Desktop Publishing Pioneer Meeting
Day 2 Session 7: Ventura, Aldus and Apple

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Table of Contents

Desktop Publishing Pioneer Meeting: Session 1: Purpose and Introduction

Conducted by Software Industry Special Interest Group

Abstract: Session 7 of the Desktop Publishing Pioneer Meeting focuses primarily on Ventura, Aldus, and Apple. Lee Lorenzen, one of the cofounders of Ventura, begins by describing the company's origin and early management. He also explains Ventura's exclusive partnership with Xerox and why the founders chose to sell the company to Xerox in 1990, after just five years, rather than attempt to build it into a large operation. Paul Brainerd then discusses Aldus and its PageMaker application. After sharing stories about the Aldus sales, marketing, and international distribution, Brainerd explains Aldus' relationship with Adobe and his role in the Adobe purchase of Aldus in 1994. Lastly, John Scull talks about Apple's efforts to market and sell the LaserWriter as well as package it with PageMaker and the Mac software applications. He and various participants also explore Apple's relationship with other firms during this period, particularly during Jean-Louis Gassée's tenure.

Participants:

Name	Affiliation
David Brock	Moderator, CHM Center for Software History
Burton Grad	Moderator, SI SIG
Chuck Bigelow	Typography
Paul Brainerd	Aldus
Liz Crews (nee Bond)	Xerox PARC and Adobe
Chuck Geschke	Xerox PARC and Adobe
Steve Kirsch	FrameMaker
Donald Knuth	TeX
Butler Lampson	Xerox PARC

Lee Lorenzen	Ventura
Martin Ruckert	TeX
John Scull	Apple laser printer
Jonathan Seybold	Rocappi, Seybold Newsletter and Conferences
John Shoch	Xerox PARC
Bob Sproull	Xerox PARC
Larry Tesler	Xerox PARC and Apple
John Warnock	Xerox PARC and Adobe
Richard Ying	Atex
Thomas Haigh	Historian, University of Wisconsin/ Milwaukee
Matthew Kirschenbaum	Historian, University of Maryland
Dave Walden	Historian
Ann Hardy	SI SIG
Mike Humphries	SI SIG
Doug Jerger	SI SIG
Ed LaHay	SI SIG
Hansen Hsu	CHM, Historian
John Markoff	CHM
Paul McJones	CHM, Software Preservation Group
Len Shustek	CHM, Chairman
Dag Spicer	CHM, historian
Marc Weber	CHM, Internet curator

Burton Grad: Let's talk about Ventura. We'll start from the beginning. How did you get started in the business, Lee?

GEM at Digital Research

Lee Lorenzen: I've got to start a little bit before the beginning of Ventura to tell that story. After graduating from college in Dallas, I was interviewed in an on-campus interview with the guys at Xerox Office Products Division. I went to work there and got exposed to the Xerox Star and the Alto and Smalltalk and all the things that were going on there. They were about ready to release a follow-on to the Xerox 820, which was their entry into the personal computer business. They had two versions: One was a 68,000-base follow-on and the other one, which was the 8086-base follow-on, was called Early Bird. Early Bird Eats the Worm was the Xerox 820. We basically took the Star user interface and reimplemented just the appearance of it in something we called Lone Star because it wasn't networked and it ran on this 8086-based PC. We hand-coded the Helvetica font we had gotten from somewhere and got our own sort of bit version of that. That made me into user interfaces.

My manager at Xerox ended up going to work at Digital Research in Pacific Grove for Gary Kildall. They were doing CP/M (Control Program for Microcomputers) and the follow-on to the CP/M operating system. She recruited me to be their graphics guy working on the user interface. We converted that Lone Star idea into something called GEM, Graphic Environment Manager, which is a very small and fast desktop management system with icons dialogs, menus, and all of the things that you need to build a graphical application. Then we built a suite of graphical applications on top on that: GEM Draw, GEM Draft, GEM Write—a whole slew of apps.

We were sort of in a race with Windows, and VisiCorp had something called Visi On. We got a call from Apple saying, "We think GEM is too close to the Macintosh from a user interface point of view," because we had a trashcan in the right-hand corner and we had icons on the desktop and things that Steve didn't think had ever been done before anywhere else but at Apple. At least, that's the way the lawyers made it sound.

Later I heard from Bill Gates that Steve Jobs was not liking Windows coming out, and he had complained to Bill Gates about Windows just before they were suing them. Bill said, "GEM is a lot closer to the Mac than Windows. Why don't you go talk to Gary at Digital Research and give him a hard time for a while," as kind of delaying tactic, I think. And it worked. I remember sitting in a room with Jean-Louis Gassée, Guy Kawasaki, and a lawyer from Apple who had really big suspenders and spent the whole time with his hands kind of tucked into his suspenders. Yes, it was Herb Rappaport.

Digital Research wasn't as strong as Apple, so we were going to have to make a bunch of changes to the user interface. We were kind of upset with that idea. Two of us wanted to build an application on top of this, but we had to get out of Digital Research with permission to use GEM and without any sort of IP or conflict issues. We proposed doing a high-end word processor that could handle graphics—we didn't call it desktop publishing at the time. We put a spec in place to say, "Hey, why don't you do this at Digital Research?" We wanted them to turn that down, so we could leave Digital Research and say they had turned it down.

At the time, we didn't really understand the full law. Still, we couldn't afford our own computers at home, but we knew we couldn't use any of the equipment at Digital Research to write our software or to start working on it while we were still there. So, we would just take long lunches and talk through the data architecture and all the stuff that we were going to do as soon as we could start. We finally got to the point where we could quit, and we got from them the right to use GEM, which was our windowing system.

Grad: Who was your partner?

Lorenzen: At the time, Don Heiskel was my manager. He had run the graphics group in Digital Research, and he squeezed every little last bit and byte out of everything. We wrote almost everything in Assembly language. I wrote mostly in C. He was really great at writing super tight, fast code.

We were at that point where it was becoming clear that Digital Research was going to cave on Aldus user interface stuff, and we wanted to do this app, so we basically made the decision to leave. I had just gotten a bonus of like $10,000 for getting GEM launched, which was a ton of money. My annual salary at that time was probably $25,000 or $35,000 or something like that, so that was a huge bonus for me. I didn't find out till later, but Don Heiskel had a $25,000 bonus! Then John Meyer was the third person on the team. John also got a $25,000 bonus, so they could take cuts in salary to allow us to kind of get started, and I took a limited cut in salary.

We were going to pay each other the exact same amount. Originally, we were going to each own 33 percent of the company. We knew we needed some money to pay our salaries, even though we cut them to $5,000 a month or whatever. So, we needed $100,000. John's dad could invest and my brothers and sisters and mom and dad could all invest. My side of the business got $45,000 of that, and John's side got $55k. We raised $100,000 and sold them 10 percent of the company. That was how we got our six months' worth of runway basically. That diluted us to each 30 percent and that was the only money we ever raised in the company. We got to that six-month point after we had started. Anyway, that's how we got out of Digital Research.

Ventura Development

Lorenzen: We knew we had essentially six weeks from when we left Digital Research to start the company and be ready for Comdex. John Meyer called all of the world processing companies that existed, and all of the publishing companies he could think of, probably taking things out of the Seybold Report. He called anyone that looked like they might be a licensee of what we were doing because we knew OEM (original equipment manufacturer) licensing was what Digital Research did with the CPM operating system.

Grad: When was this?

Lorenzen: This is October 1985. He wrote about 35 letters to all these different companies saying, "Hey, we're going to be at Comdex. Come by our suite and see a demo of our software." Don and I had to sit down and write the software in the six weeks from then until we launched.

Grad: Let me stop you for a second. What were you trying to do with that software? What was the function or the application?

Lorenzen: We had seen the success of PageMaker. We knew that we wanted to be able to do PageMaker-style short documents, but we thought we had a better way to do it. Internally, we used Scribe as our system for doing tech manuals and all of those types of things, so we understood about style sheets and the concept of what I think they called components in Scribe. Basically, a paragraph had a style: heading, subhead, byline, whatever it might be. Then you could assign type attributes to those style sheet tags. We thought that was a great idea.

I had built a windowing management system in GEM, and I thought of the page layout thing more like a window management problem. The way Paul's team flowed type very much replicated the by-hand way that had worked in the newspaper. I'd never see the by-hand way when we were doing this. I had no concept of that, so I couldn't understand why you needed to grab the windows' shade here and then put it here and here and here. It just seemed like, "Let's just let the computer flow it all." When you're doing a windowing system the way I did it, you start from the lowest layer, the desktop layer, and put a window on top of it. That creates a clipping region for all the stuff that you don't have to draw. This window is on top of the other window and the other window, so when you're actually drawing the screen everything is kind of clipped down below. You're always drawing from the fixed display list, and you just draw the portion that the user can actually see. That's how you simulate the layers on a desktop app.

When we were still at Digital Research, we knew we wanted to build something and we knew we needed to support magazines, books, long document tech pubs, and short document newsletters. Every time we saw a piece of text or a layout technique that we had not seen before, we'd just tear that page out. We had this grocery bag full of type examples, showing pages that we wanted to layout to see if we could come up with the rules for the style sheet tags

that would power all of that. We learned a lot from that—for instance, ruling lines. Ruling lines go with paragraphs. If you have ruling lines above a paragraph and the paragraph moves down, something on the page above those ruling lines has to move with it. That was a big problem with PageMaker. We said we could do it better than PageMaker and faster and on the PC. That's how we measured ourselves.

Grad: You were going to use GEM as your platform. How did you get that deal without running afoul of Apple or anybody else?

Lorenzen: Digital Research owned GEM, so we had to talk it into letting us have a license. One of the things Bob said yesterday was so true: we had very little memory to work with. We didn't want to run it on Windows because it didn't really work that well at that time. Windows 1.0 was not really useable, and 325k out of 640k was just to get Windows in it. Then you had to build your app on top of that. That was not going to work.

At the time, the basic operating kernel of GEM that handled all the UI part of it, was about 64k. And I said, "Well, the part that we actually need for our app is about 24k." So, I built a new version of GEM that was about 24k, so we had 24k versus 325k of Windows. That gave us a massive memory footprint advantage. It gave us a window of time before larger teams of engineers could come along with larger memory spaces and just build what needed to be built.

