slater: Well, I tell you, my perspective has shifted a lot by getting cancer and by being older and by thinking about the world, by being curious about things. I'd probably study genetics if I went to school today. This is what I find really fascinating today is trying to understand what people are and how they work and that we have this whole genome and we've got all this data. There are a few things we understand and it's even more incredible than the electronics. I mean you look at what actually goes on in our body and the way the chromosomes work and all that. It would seem wildly outlandish and unlikely if it weren't for the fact that you can actually prove that it's all actually happening. But, the amount that's actually understood. You know, people talk about the human genome project, now we know the human genome. Well, they understand less than 1-1/2 percent of what any of it does right. They've got a list of genes, but...

Fairbairn: So, if you can list this program, but you have no idea what the program does?

Slater: Right, so I think that the-- I mean the problem that I would have with going to school with that is it works against my desire to build things, so maybe I still would go to engineering school.

Fairbairn: Well, that's engineering.

Slater: It is engineering right, yeah, but what I find most fascinating today is that I feel like we are on the cusp with the ability to quickly sequence genomes. Like a team of three people would work for five years on something that can now be done in an hour. So, that ability I think is going to create a lot of data and there's just going to be a whole lot learned about life and people and disease and if I were to start over frankly I would want to pursue something where I felt like it made more of a humanist difference. You know, I'm not sure that-- I mean I think I've made a difference in that I've brought communities together and I've built some cool stuff, but if I could start it over I'd like to make a contribution to health.

Fairbairn: Well, I'm not sure exactly about health, but I would disagree that you haven't made a contribution. Partly the work you did helped to make everybody's iPhone better and we all love that.

Slater: Yeah.

Fairbairn: And, that's life. It's not prolonged life that you have in mind, but it is life.

Slater: Well, if that's true, I'm honored and I do think we've made a contribution and I wouldn't have kept doing it if I didn't feel like we have and really the thing that kept me going with Microprocessor Report was

all the feedback I got from people saying how valuable they found it and what keeps me going in my current company is the feedback from customers that tell us how valuable they find it. It ultimately comes down to people and interactions with people. You know, in some sense the failings of Microprocessor Report, like the relationship with Intel, ultimately came down to people. The issues were not the ability to understand something or the technical stuff...

Fairbairn: Encouraging Nick to insult Intel, that...

Slater: Lack of alignment, lack of alignment to motivation.

Fairbairn: Well, I think this has been a very interesting couple of hours we've spent...

Slater: Good.

Fairbairn: ...and we want to thank you very much for your time here and we offer you the opportunity to go see some of the exhibits now.

Slater: Great, well thank you very much for the opportunity. I'm very pleased to have had the chance to make the recording.

Fairbairn: Thank you Michael.

END OF INTERVIEW