Grad: That would not screw up on the IP side?

Lorenzen: We got permission because they wanted us to write to the GEM API.

Grad: Who?

Lorenzen: Digital Research. If we wrote to the GEM API, even our special trimmed down version, they thought, "Maybe there'll be more apps that come along that write to the GEM API, and it'll build out." So, they were willing to let us go. We offered them stock, but they didn't really want stock.

By the way, I have to give Gary Kildall a lot of credit. He's a great guy, and he gave me enormous latitude in terms of the products that I got to work on at Digital Research. Even though he wasn't actively running the company, he probably still had sway on that. He also was able to get Steve Jobs ultimately to back off on the user interface stuff because he and Steve had cut some deal five years before.

Ventura Demo at Comdex 1985

Grad: You had six weeks to get your product ready for Comdex.

Lorenzen: Yes, we had to get our thing ready. We had a suite at the Riviera at Comdex. John scheduled people, and we had one in after another. The three key ones that really liked what they saw and got serious about bidding for it were Xerox, Kodak, and MicroPro, which has Word Star at the time. Although I had worked at Xerox, it didn't really occur to me that Xerox and Kodak were rivals at this time. It wasn't our plan, but they got into a bidding war over what they saw.

What they saw was one of the things that I view as our real innovation: laying out a page if you want to auto-flow the text. We did what I called rectangle breaking. Essentially, you start with the base page, which is just one rectangle with one text file flowing into it. To make it two pages, you break that rectangle with another rectangle on top of it. That's essentially where the gutter is, right between the page. What was one rectangle becomes two, and you know that they're linked in a certain order. Whenever you break one rectangle with another rectangle, you create a finite number of rectangles and you know the order of the flow of texts. When I looked through all of this grocery bag full of examples, even six column high-end newspapers, you could always have an ordering of those documents so that you would get the exact flow that you would get through this window shade method by this rectangle-breaking technique. That allowed us to focus completely on that model of just flowing text, from one rectangle to another, as fast as we could on the line formatting.

For the J part of the H&J (hyphenation and justification)—basically, breaking the line—Don Heiskel wrote in very tight Assembly language. I presented them basically with the paragraph, the offset into the paragraph, the X-Y location on the screen, and all the rules that would determine the width table. We had to load the width table into memory as well do all this stuff. There's a lot of memory management going on to get that to work.

Grad: Did you ever write a business plan?

Lorenzen: No. We might have written something kind of like a business plan when we tried to get Digital Research to say no to it, but we weren't very optimistic in that sense.

Grad: You didn't write one for your relatives to raise the money?

Lorenzen: No. I've gone on to lose a lot of money from other investors, and my first law of fundraising is, "Invest what you can afford to lose and have us stay friends." That was the model I used with family members as well. We knew we could come home for Christmas. This wasn't their last dollar. It was very fun though. My dad was really wise. I have to give him credit: My

one brother didn't have $5,000 to put in for his share, so my dad put the money in for him, because if we were successful, he wanted all the siblings to have a good day on the same day. I have to give him a lot of credit for the wisdom of that.

Ventura Management

Grad: There were three of you. How did you split up your roles?

Lorenzen: John Meyer was the company CEO, and he wrote the documentation. Don Heiskel did all the line formatting. He also did all the screen drivers. If we had new screen drivers for large displays and he did some of the printer drivers, he also did the word processing input-output file format converters. Then we hired another guy from Digital Research, John Grant; he would've been a founder, but he couldn't leave at the same time. He did the PostScript driver and the equation editor. He did all of the other pieces in between and was involved with some of the testing as well. I wrote the page formatter. A huge challenge was something called the Halcyon C compiler. A guy in Santa Cruz did that, and the C compiler had an overlay manager.

We worked on small models, '80-'86, so our addresses were all short, basically 16 bits. Everything had to work in 64k, but then we could have an overlay manager, put the code in other chunks of memory, and then bring them into that one 64k block to execute. Whenever we needed a new feature, if it was in the critical path where the code was most full, so we had to move code around and redo the overlays to give ourselves room to add that new feature.

The most important case of where that was a challenge was H&J. We read in the Seybold Reports that one of the benchmarks they used for all systems was, how fast could you do hyphenation and justification of the Kennedy inaugural address? So that was the standard benchmark. We said, "We're going to be measured by that." It was like two or three days into starting the company when we actually were writing code. We said, "Okay, we gotta load the file and we gotta do this H&J. How are we going to do it?" The way we thought most systems worked was that you'd be formatting the line and you'd come to a word like "impossible." Then you had to go out and call this dictionary in and figure out hyphen points for "impossible" and then decide, "We'll pick that one. That'll be our break." That's a lot of thrashing back and forth to bring all that in. Instead, when we loaded the file, we put in all possible hyphenation points as a special code. So, "impossible" would be "i-m," and then the special code, "p-o-s," so that the line-breaking problem was now really easy. It's like all the words had extra spaces in them. They were all these hyphen options. That allowed us to take all of the hyphenation and do that at file load time. Then the justification part was a lot simpler then.

The first test that we did we didn't have the file loading stuff. We had one canned set of text, and we couldn't tell how fast we were. After four or five weeks, the line formatting was working. It

seemed like it was fast, but we couldn't really tell how fast. We finally got the file loading stuff to where we could load something as long as the Kennedy inaugural address into memory so we could test it. I was there with my stopwatch and I said, "Oh man, this is going to be good." I had to load 50 copies of the Kennedy address in and format all of that to actually get a measurable thing. At the time 1 minute, 31 seconds, 21 seconds, 7 seconds was the fastest that I'd ever seen in the Seybold Report, and we were under one-second times for the formatting for doing the H&J. We thought, "Okay, this is fast enough. Now maybe we can actually do editing."

I remember standing in my kitchen and calling out to Don. I said, "Don, you're not going to believe how fast we are."

Donald Knuth: Does this code survive? And how long did you keep coding instead of becoming a manager?

Lorenzen: Ventura Software as a company survived for five years. We went from 1985 to 1990. We licensed the software to Xerox. That happened out of the Comdex demos that we did, so we got to stay just ourselves as developers. There were three developers: one guy writing the documentation and being CEO—just teasing, John; and there was an administrative assistant, so it was really a five-person company. We just did software development all that time. Eventually Xerox wanted to buy, although we had a number of very good renegotiations along the way.

In 1990, we sold. The last thing I worked on was porting it from GEM to Windows and to OS2 Presentation Manager, because Xerox was buying the software and they wanted the source code and wanted it on these other platforms. They were going to hire a team to do the Mac, so we just remapped all the GEM calls into their equivalent Windows and OS2. In a couple weeks we were up on those platforms and that got us out of that. Eventually, Xerox sold it to Corel. There is still a Ventura 12.0 running on Windows 10 or something like that, so apparently, it lives on.

Knuth: I meant the original source code.

Lorenzen: The last I saw of the original source code was when we sold it to Xerox in 1990.

Knuth: Did you do ligatures?

Lorenzen: We went with what the width tables told us. If the width tables had a ligature font in them and we had that data in the width table, then we would use that. We didn't do anything in

the font space ourselves other than load the width table—if it was for the PostScript fonts or the PCL fonts or whichever ones they were.

One thing about ligatures in German hyphenation is the spelling changes the end of the line when it's hyphenated. They don't just insert a hyphen; they sometimes insert an extra character. That was a couple weeks' worth of work. I had not anticipated adding a character into the paragraph because of hyphenation. That was Swedish, too.

Xerox Licensing of Ventura

Grad: Did anybody pay attention to the sales, to the marketing? Who did that?

Lorenzen: We were very blessed by having Xerox's entire organization trying to make money from this software, because we had licensed it to them. I think we had a five percent royalty.

Grad: Was that your first sale?

Lorenzen: Our first and only sale really was the licensing deal to Xerox. It was $5 million nonrefundable advance against royalties. This was signed two or three weeks after Comdex. We were about 12 weeks into the company, but they didn't give us all that money up front; we had to actually ship the product.

Grad: I'm shocked! Who negotiated? Who drove all that from Xerox?

Lorenzen: Larry Spelhaug was our internal champion. Does he get bonus points or negative points for that?

Grad: We are moving too fast. You start the business. You have $100,000. You go to Comdex six weeks after you start. You see Xerox, and who else?

Lorenzen: Xerox, Kodak, MicroPro, and 30 other companies. But those three bid for the deal.

Grad: Three of them bid because of the speed? Was that how you convinced them not to go with Aldus?

Lorenzen: Aldus was already out there. They couldn't probably get Aldus, because it was an up and running successful company. They weren't really on the map, but they wanted to have something where they could make money from all of this technology that they had invented and

this was potentially a way to begin to do that in the document space. That's the way I looked at it.

Jonathan Seybold: I saw the demo, and it was a really, really good demo. These guys were good at giving a demo; it was impressive. It was really fast, and it was creative. There were companies stacked up who wanted to compete in this space, so this was a hot thing, very well presented. These guys were low key. They weren't being salesy, and it came across very well.

Grad: Did the companies want exclusive use of this? Was that the whole concept?

Lorenzen: We had pretty much made the determination that an exclusive partnership was going to be the only way to really do it in the app space because we needed someone to do customer support and service and all of those other things. It wasn't really an OEM. It seemed like a single company would be the thing that could compete with Aldus or compete with the other players.

Grad: By this point, you had seen the success of the people at Adobe, and they went the opposite route.

Lorenzen: We had a lot of experience on the OEM licensing market, and we knew how lucrative that could be if you have something. They had basically an imaging operating system. At Digital Research we had a disc operating system. If you can get that position and own that, then it's really what apps get built on top of that operating system that make the operating system valuable to everyone. Whether that's Aldus as an app that leverages PostScript, or all of the other apps that eventually pushed PostScript as a standard (Illustrator, etc.), everyone has to license your standard.

We had something a little bit different. From the beginning, we said we've got a window of time here before memory gets really cheap, Windows gets faster, and processors get faster. All of those things are going to get solved over three or five years, so we've got to get in and cut a deal that's going to make our investors whole and go from there.

Grad: That was the key. You saw a narrowed time window, so you were looking for a relatively quicker payoff rather than a mammoth pay off. Is that a fair statement?

Lorenzen: We weren't opposed to a mammoth quick payoff, but yes, that's correct. We were skeptical about the idea of building a big company, having lots of employees. We had seen that at Digital Research and that has a life of its own. You are committing to building a company, not a product. I think a couple of us coming together just said, "Let's just get in and be successful."

Ventura Style Sheets

Butler Lampson: What exactly did all the people that were bidding for your software want to do? Compete with PageMaker?

Lorenzen: I would say that's a fair way of describing it. I think we probably described it as the next wave of word processing: this is where all world processors are eventually going to go, so you have a chance to be there. We didn't really think of ourselves as typographers. We thought of ourselves as a production system for short, medium, and long documents. With our ignorance of typography that I mentioned that earlier, I did the style sheet looking at all the example documents. Almost every article in *Time* magazine had something that I called Big First Care. I learned later this is called an initial drop cap. In all of the versions of Ventura that were out, there's a feature in the style sheet called "Big First Care: Yes or no?" It was some time later that someone actually pointed out that there's a name for that. So, we didn't really understand it other than we saw it on paper and said, "Okay, we've got to be able to do that effect."

Grad: You're talking about coming from a word processing world and trying to build a better word processing system to use PostScript. Is that correct?

Lorenzen: I think it was a little different than that. We didn't really have a functional spec other than this grocery bag full of sample documents. I thought of it much more from a style sheet point of view. We could build the richest style sheets on the planet and then format everything based upon styles.

There was a magical thing that we demoed: You'd bring up a document. All the paragraphs would be body text, and it would not look like anything. Then you'd click on the paragraph. Off to the left there was a thing where you'd say, "Okay, that's a by-line," "That's a headline," or "That's a company name." That is, selection preceded command.

Instantly, in front of your eyes, this thing that was just raw text became this beautifully published page or document that you could then print out. The real magic was when we said, "Now let's change the style sheet from Resume 1 to Resume 2 to Resume 3." it changed instantly; the form was separate from the content. All of that stuff was core to what we could do with how the style sheets worked.

Ventura Sold to Xerox

Grad: Over the five years, did you need other financing?

Lorenzen: No. We had $5 million a year as our guarantee nonrefundable advance against royalty. Then we sold it in the fifth year for $18 million. It was a very lucrative business for us. We were profitable every year at that level, but we didn't master what you guys had over 40 years. Before we started the company, Don was my manager, and John Meyer was in marketing—he was at a higher level. In the first years, all those relationships kind of stayed the same, but we were all paid equally, and the distributions were all equal. That was great. But there was a little bit of a feeling like, "I'm still your boss. I'll do my one little thing. You can do everything else, and I'll focus on my one little thing."

I remember riding back from Comdex with the guys probably in 1989. We could see that Microsoft was starting to add functionality to Word. We had built these tables, equations. We had —cutting-edge style sheets, but we could see that Word was creeping up on us. We were in the era beyond 386s, 486s, and memory was not an issue anymore. Some of our core advantages were kind of drifting away. Driving back, John Meyers was in one seat in the car and arguing, "We gotta go big. We gotta hire a bunch of people. We gotta build this big software company." And Don was on the other side saying, "No, let's keep it really small, just us. We can do everything." By "we," he meant the royal "we," meaning Don and Lee could do everything. I was thinking that I didn't really want to sit for the next three or four or five years of my life mitigating, mediating between these two very strong individuals and their view of what the company would have.

At that point, thankfully, someone had come into Xerox who was wanting to build an applications group in Xerox. That person negotiated that they wanted to own the source code, which was the key. That gave us a way out.

Grad: Did you trigger the fact that you wanted to sell, or was it pretty much agreed?

Lorenzen: We could've stayed in. We were in total control. They had no rights.

Grad: I mean among the three of you.

Lorenzen: Did I trigger it? I think everyone sort of realized this was not going to be much going forward. It was easy to part friends in a way. Everyone could high five, and it was huge success. It was a mammoth short-term success by anyone's definition.

Grad: Of course.

Lorenzen: If we'd all put that money in Apple stock on that day, then we'd have done very well. But we didn't do that.

Grad: Or in Xerox stock you'd have done poorly.

Lorenzen: Well, not as poorly as I did with some of what I did with the money.

Ventura on Various Software and Hardware Platforms

Thomas Haigh: It seems like in the 1980s that there was one successful package per platform, right? You were on the PC, PageMaker was on the Mac, and Frame was on the workstations. I was wondering what you thought were the strengths and weaknesses of being on the PC rather than the other platforms. You already mentioned the horrible things with the segmented memory model. On the tech or business level, were there other things like device drivers or the customer base of expectations that you think were distinctive?

Lorenzen: At the very beginning FrameMaker was on the Sun, Aldus was on the Mac, and we were on the PC. Everyone sort of got on each other's platforms as time marched on. I think the particular advantages that we had on the PC though was just the ubiquity of the PC. No one could do publishing on it, because they needed a graphical operating system, and Windows didn't really work from 1984 until 1990 maybe. We had that window of time when we had it to ourselves, and that was a big advantage.

I think in terms of other advantages, the hardware did keep getting faster, and there kept being new chunks of memory that would show up. We were so happy when there was something called "high memory," which was outside of the 640k address space. In our overlay manager, we could kind of stick stuff up there and it was like an extra 64k or 128k that felt like heaven had arrived in terms of extra memory.

I can remember going to Comdex and seeing our software running on 386 for the first time. We had the same document we always loaded up with the space shuttle on it and some other two-column document. The space shuttle would kind of line-dry in fairly slowly. When we saw it for the first time on the 386, it was instantly there. It was like, "Oh my gosh, things are getting really fast." The hardware did keep getting faster.

I was not a part of the Mac team; the Mac one was after we sold it to Xerox .

John Scull: I got to know John [[Meyer?]] a little bit, and being the type of person I was, I wanted to convince everybody that they should be on the Mac. We didn't get very far. He was pretty religious in my view, and I was probably equally religious on the other side.

Lorenzen: John had the interesting role to play of representing us to the rest of the industry, and Don Heiskel is a very opinionated person. You were probably very happy to be talking with John as opposed to Don on these issues. I think the core thing was that we weren't opposed to doing a Mac version, but we had gotten used to Xerox paying us to do things. So, we were not going to do things unless Xerox came up with some money to fund them, and that extended itself to Windows.

I can remember very well sitting across from Bill Gates in his Microsoft office—if Charles were here, he might vouch for me. Bill was rocking back and forth—he won't mind me saying that, I don't think—and he was explaining how he had a list of graphic applications that he respected that were not on Windows. We were on that list and had been on that list for a while. He said, "Okay, what would it take to get you onto Windows?" We said, "Well, if you'll buy 10,000 copies on Windows, because we're not sure there's enough market there on Windows." We were going to force him to buy inventory to do it. He rocked for a few minutes, and then he got up and stormed out of the room. That was the last we heard at that meeting. Someone came in after him and said, "I think your meeting's over with Bill." We walked out and that was fine.

Bill Gates was ultimately the seed round investor in a following company: Shop.com, which was Catalog City in Shop.com. He did eventually invest in something, but I think people like that are used to everyone saying "Yes" to them. When you say "No" to someone like that, then they kind of keep you on their list of "I want to eventually get to a yes with that person." That's at least the psychology I was thinking about. But at the time, it was kind of like, "Wow, what just happened?"

Grad: Anything else you want to add?

Lorenzen: I'll just add thanks and homage to the people in this room. I was so excited to be invited to this and get a chance to sit at the table with folks that were my heroes and idols and who created software and hardware that allowed my whole career to happen really. And not just as a user, but as someone who actually got to walk down some of the trails from a systems software and application software point of view. Anyway, thank you to everyone here. I really do appreciate it.

Grad: Ventura continues as an identifiable separate product and name to this day.

Lorenzen: There is apparently a product called Ventura Publisher sold by Corel. I haven't kept track of it, but yes, I looked for it yesterday and it's still out there.

Grad: You had never had any further involvement with it?

Lorenzen: No, but I'll add just a quick thing about the name. We wanted to be called Ventana Software, because "ventana" is window in Spanish We couldn't get that, so we were in that same part of the Spanish dictionary and "ventura" was close. "Ventura" means good fortune, so that was good. That was a good thing.

Origin of Aldus and PageMaker

Grad: Let's move on to Aldus. Now we'll start with Paul Brainerd. Please start from the very beginning, Paul.

Paul Brainerd: As I said yesterday, I think Aldus is more of a story of sales and distribution and building a company than it is about technology. We were trying to build on top of the PostScript platform, and we were depending on that three-legged stool of Apple and ourselves. There's a lot of things that I could cover, but many of them have already been told in prior stories and are on videotape. I thought maybe focusing on two might be the most important. The first would be the Apple Macintosh internal decision with the LaserWriter and Bruce Blumberg. I'm really disappointed that he chose not to come or wasn't able to come because he would have his own perspective, but I think between John and I we can probably sketch that in. That's a story that hasn't been told very much, because it was kept pretty quiet.

Grad: Before that, you started a company: When do you start your own company? That's where I want to start.

Brainerd: In 1984, as a result of the acquisition of Atex, we were all without jobs and I had a choice of 17 engineers, clean cut. I got stock in Kodak, so I put in $60,000 of my money. Engineers worked at half salary. I took no salary. We gave ourselves six months. So, there's a lot of parallels with what Lee just described.

Grad: Was that your only financing?

Brainerd: No, we raised one round of venture capital, which was $640,000 and then we sold the company 10 years later after the founding at a public stock. We were both public companies, so this is all public information. We sold for $525 million.

Grad: To?

Brainerd: Adobe. I served on the Adobe board for a couple years.

Grad: That was 10 years after you were founded, so it was 1994 approximately.

Brainerd: Correct.

Grad: Okay, let me go back. Did you ever have to raise more money?

Brainerd: No. One round of financing, and we went cash-flow positive within three months of shipping our product.

Grad: How much did you give on ownership to get the $640,000?

Brainerd: Well, the technical founders got 10 percent of the stock. Because I put up the money I had 50 percent of the stock, and the investors got about 30 percent.

Grad: You had half the company?

Brainerd: Yes.

Grad: And your investors. Were they professional investors, or were they just people you knew?

Brainerd: No, it was a venture capital firm. Doug Defevo was his name, and it was a lot of investors from Apple actually, the very first Apple employees. There's a story around that, but I've already told that story.

Grad: 1984 then. Who was with you? How many people? You had 17, you said?

Brainerd: No. That was the total number of engineers working on microcomputer development at Atex. As I said yesterday, there were four technical cofounders, and I want to give full credit to them, but that's not the story of Aldus.

Aldus Marketing and Sales

Brainerd: The story of Aldus is about marketing, sales, and strategic partnerships. It's not about the technology.

Jeremy Jay [???], Mike Templeton [???], Mark Sunstrom [???], and Dave Walder [???] should get loads of credit because they were the engineers who figured out how to make Aldus work in a nearly impossible environment. That was a result of the operating systems not being graphical, Quick Draw limitations, and PostScript in the early days with bugs. I think the major

technical challenge was the memory challenge that we had, particularly on the PC side. The 16-bit address space was just killing us.

But of the stories that I could tell, I think the two that are most important are the Apple Macintosh and how they came around after Steve Jobs left the company and John Sculley took over. It's the international marketing story, because that's something that we did that no one else did.

I had an audience with Steve from time to time, because he wanted PageMaker on the Macintosh. They were coming out with this incredible new machine called the Macintosh, and he had it in mind that he was going to sell millions of Macintoshes. It was supposed to be $79 to $89 for each of the applications. I had an audience with him and listened to him politely. He told me to price myself at $89.95. I thought about that and thought, "No, I don't think so," but I didn't say anything. I just let it be. We priced it at $495, which was pretty aggressive for the publishing industry compared to $2,500 that we were hearing about FrameMaker and the workstation market. That's how we went cash-flow positive, and it's also how we were able to build the company. We had enough cash in order to invest in technical support, distribution, marketing, and manufacturing—all the things we needed to do. If we hadn't set that price point, we wouldn't have been able to have that cash flow.

Steve was on his way out. I think Steve mellowed over the years and changed, as we all have. But at that point, I was visiting Apple probably once a month. I'd walk into the Macintosh division there on the Infinite Loop Way and there were certain things I admired and other things that weren't so admirable. But Bruce Blumberg had a basic problem: he was coming out with a LaserWriter printer, and the sales force at Apple had pretty much rebelled. As John reported earlier, they were afraid it was going to be another Lisa. It was way above the price point of the Apple II, and they basically said, "No, we don't want to sell this printer." And more in, "You're also not making any profit on it." I think there was some board influence that came into that as well, but I was never really a party to that, so I don't know.

Then Steve left. I'd been working with Bruce Blumberg, because every time I'd come down he would say, "Let's go take a walk." We would walk through the halls of Apple and find somebody that had some money somewhere that was willing to work with us on PageMaker and do marketing and sales. It was extremely helpful.

One day Bruce called and said, "I am making a presentation to the board of directors at Apple at John Sculley's request of what we can do about the Macintosh. The Mackintosh sales are not good right now. We're selling under a thousand units a month. And I want you to produce the marketing plan for desktop publishing for Apple Computer." I said, "Whoa." We had six weeks to do it. I delivered it to him in five so we had one week to revise it. I worked with a marketing

consultant in Seattle, and we proposed a $1.5 million marketing program for Apple that included advertising showing what the LaserWriter could do that would appear in the *Wall Street Journal*, *US News and World Report*, and several other of the large publications.

Most importantly, it also included a tour of the United States for training sales people at Apple dealers. We did two sets of these tours. Russell from Adobe and Aldus came together. We paired and went to Apple sales offices in 14 cities over about three months. We would do one city a day usually with 12 to 15 Apple sales representatives and Apple dealers to show them how to demonstrate the software, how to sell the software, and how to price the software. We basically laid it out for them, and lo and behold, it worked.

Our advertising budget and our business plan was $50,000, so to have Apple spending $1.5 million on this was really amazing. We had a brochure in there that became the famous desktop publishing brochure that was beautifully produced. Steve had full credit for good aesthetics and typography. We just put all those pieces together and ran it out. Classic marketing campaign. It was planned very quickly. Apple didn't have a whole lot of options on the table at that point. It was a bet, but it paid off.

We couldn't take it to Europe right away though, because we couldn't get enough LaserWriters. Canon and the one factory they had in Japan couldn't produce enough. I can't remember the details, but I know we had to wait on the UK launch for almost six months, because we had allocated production on the LaserWriter from Cannon. We couldn't get enough engines, and that was very frustrating.

John Warnock: I can talk to all that.

Brainerd: Good. So, that's my part of the Apple story. I wasn't there for the presentation. I don't know what the politics were within Apple. I kept that confidential for years and years. It was basically between me and Bruce Blumberg, and only three or four people knew about them.

Aldus and Apple

Grad: What was your financial deal with Apple?

Brainerd: We had none.

Grad: How were you going to make money?

Brainerd: We were just using their platform.

Grad: You were going to get $495 for each one that sold.

Brainerd: We were selling that to our customers. We were just using their platform. We never had a contract with Apple Computer. We never received any money from Apple.

Grad: John, were you involved in that?

John Scull: Intimately. I'm perfectly content to just have him do his story. In my view, it was a little different, so I'll tell you want happened inside. But I think it ought to be done in a context, because this is an Aldus perspective.

Grad: Okay, but we'll pick this up.

Scull: I was looking at a lot of different things. and this was one of the perspectives. It was the dominate perspective, but I'll give you a little more nuance on it.

Aldus' International Distribution

Grad: What is the second story you wanted to tell?

Brainerd: That was the international story. I had a great interest in international business, so in building the company, early on we enlisted international distributors. Again, Apple helped us. When I went into a country, I'd go to the Apple subsidiary and say, "Which distributors should I use?" because there's usually 10 of them in a country that were distributing application software.

We made progressive commitments in each country with contracts in terms of international distribution and then sometimes we'd buy out the distributor and it became our subsidiary. We ended up with 23 subsidiaries selling product in 50 countries with 60 percent of our business international. This was very important to the Adobe merger because their business model had done well, but not to the extent we had. I think it was about 40 percent.

Our international group was extremely skilled in terms of the interactions with the publishing industry within their country, because we chose local managers that understood each of the countries. We didn't bring Americans into France. We had some really good people, as John and Chuck know.

When we finally sold the company, that was 20 percent of the company we could increase almost overnight, which we pretty much did within the 12 months that followed. We translated

into seven languages within the first year and then eventually I think into 13 languages overall, including right to left and Chinese and so forth.

Grad: How did you buy these distributors? Did you have that kind of money? You only had this limited amount of cash.

Brainerd: These were little tiny companies in that day that were distributing applications software. There was no Ingram Micros. A typically company in France might distribute five application products, and they might be five to six people.

Grad: What kind of deals did you cut with them? The ones you didn't buy, what kind of percentage would you split?

Brainerd: We couldn't necessarily control the price legally in each country. The US selling price was $495. That was somewhat of a limit depending on the language and the specialization, but we did all the localization and the translation of our manuals. All they were really doing was providing distribution. Theoretically, they should be making 20 to 30 percent in the distribution model, as you would see it today, but in many cases they were making 100 percent. They would buy our product at a discount and mark it up, which really limited our sales in some markets.

Grad: Did they work as an OEM in effect, bundling it with hardware and anything else?

Brainerd: No, they were simply a distributer.

Grad: They were strictly a software distributer.

Brainerd: We provided them with a packaged product in their language, packaged and ready to sell.

Grad: Did you sell in the United States?

Brainerd: Through distributors.

Grad: You used distributors again. You never built your own sales force?

Brainerd: We had our own sales force.

Grad: Selling to distributors?

Brainerd: In terms of sales force, we probably had 100 to 160 people selling worldwide, but they were going in to the bigger customers and selling to the distributors. The sales force sold to distributors and the Fortune 500 and all of those companies. We'd go in and make sales for 100, 200, 500 copies.

Grad: Eventually, you were going through these distributors to get the volumes that you needed.

Brainerd: That's correct.

Grad: What kind of numbers did you sell? Do you remember either how many dollars' worth or numbers of units?

Brainerd: It depends on the year. Immediately, we started selling hundreds of copies, and within the first year, I think we sold 30,000 and far exceeded my expectation. Then we were selling 100,000. The challenge, of course, with a one product company was the same one that's been discussed so far: you get to a certain stage and you can't maintain that momentum. How do you diversify your product line?

Grad: The choice they made was to sell out. The choice they made was to build more product. Why did you make your decisions?

Brainerd: We were trying to do both, but the problem with a platform was such a challenge in this timeframe, because of the memory and all this other stuff. We adopted a core graphics model so that we could go to the Mac or the PC. We had to deal with all these technical issues that consumed more and more resources because we didn't have the memory address space that we needed. We were constantly rewriting the application to try to keep it going on the current platform.

Aldus Acquisitions

Brainerd: We had all these people coming to us to offer to license their software. We did do licensing deals and acquisitions— sometimes for product, sometimes for the people. Sometimes that was misinterpreted because I couldn't explain it necessarily to the market. Like, Silicon Beach Software has some technology but really didn't have great software developers, but it had Bruce Chizen who became CEO. He was worth all of the $2.5 million I paid for Silicon Beach Software because he became a major player in this whole thing. He was a great manager. I really liked him, and I needed that type of management talent. I figured we could get some value out of the technology as well.

Grad: Well, that's the point. You had enough revenue, enough profit to be able to have money to buy companies.

Brainerd: Oh, yes.

Grad: How many did you buy?

Brainerd: We probably bought five or six.

Grad: What kind of deals did you cut with each of them?

Brainerd: They varied. It depended on what the founders wanted to do, whether they wanted to just leave and be off and gone or whether they wanted to be a part of our company. Then we'd give them stock options.

Scull: Yes. He bought After Effects. That was really a good buy.

Brainerd: Some were good, some were bad.

Grad: Tell me what you think was the best one, in your opinion.

Brainerd: It's really hard to say. Again, each had a different purpose. In some cases, it was technology, like After Effects, which was wonderful engineering. We really felt strongly about it. In other cases, it was management talent. One came back to haunt us big time.

Grad: Which one was that?

Brainerd: That was Altsys and FreeHand, which is the competitor to Illustrator.

Grad: Who were your major competitors during this period of time?

Brainerd: Well, at the beginning there was probably 10 or 15 people trying to develop applications on the Macintosh and for PC. There were a lot of them, but most of them didn't necessarily have the technical capacity to actually write the code or the understanding of the industry. Most of the products technically weren't very good. Lee's was one of the exceptions. You had to be very cautious in buying things. Microsoft actually got into that; Melinda licensed this Macintosh software for the Mac, but they had no technical capacity to do what it said it would do, so within six months it died. You had to have a grasp of the technical technology as well as the market and the needs of the customers. That was the key.

Adobe Purchase of Aldus

Grad: For the price that they paid after just 10 years, you must have been a very profitable company.

Brainerd: We were always profitable. In 1992, though, our revenue stream started to slow down because we couldn't keep up in terms of the new versions and the things that were coming out. When you get to a certain scale, you need more than one major product to really push. Altogether I think we had 13 different products at different times on the platforms.

Grad: You sold in 1994?

Brainerd: Yes.

Grad: I'd like to finish that part of the story, because we didn't ask you this question: Why did you buy?

Warnock: We didn't have a page layout system. There was Quark, and there was PageMaker. We were not enamored with Quark, so we felt that to flesh out the graphic authoring system we needed page layouts. We eventually bought FrameMaker for large structure documents that were industrial strength. FrameMaker was obviously for desktop newsletters. It was becoming more and more sophisticated. It was a very good, powerful program, and we also felt that we could use it as a platform. We knew what they were working on and that was a first-rate, high power thing. And we really wanted to kill Quark.

Grad: That's what I was trying to get at. Did you buy it for the income stream? Did you buy it to kill Quark? Why did you buy it?

Warnock: We bought it to fill out the application set.

Grad: You wanted the whole range.

Warnock: Absolutely!

Grad: You had obviously very topnotch development skills.

Warnock: Yes.

Grad: You could've built your own!

Warnock: Not in the time frames you need to respond to the market, even though I loved Lee's story.

Grad: Six weeks is all it would've taken you!

Warnock: Even though you could do it in six weeks. Maybe not.

Grad: That was my point: Is it that complex and that difficult what was built into PageMaker? Did you say to yourselves, "Hey, it's not spending the six months, a year, and the, I don't know, two million bucks would take us to build it."

Warnock: All right. Let me give you a little piece of rationale. The PostScript business and the application business is like a 90 percent gross margin, so you're really in a very, very profitable state. You accumulate cash like crazy. Okay? We have a lot of cash now, and we had a lot of cash then. I think we did a cash deal.

Brainerd: We did a cash deal, and we had a lot of cash too. Part of that $525 million was cash. I mean, for cash. It wasn't as if we were leveraging it.

Grad: In other words, you didn't keep the balance sheet. They took over the balance sheet.

Brainerd: Yes!

Chuck Geschke: We bought the whole thing. We bought everything.

Grad: One more point though. Their profit stream was so strong that you felt that that was worthwhile just in its own right, not just in terms of what else it would give you in terms of a total market package.

Warnock: You can leverage off of the distribution channel. We had common distribution channels.

Brainerd: National.

Warnock: You can leverage off of development costs because a lot of it uses core technology. You can leverage off of all kinds of things. You can make your marketing message much stronger, because you're covering the whole space. For me, it was a no brainer.

Grad: One question for you, Paul: Do you remember what your revenues were in the year before you sold, in 1993 or 1994?

Brainerd: $236 million.

Grad: <whistles> Okay. Now I see the numbers.

Geschke: I think we should emphasize that time to market was critical for us because we didn't want to wait two or three years before we could be in a position to be truly competitive with PageMaker.

Man 5: Why didn't you buy them two or three years earlier?

Geschke: Because we're not always smart.

Warnock: You were very involved with the company you were running, and maybe they weren't for sale.

Lampson: I wanted to ask a meta-question. We have several company founders here. They've all done acquisitions. Maybe this question doesn't make any sense, but what fraction of the acquisitions need to succeed for you to feel good about it? Presumably most of them don't succeed.

Brainerd: It's a high-risk proposition.

Lampson: I have a rule of thumb in the back of my mind for venture capital: Probably nine out of 10 are going to fail.

Brainerd: Right.

Lampson: Is it the same for acquisitions, or do you expect one out of three to succeed. How does it go?

Brainerd: The issue is a private company. An application software company was valued at half or less of the value of a public company, because public companies have more leverage in the market in terms of their investment. When we acquired, as long as it was profitable and we acquired it and could succeed or at least break even with where they were, we just increased the multiple value of our company by 3x for their revenue stream. I don't know if you understand what I just said. I didn't say that very clearly.

Grad: I was doing valuation of companies then, and the valuation of a private company was considerably less than the public company. The public company often felt it would get leverage not just on the business, but could get its stock value up as well

Warnock: We built all of this infrastructure for selling, to have the sales force, to have the international presence, to have all of the accounting systems, all of the tracking systems, all of the development support. You can leverage all of that.

Grad: I see. Did you get rid of most of the people when you acquired?

Warnock: No.

David Brock: Forgive the question: I can't remember when the hostile takeover attempt was made.

Warnock: 1998.

Grad: Many years, five years after.

PageMaker and the Origin of the Adobe Creative Cloud Subscription Model Error! Bookmark not defined.

Haigh: Yesterday you explained how in the end to take on Quark you needed to build InDesign, right?

Warnock: Yes.

Haigh: And just now you explained how you had to acquire PageMaker.

Warnock: That's where InDesign came from.

Warnock: That was PageMaker.

Haigh: All right. As far as, I knew the code withered away.

Warnock: Yes, it did, but the guys who built PageMaker were really good software architects. They had one bright lady. I can't remember her name, but she was really good at object oriented programming and the architecture. InDesign was a rewrite of PageMaker.

Haigh: Total rewrite.

Warnock: Total rewrite. PageMaker had an ongoing revenue stream until InDesign could get launched.

Haigh: In the longer term then it was the team that was more important than the product.

Warnock: Absolutely. And After Effects and the other products that they had were really good.

Grad: You ended up with a total solution in effect.

Warnock: Yes.

Grad: It gave you a lot of leverage on those things.

Warnock: When we switched to the licensing or for the …

Geschke: Subscription model.

Warnock: God, I can't remember words anymore. When we went to the subscription model, you could go into a corporation and say, "You buy all of your graphics capability, all your page makeup capability, all of your publishing capability in one spot for one subscription price."

Grad: No interfacing issues, no "Do they work together?" or "Will they say synchronized?" issues. All those things go away.

Warnock: No. None of those issues. You go into a big corporation, and they have 10,000 seats. You cut a really nice a subscription deal, and you end up really doing quite well.

General Acquisition Deals

John Schoch: I was going to try just to leap back and pop the stack. Butler, you asked a question about acquisitions. There are different kinds of acquisitions, so there isn't a single answer. There's the classic 10 engineers acquired that has a price per engineer. You may get some code. They may or may not have launched it. It may or may not have been very successful. I've sold several companies to Microsoft this way. It's like, okay, they get 10 guys. They get the code. Half of them have to move to Seattle or all of them in the first ones and then later not. You run some numbers and what it works, and you assume that three-quarters of the people will stay, will work out and be grade B-plus engineers, and will find a place in the organization either in that product or not. You can generally label all of those a success. The product may or may not be right or it's a module or it's an add-on.

There's another category that I always like that Cisco was able to do. Cisco had a superb marketing organization, a very diverse product portfolio, and they would go in and they would buy a company that was further along, that was doing $5 or $10 million in revenue and they would pay $100 million for it. If It wasn't one of mine, I would say, "Ridiculous price! Why are those guys at Cisco such idiots to pay $100 million dollars?" Well, they would turn right around, they would get rid of all the infrastructure except the engineers, they would jam it through their channel, they would put their label on it, and in the first quarter they'd sell $50 million dollars' worth. You'd say, "Oh, my god, that was a brilliant idea," because it had to interoperate. I mean, you'd get a fast Ethernet switch, whatever generation it was, and you'd pay a $100 million for Copper or Grand Junction—I forget which one. You got the product, you got the infrastructure and to sell it through, and every one of those was a winner. Three years later you'd buy the next one, which was sort of the next generation, and you just had to change the color and change the label and give it to your sales force.

Integration was about the documentation more than anything else. It had to physically interoperate and do the right thing, and later of course, you'd kill yourself trying to put them on a common code base and so on. Those code count as successes and are the toughest ones.

I'm missing a bunch of categories and other people can speak to this. Another category is where you're doing two fairly large companies, and if you have the right cultural fit and expectations and a lot of things lined up, you do pretty well. The really big blowups are where the cultural fit doesn't work. Chrysler and Mercedes-Benz are going to be a 50-50 percent ownership and joint management. Yeah, over my dead body. That's not going to work. If it happens with 10 people, it's fine; it was a mistake and you move on. But it's those giant ones that are either technically or culturally a mismatch, and you get an impedance mismatch, those are really bad.

There are probably some other categories. You know, I can say 100 percent of the acqui-hires work, because you keep half the people and you feel okay about it. You paid a million ahead or whatever it was in that day and age. Okay, fine 100 percent of those are successful. The really big ones, I'd be surprised if I called half successes.

Warnock: We look at the cultures very, very closely. After the acquisition of Aldus, we had no attrition.

Brainerd: That was probably one of the most planned program acquisitions. We had secret teams meeting in cities so that nobody would spy us at the airports for three months. We worked out all the management arrangements to the minute as to which employees will be informed, and all the issues were resolved. It's seldom that that work went on. But there was this fundamental trust in us and the integrity of the people involved. I think that's really what it gets down to. I respected John and Chuck for their technical abilities; they respected me for whatever I'd done. We trusted each other. You know, it really comes back to that, ultimately. The cultures were similar, although they were different.

PageMaker Target Market

Seybold: I want to go back into the weeds here for second. There's a lot we can talk about acquisitions. You guys have been working on a graphic terminal at Atex. Looks familiar. You had all the address space you wanted, you had the memory you wanted to work with. When you left, the first thing that happened, when you called me and said you were leaving, was I offered you a job. You said, "No, I've got something else I want to do." Later I came up and saw what you were doing. How much of that was bringing what you learned from the Atex graphic terminal and trying to squeeze it down into a small box, and how much of this was rethinking what you were doing?

Brainerd: Pretty much 100 percent rethinking. That all happened in about three weeks from our founding. We were all fired or out of work, because they closed the facility. We all got in my car and went down Interstate 5 as far as two states and stopped at every small newspaper and

publication along the way. With the 18-month sales cycle in the professional newspaper market, we'd be out of business. So we fundamentally shifted our strategy to appeal to the newsletter writer, the smaller documents of 16 pages or less, using the pay-step model very consciously. We weren't doing long document form, so we didn't put all in the style sheet stuff. We just took the platform and built the pay-step model, basically.

Grad: It took you three weeks from the time you started to make that decision to shift the market?

Brainerd: Yes. I could see after that trip that we would be out of business if we waited for these newspapers to buy whatever we were creating, which was what we had already defined.

Seybold: By the time I went to see you, you'd already made that mental shift.

Brainerd: Correct.

Software Programming Skills and Demand

Knuth: I'd like to ask the people here. It's clear from your comments that getting valuable employees is really important, that there seems to be some employees that are worth 100 others. There's a debate going on among educators in computer science as to whether good programmers are born or made. What is your opinion? Is there something about a great programmer that is developed by the time he or she is 17 years old? Or is it something that they can learn from great teachers?

Brainerd: I think it's both. I don't think it's either/or. The difference between an average programmer and an excellent programmer, like John was relating on Photoshop, is an order of magnitude difference in terms of their productivity and their ability to create great code. It's huge. Whenever you come across those people, they tend to have interesting backgrounds. There is some connection to music, I think. I notice that. People that were into music seem to have good minds for programming. But I mean, you don't really know until you get them there.

Lorenzen: I think a period of time where you are watching someone else program who's better than you or different than you can have an impact. That happened a lot at Digital Research because we were working on existing code and there's some engineer that has that. When you were a new engineer there, you were kind of looking over their shoulder while they were coding. There's something that you learn when you have an idea of how you would do it, but then you see someone doing it in a better way and you're like, "Oh! I need to add that to my toolbox." It's almost more like a craft apprentice model.

Knuth: I guess I want to rephrase it a little bit. I guess Fred Gruenberger told me in about 1970 that his experience as a teacher was that two percent of his students really resonate with computers. I started thinking of that as a model and testing that out with my own experience with the people I met and the projects that I saw that. I saw a lot of projects that succeeded and failed, and the ones that failed it seemed to me had somebody involved that wasn't one of that two percent doing the coding. I was at the University of Illinois visiting—I think it was 1977—and I was talking about this two percent hypothesis to a guy there. I said, "Well, how many graduate students are there at the University of Illinois in Champaign?" He said, "11,000." "How many are computer science majors?" "220." It was a perfect two percent.

So, when I heard that Sarah Palin was running for president years ago and she comes from the town of Wasilla in Alaska, I said, "Okay, there are 20—or is it 200 computer programmers in Wasilla?" Anyway, there is this hypothesis that there is a certain percentage of people who have this peculiarity, whatever it is that correlates with music or whatever, but good programming. Is that a reliable hypothesis? Or if it turns out that the world needs more programmers, does it just mean that we have to get more kids majoring in programming? That's the question I'm wrestling with.

Warnock: I think we both think having a mathematics background was a huge advantage. Having to solve problems in your head is really also a property of people who I believe that program well. Here's sitting one of the world's fastest programmers. He's amazing. But I think that having a strong analytic foundation, an ability to carry a lot of thoughts in your head at the same time, organize and structure things so that they fall in place with just mental exercise is sort of the prerequisite to writing programs.

Lampson: But there are different kinds of demand for programmers. The Labor Department says that we need five million programmers in the next 10 years. They're not talking about these two percent people.

Broadening Market for Desktop Publishing

Grad: Butler, I'm collecting software history right now. Let's go to another subject. Tom, do you have a question on this subject?

Haigh: I have a question on PageMaker if that's okay. PageMaker is right up there with VisiCalc as the perfect example of a killer app, when people who buy the whole platform just to run it. At least, that's the perception. At the beginning, is it true that basically every customer was buying a Mac and a LaserWriter just to run the program? And how did that change over time? Was there some point in the 1990s where most customers already had the platform they needed and were buying it as one extra application to run among many?

Brainerd: It's a little more complicated than that because publishing is a part of every office. In the early days that was assigned to particular people, typically because of the history that we talked about —yesterday. They had a particular affinity to that. Either they were interested in graphic design or photography or typography or they were assigned this task. When PageMaker came along, they continued, but with a much more powerful tool that saved them time and money and gave them control.

As that evolved over time, more and more people became familiar with the graphic user interface, Macintosh, and Windows, and more and more people were able to participate in the publishing activities other than those people who were in the early 1980s and 1970s. It became a much broader market for sure, but that didn't mean that those people had tremendous publishing skills. There was this whole need to educate about aesthetic and design and quality of production that still maintains itself today. That was a great philosophical debate at a lot of the Seybold Reports—the old core holding this cherished value of quality and excellence of type and design. I felt that myself. But when you opened it up to a bigger market, to millions of people, where does that go? You get a lot of junk, at least initially.

Haigh: Initially.

Brainerd: Over time it resolved itself. People with design skills still have value, and they came back and they create these documents.

Lampson: Did PageMaker sell more or less than Microsoft Publisher?

Brainerd: I think we sold more until they bundled it. They basically gave Publisher away. At that point, you can't compete.

Lampson: That has presumably a sizeable effect on this sort of unprofessional publishing market.

Brainerd: That's correct. That was the constant challenge that I probably underappreciated. We had a lot of technical difficulties in those early days with the languages and the memory space and all that, which really kept us occupied. We just didn't have the resources. But we knew we had to go to that professional space. That's why we were reengineering PageMaker from the ground up at the time Adobe bought it, and they put their imaging model in it. It became even bigger, but that's why InDesign has won in the marketplace now.

Apple Reorganization in the 1980s

Grad: We're cutting off the PageMaker discussion now, and we are going to do one more before we do our break. I'd like to talk about Apple. It's a little different kind of story. Tell us about LaserWriter and so forth and how that fits into this from an Apple standpoint.

Scull: I think Paul hit on something that probably hasn't been spoken about enough at the beginning and that's just foundational: Steve should be getting a gazillion amount of credit for a lot of this since he and his team really were the architects that thought through it. Whether he knew it or not, he really set the foundation for the Mac, with the graphic interface and the fonts, and then with the LaserWriter and convincing these guys. Much of this is all foundational. I was pretty fortunate to step into a situation where a lot of the pieces were either there or just about to be there, so they probably just needed to be pulled together.

I'll talk a little bit together about that. The LaserWriter was introduced at the beginning of 1985. I think it sold 2,000 the first month, went to 1,600 the second month, went to 1,200 the next month, went to 800 the next month, and was at 400 when I took over. Now I kind of understood the urgency.

Steve had just left. He had been encouraged out the door. The company was in complete crisis. The Mac was not doing well. The Mac Office had been introduced. The LaserWriter was part of the Mac Office with the lemming advertisement, if you remember that, trying to do the sequel to the 1984 ad. You know, just completely was the wrong thing to do, kind of slapped customers. Just everything was going wrong, and that led to Steve obviously leaving. It was a tough situation, but Apple got kind of political. You could see the beginnings of it. The context was crisis. They re-orged the whole company. Divisions were blown up. There was no Apple II. There was no peripherals division. There was no Macintosh division. All blown up. Functionally, there was one product development group. Originally, a gentleman named Jean-Louis Gassée was supposed to become the head of the Mac division, but when that got blown up, "I guess, you'll be in charge of products." Here's a gentleman who had been the head of Apple France—basically, a sales and marketing gentleman. Quite opinionated.

Packaging LaserWriter with Software Applications

Scull: From a sales and marketing standpoint we went with consumer education and business. I got put in the business category because the Mac Office was heading into business. LaserWriter was a key part that we had to figure out how to turn it around. This was a challenge. I had myself and a summer intern. No budget. Zero. But there was a lot of resources around the company, and I'd been there for a couple years. I'd been responsible for the retail rollout of the Mac, so I kind of knew the sales organization. I had sold computers before joining Apple, so I

understood the dealer network quite well. That proved to be quite helpful. It was May 1985, and I'm like, "Whoa. I got a fun summer ahead of me," because I knew there was a crisis and I knew that if I didn't figure out a way to turn it around fast this was going to be dead. I didn't have the luxury of "Let's take six months. Let's do a plan."

The first thing I did was talk to the smartest people inside the company—Bruce Blumberg who was in charge of the LaserWriter and several people in our technical team—and tried to get everything I could from them. Then I started to figure out who in the outside world was really smart. I had to go figure out how to get as much brain power as I could and Adobe was fantastic. Probably everyone's heard of Guy Kawasaki, but we had an evangelist group that said, "Okay, who's doing anything interesting having to do with the LaserWriter?" I knew nothing about PageMaker. Even though I was in the Mac division, I was doing a special project trying to figure out how and whether Mac should be in the education system, in K–12 education because that was a big deal. We'd been at universities and Apple II was K–12. I said, "I think we're about to get blown out of K–12 unless Mac gets in there." I got assigned a special project to go do that. I was kind of in my own world when I was given this. I did not know much about the Mac Office other than, obviously, they sat in cubes right next to me.

I took it over and started talking to people. It turns out there were three page-layout programs: Mac Publisher had come out in December 1984. It actually, had been the first page layout. And Aldus. One of the inside investors was Gene Carter. He was the former VP of sales of Apple, so that raised their credibility pretty high because he was involved. could talk to him. And obviously, I went and got to know Paul and they had a consultant that had put together a pretty interesting marketing plan, which I was given a copy. Then I talked to a Manhattan Graphics. There was a company called "Ready, Set, Go."

There were three contenders and I was like, "Mmm. Now let's figure out, are they all the same? Who's better? Who's not?" I got some of our evangelists and technical team and asked, "Hey, who's really good here?" It wasn't that long. It was just a matter of a few weeks, before I was pretty clear that while the other ones were pretty interesting and had a lot of stuff going for them, the group at Aldus was a step above. Technically they were probably going to pull it off. Mac Publisher was not whizzy wig. Ready, Set, Go was and that kind of separated it, but Ready, Set, Go was just too small of a group. If they had enough money, they may have been able to pull it off, but they just didn't. You know? It became pretty clear we wanted Aldus.

I figured out that the goal was, "What is the least number of players to create a solution that our sales organization, our dealers, could actually sell successfully?" You didn't want it complex. You wanted enough that it could work. It looked like we could really simplify it. We had Mac Write, Mac Paint. At least we had a word processor. I don't think Word was really quite there yet, but it was coming. We had Draw that was coming. We had some graphic stuff coming, but

we basically had enough with PageMaker and Mac Write. And if you needed a little graphic, let's throw in Paint. Right? We had enough to do it, especially given we only had this limited size of a computer. We didn't even have the Mac Plus yet. It was just the 128. It wasn't even the 512 yet, so, no hard drive.

I figured out that solution. Then I continued talking and met Jonathan. He was extremely helpful in understanding who the players were. There were a bunch of other analysts that were Mac people; they'd been starting to follow us, so they were giving input.

In six weeks I had to figure out whether we're going to try to do something that fall or not, because we had a certain window. If we didn't have a marketing thing in the field ready to go in August so we could do something in February—I mean, September for it to be in Q4—we were done. We might as well pick it up in January. So, it was really compressed. I was getting that all pretty good, but one thing was always there. as I talked to the Adobe guys, Aldus, a couple of magazine guys, and Jonathan. My memory may be a little wrong on who, but basically if you take these three gentlemen, each of them at that time had a different view on the name. They wanted desktop publishing. That was real clear. You guys didn't. You wanted some other name. It was either electronic publishing or professional publishing. This was in June 1985. Don't confuse it with when we launched. At that time as I was going around and trying to figure it out, other people were suggesting PC publishing and others were suggesting micropublishing. And I'm like, "Wow. What are we going to do?"

Fortunately, Stanford had a publishing course that they did in the summer every year where they brought in people from the publishing industry to Stanford, and it just happened to coincide with when you had beta software. It was solid enough that you guys were pretty confident it wasn't going to bomb.

We got a demo of the LaserWriter, the Mac, and PageMaker, and we brought the whole class. They got the demo, and they were all blown away. That made me feel pretty good, and I thought we were really onto something. I then asked them about names, and there were a variety. Some were high-end guys and they liked electronic publishing or professional publishing. The smaller business guys liked desktop publishing. We did some market research focus groups. We did I think three different focus groups in the Bay area of different types because we knew who we wanted to go after. Or at least the hypothesis. You know, are we going after corporate? Are we going after small business? Are we going after just graphic arts and kind of publishing-type folks? There were three different groups. I also used it as a selling opportunity inside of Apple, because I had no budget.

I had to convince the training department that it was worth them pulling time off doing other things and putting my agenda ahead of others. I had to steal money from the marketing and

communications budget so I could have collateral and stuff like that. Regence was really easy because he was one of the godfathers in the background and was very supportive to me. Basically, I was able to get a dedicated person for PR to help and that became really, really, really important because I had no money for traditional marketing. You had to do it all through PR and stuff. Basically, I used the software publishing and our focus groups to invite people from Apple to come see how customers reacted. That was the way to get people to say, “Hey, this is going to be a winner.” We did all that.

Fast forward: I made a call on name. I decided, “Look, whatever decision we’re going to make, we’re going to be the muscle that was going to be doing the marketing.” Whatever we decided, for good or bad, probably was going to be the name. Desktop publishing was the name that ranked the highest by quite a bit. It felt good and we all said, “Great.” Paul was the one who came up with the name, and rightly, it really kind of captured it. It was like, “Great, we’re going to go behind that.” That got us to the point where we’re then in a position to actually go to market.

Then we had to say, “Okay, great. How do we go to market?” On the name, the deciding factor came down to PC publishing or desktop publishing. I was scared to death of PC publishing because I didn’t want to have what happened to the Apple II happen again to desktop publishing on the Macintosh. I knew we couldn’t call it Mac desktop publishing or Mac publishing because it needed to be an industry, but I didn’t want to let the IBM PC come in and steal that from us. Desktop neutered that idea, and we felt that we had a strong enough advantage architecturally from a platform that we at least had two years’ advantage over Windows and what the PC was going to do anyway. If we could do it and do it fast, we could establish and build the category; if we could establish ourselves as the dominate player, we were going to be fine. We were all ready. Go!

I had a bunch of people tell me I was an idiot. Jean-Louis told me this is the stupidest idea he had ever heard; that’s not what Apple does. Sorry, Jean-Louis.

He said this was stupid; we don’t do these vertical solutions. “We are Apple; we do wheels for the mind; this is general purpose.” I said, “I respectfully disagree. I think we have a $12,000 solution of two Macs and a LaserWriter. And if you sell it as the Office, it’s just a very expensive shared printer and that’s not going to work. Here we can really do something special.” The only way I could ultimately convince the others was to sell it as a Trojan horse, for us to get the Macintosh into business by using this killer app—we didn’t call it killer app. I forget what it was, but the special application that we could do that nobody else was going to be able to touch us. People really liked the Trojan horse idea, and that resonated at the exec staff level. Sculley was always quite supportive any time I needed him to give a talk at a conference, and I’d do it periodically to keep him engaged. I’d get him to come keynote at Seybold or at some of the other Macworld conferences. Those were our two: Seybold for us and then desktop publishing

comes later. And then the Macworld. Getting him to be the speaker instead of me kept him engaged because I needed to keep the resources.

Apple Sales and Distribution of LaserWriter and the Mac

Scull: So, you had to be fairly thoughtful about the way you leveraged the whole organization because not everybody thought this was the right thing to do, at least in phase 1. In phase 1, we put together the training program with the assistance of the folks at Adobe and Aldus. Paul mentioned we decided that we were going to go after about 150 to 250 of the top dealers. We had two teams. I led one, Paul led the other. I hired a consultant named Mike Solomon because I wanted to make sure there was someone who knew our channel real well; I put him on the team with Paul. Paul later hired him to be head of sales and marketing. I think, Liz, you were either on their team or my team. I get it mixed up. You were on mine and I think Clint was on Paul's team. And then Jennifer Siemen [???] from Aldus was on mine. We had two teams, and we went around the country, five or six cities each over a week. I forget. We spent a day in each and just trained up guys, made it kind of exclusive. Only the top guys could come and that turned out to be a great way to launch it into the dealer channel. That started us off and running.

Grad: These are the dealers?

Scull: At that point, Apple only sold through dealers.

Grad: Ah!

Scull: We had national accounts, but our bread and butter was selling our computers through dealers, and our dealers wanted to know which software we supported. So we knew that when we put out our imprimatur of "Aldus is the right way to go," all of a sudden they all knew they needed to start stocking and selling Aldus. They were always looking for us to say which one that we were going to get behind because then they knew we were going to support it with marketing and sales.

Grad: This was the concept of how to sell the Mac, convincing them to sell the software?

Scull: It was a way to sell what was known as the desktop publishing system, which we always thought of as two Macs, a LaserWriter, and the appropriate software. Normally, it was two PageMakers, or at least one, but normally two and Mac Write and others. Over time other types of software would come along.

Grad: How big was the package? You said $12,000?

Scull: It ended up being about $12,000 to begin with. My goal was to get the LaserWriter down. At that point, the LaserWriter was almost $7,000. The Mac was $2,400 each. The software was another thousand.

Grad: What was Apple getting out of that sale? They were getting the hardware and the LaserWriter.

Scull: Well, we sold the Macs and the LaserWriter.

Grad: The others got the other money? But they'd been prepaid, and still they got your money.

Scull: Yes, this was called an alliance of mutual self-interest. We got the lion's share of the revenue, not to be confused with profits, although we did reasonably well and over time more. We had the distribution channel; we were the brawn and we needed these guys as brain. It worked out pretty well.

Grad: Did you have to cut a deal with them financially?

Scull: No, it was pretty easy. They needed us; we needed them. We were in product together, right? We were already in bed, and we just needed to have a solution.

Apple and Adobe Relationship

Warnock: Our relationship with Apple, not with John, but Apple was poisoned, okay? Because Steve jobs was shown out the door and Jean-Louis Gassée came in. He was basically hostile to anything Steve believed in. Would you agree with that?

Scull: Not everything.

<laughter>

Scull: Not everything. I'll give him credit; he was really good. He's a good leader, but his leading style is "us versus them." You're either part of the "us" or you're part of the "them." So, it depends on if you're on the "us" side. It's different than if you're on the "them" side.

Warnock: With us, the relationship was very difficult. They sold their 20 percent of Adobe and they made $70 million on that. It would be worth $10 to $15 billion now, but Apple doesn't need the cash.

Scull: Let's put it this way: I did not want to sell, and furthermore I tried to convince internally that we should buy 19.9 percent of Aldus as part of this deal. I thought, we were going to make these guys gazillionaires and we might as well participate in gain.

Warnock: Well, no, it's just we found it personally difficult to deal with Jean-Louis Gassée.

Grad: How did that affect you?

Warnock: We were starting to build the OEM channel, and we had relationships with the PC side of the business. We always tried to maintain the relationship. We didn't have a bad relationship with John Sculley. I think that was reasonably good. We had a lot of friends at Apple, so that was not a problem. Jean-Louis: not so much. We stayed with Apple all the way until Steve came back, and that was a difficult journey.

Scull: At some point, the alliance of the companies got a little strained. Let me say that, and talk a little bit about that.

Grad: Let me ask you a question: How good was the LaserWriter?

Scull: That was the best thing out there. It was better than the alternative.

Grad: When do the competitors come out with good printers?

Scull: There really wasn't a meaningful competitor in the marketplace for three years. I always liked to pitch it that you had us, then Data Products was supposed to be working on a 600-dot per inch higher-end expensive one, and then you had the Linotype, which was the ultimate in that you had this nice way that you could always scale up. PostScript was much later. What I'm talking about was the formative years, 1985 to 1988, okay?

Mind you, I left at the end of 1988 to pursue other pastures. It seemed like it was right at the point where things were starting to get a little more challenging. By then it was a $1 billion business for Apple. I mean, this was a big deal. Desktop publishing was the tail that was wagging the dog at Apple. Unfortunately, for good or bad, it became very mainstream at Apple and everybody then was watching it. Everybody had an opinion on everything I was doing. I started with my small little band of two to three folks. I had people that I worked with, but they didn't work for me on the LaserWriter team, an evangelist dedicated to me, a PR person—it was a small, really fun thing.

Then, all of a sudden, it became, “Whoa! If you guys screw up, it could really hurt Apple.” Everybody wanted to have their opinion, so it started to get a little less fun. At the same time, I got pretty excited by multimedia, which I thought was going to be the next cool, neat thing and I like new things.

Grad: Were you measured separately? Did you have your own profit and loss (P&L)?

Scull: I created one just for my own. Essentially, I created a P&L for the way I saw it. I gave them the forecast from the marketing standpoint.

Grad: Did your P&L include the sale of the Macs as well as the sale of the LaserWriter?

Scull: Yes.

Grad: It was the whole package?

Scull: Oh, yes. That’s the only way to think about it because that’s what we were essentially doing.

Geschke: Just to illustrate how difficult things became after Steve left—not many people know this, but Steve actually negotiated that Apple would have the rights to display PostScript for no extra charge. It came with the deal. We could not get it implemented on the early Macintoshes. They just didn’t have the capacity to do it. But we continued to work on it ourselves.

After Steve had left, I put on a demonstration for the Apple management of display PostScript, but I didn’t ask the permission of our friend Jean-Louis Gassée to do that. We did the demo and then Jean-Louis asked me to leave the conference room in which we did it because he wanted to talk to me. He came out, put his finger on my chest, and said, “Don’t you ever demonstrate anything again to Apple management without my permission.” That’s the kind of environment that we went to; we got along really great with Steve, and just a couple years later that was the kind of environment.

Grad: The argument was not that it was Sculley’s per se, but the next level down.

Geschke: No, Sculley was sort of out of it. Excuse me. Sorry, I didn't mean it that way. I meant he was out of that contentious part.

Knuth: I'm not real familiar with the numbers, but yesterday it was said that at this time that LaserWriter was being sold at cost. I know that in 1985–1986 I had an Imagen printer in my apartment in Boston. You didn't mention Imagen as a possibility. Were they charging lots more?

Scull: PostScript was what Steve had settled on with the team.

Warnock: Imagen couldn't be driven by PageMaker.

Knuth: Excuse me? It didn't have the typographic capability. It didn't have the font scaling capability.

Warnock: It didn't have the font scaling capability.

Lampson: Did they have enough memory, or was there something else?

Warnock: They may have had a megabyte, but it was more like a Hewlett-Packard PCL. It was more like a PCL.

Larry Tesler: No, I don't think so.

International and Domestic Market for Apple Desktop Publishing

Scull: Paul talked about international business. International was something I strongly believed in. I had been raised overseas my entire life, so from pretty much after the initial launch, we started thinking, over the next two years while we have this window of opportunity, how do we make sure we solidify that we're the choice? We felt we had to do it by not only doing it in the U.S., but also doing it in every major market. So, I convinced the head of international that they needed to have a desktop publishing person in every major country, so I got a person put in for Canada, the UK, and then later France. Those were the major markets. —

Each summer I would host the international desktop team to come to Cupertino, and we invited the software guys that could really help educate. We tried to establish whatever relationships we could to make it easier for them to be successful in each country. Both Adobe and Aldus were by far the best to work with because they were committed to supporting whatever was needed. It was a terrific relationship, especially in the first two years. We were completely aligned, even though we knew they were doing things with other vendors and we knew that Paul was wanting to do Windows. —It's not that we liked it, but we understood it. That's kind of how we approached it.

Competition from Quark

Scull: By the time we got into probably 1987Quark was showing us their products, so I knew that there were alternatives that were pretty good coming out. Just like they didn't want to be too dependent on Apple, we didn't want to be dependent on PageMaker alone. You know, let a thousand flowers bloom.

I was trying to convince Ventura. They basically said no. I tried Interleaf and Frame. They said, "Thank you very much. You can't do it on that little toy." Now I knew we were about to come out with a Mac II, which was our step up. It had a better screen. That started to get their attention, but it still wasn't quite ready for what they were trying to do. Still, we kept evangelizing. Quark, you know, did get there. It became a real force. It became a real competitor to PageMaker because it was more akin to what Ventura would have been.

While Quark and PageMaker overlapped a lot, we tried to kind of help position that one's good for the more cut-and-paste shorter kinds of products and the other one was better for larger products. You've got to keep it simple for the sales guys. They either sold just one, or if they wanted to sell two, they had to know how to position it. You had to help them. Remember, these were dealer sales guys. —They were a step above a car salesman sometimes. These were not your national account, super strong sales guys. You had to make sure it was simple, and the top ones were really, really good.

By then we took it a step further. We had 12 field marketing specialists, and we had 12 business development managers. They were in each region in the country, and basically, even though they didn't work for me, they almost all became desktop publishing people. I got these guys to train them. They were on their mailing lists. They were just constantly bombarding them with education so that we really had some really strong people in the field that helped keep the seminars and the training of dealers going regionally. There was turnover, and they had to keep them trained. It was a pretty steady drumbeat for about two and a half to three years. —

Apple Exits the Printer Market

Grad: What happened at the end?

Scull: This is just the end of all I'm involved in, and I can't speak beyond1989. The relationship started to get a little frayed, because there was a little tension. Adobe had independent needs. I

think the royalty and pricing was always a point of contention from the LaserWriter from product development. That was always a bit of a friction. I'm sure there was some pressure there.

Warnock: I can't remember the year they stopped making printers.

Scull: That was well after my time.

Warnock: There were so many OEMs and the Japanese came into the market, so they decided to exit the market. IBM also exited the market and sold to Lexmark.

Scull: When was that? It was quite a while later—1990 or 1993/1994. There were so many choices of PostScript printers and other type of printers.

Grad: That was my question. When did the next laser printers of this kind of quality come into the market?

Warnock: They started pretty much immediately after Apple announced.

Grad: Even though they had their own. How about the use of Windows and use of the PC, was that simultaneous?

Warnock: No.

Grad: Later?

Warnock: A little later.

Grad: That's why they had the market to themselves for a while.

Scull: They did. Pretty much the whole time I was there.

Lampson: It wasn't because of Postscript; it was because they had graphics.

Scull: I'll add another little caveat. I love the guys at Xerox for two reasons. One is Xerox PARC brought all this brainpower into the industry. The second is I love the fact that they bought Ventura and were aggressively marketing publishing. I personally viewed that for every dollar they spent, I got 10x the sales because they educated more people about publishing and they showed that there was this alternative. When people went to check it out, inevitably they bought

a new computer because the Mac really shined, and it was the greatest thing; it was manna from heaven for a guy that had very little budget.

Now fast forward 18 to 24 months: I start having plenty of budget. By then people could see the success, and it was real easy for me to get budget at that point. Prior to that, Xerox funded my marketing, and I just spent PR to convert that marketing from their spin to my conversion. It was like Ju Jitsu marketing, and I thought it was the greatest thing that ever happened.

Apple and Other Industries

Seybold: I think there's a consensus in this room that Apple wouldn't have survived the 1980s if it wasn't for desktop publishing. Do you guys agree?

Tesler: I wouldn't say that anybody's thought through. Nobody has asked, what if they had focused on K–12 education, or what if they had focused on financial applications or something else that had the same qualities and advantages? I don't know what the alternatives might have been.

Lampson: Even in retrospect, I don't see what it would be.

Scull: In our business marketing, we had three groups. I became one of the groups, and it was an effort to try and find some other killer app areas. We didn't quite get there. Excel wasn't even out yet on the Mac at that point, so in the mainstream business, we just weren't there yet.

Seybold: After you left, there were two other billion-dollar mergers in the group; one was education and the other was science and engineering.

Scull: Yes, we were always really strong on the university side because that was a core market. When we launched the Macintosh, we had a university consortium of the top 24 universities that were already seeded with us and deeply embedded in the computer science parts, so we had a pretty strong place in universities that expanded. We had a great internal fight about K–12 education that in that continued for at least two or three years. Even as I was leaving Apple, they were just then starting to allow the Mac to go into K–12 because it was pretty clear we were about to get blown out by the PC. We were getting blown out by the PC, and we had to do it, but the science and engineering only came a little later.

Grad: Anything else about desktop publishing?

Martin Ruckert: I think desktop publishing was one of the first big areas where the computers reached the workplace of nontechnical people, like artists and designers. What role did Apple design play in reaching that user group?

Scull: Steve had a very incredible aesthetic sense. He valued that highly in everything, not just the computer and the software, but everything—the art on the wall, the Steinway piano in our lobby. He pretty much wanted to make sure that that aesthetic carried through. I think even if you look at Chiat\Day and BBDO advertising agencies that took over after that, they were chosen because they got it. If you go into our creative services, we had world class designers in our creative service people. And we were remiss in not including them as part of the focus testing that for me early on. Clemment Mock [???], Hugh Duberly [???], Tom Suiter [???], etc. really deeply understood desktop publishing and understood how the Mac fit. They were thought leaders in their community as well and they knew others, so it was really helpful to have that. Obviously, John and Liz understand and value aesthetic, and Paul has that deep aesthetic sensibility that carried over through everything. You didn't have to be a left-brain person to use the Mac; you could be a right brain person and understand the graphic interface and how it worked, so it was approachable.

Grad: I could go on indefinitely about this, but let’s take a break now.