



Desktop Publishing Pioneer Meeting Day 2 Session 6: Adobe

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Recorded May 23, 2017
Mountain View, CA

CHM Reference number: X8209.2017

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Desktop Publishing Pioneer Meeting: **Day 2 Session 6: Adobe**

Conducted by Software Industry Special Interest Group

Abstract: Session 6 of the Desktop Publishing Pioneer Meeting focuses on Adobe. Adobe cofounders Chuck Geschke and John Warnock explain why they created the company and their initial business plan and work with investors. They also discuss Adobe's early customers, particularly its relationship with Apple, and their business and management philosophy. After exploring the development of Adobe's early products, PostScript, Illustrator and Photoshop, Geschke and Warnock talk about how the company evolved over the years, adjusting to marketing forces and technological developments, and the various mergers and acquisitions that brought in additional applications and product lines. Of course, they then talk about Acrobat and PD's which eventually became their best known, most widely used and greatest revenue product.

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Burton Grad	Moderator, SI SIG
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Chuck Geschke	Xerox PARC and Adobe
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Lee Lorenzen	Ventura
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John Scull	Apple laser printer
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Larry Tesler	Xerox PARC and Apple
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Dag Spicer	CHM, historian
Marc Weber	CHM, Internet curator

Burt Grad: Two people have joined us. Mike Humphries joined us late yesterday, and Dag Spicer has joined us this morning. I'd like them to briefly introduce themselves.

Mike Humphries: I'm currently the chair of the Software Industry Special Interest Group. Burt Grad and Luanne Johnson had that position for the last 20 years, and fortunately, neither of them has really retired. Burt somehow put this whole conference together in his spare time. I had nothing to do with it, but I think we're going to have some more interesting conferences coming up. I've been involved for a little over 15 years. Burt and Luanne drew me in when we did a group meeting on timesharing, and I became really intrigued to find out that other than those of us who have been living in the computer software industry, which is how I spent mine, there was a lot of interesting stuff going on behind the scenes. It's been a pleasure working with them. They've set a really high standard and we have some interesting meetings coming up. There might be some overlap, so some of you might get invitations to come to some of those, particularly the historians who are here. Thanks.

Grad: Thank you, Mike. Dag.

Dag Spicer: Hi, I'm a senior curator at the museum. I've been working here for 21 years or so. I'm an electrical engineer and historian by training. This is a wonderful group. It reminds me of the 1976 conference at Los Alamos of computer pioneers. We've got all the right people in the room. It's like a super nova of desktop publishing people. I'm super excited to be here and listening to some of these legends. It's just amazing, so thank you all again for coming, and thank you Burt and David for organizing this wonderful conference.

Grad: Are you the longest tenured employee at the Computer History Museum?

Spicer: The Methuselah of the Museum, yes.

Grad: Dag is also active with the *IEEE Annals of the History of Computing*. He's been involved in that for a lot of years as well.

The Founding of Adobe

Grad: These coming sessions focus on the individual companies as a whole and where the technology directed things. Fundamentally, we're trying to look at each company as a business. I have a sequence of questions I normally go with, but we'll see how the flow is. All of you pitch in. If you hear something or think of something, please speak up, because we want to involve everybody in all these sessions.

John Warnock and Chuck Geschke, you decide who answers what. You can poke each other as you see fit. You were both at Xerox PARC, and you were not happy. Yesterday, you said at Xerox it was going to take seven years to do what you wanted to do, so you decided to leave. Tell me how you made that decision, who was involved in making it, and about your concerns and your plans.

Chuck Geschke: I'm going to talk about not only how we started the company, but sort of our philosophy and attitude about what kind of company we wanted to be. I met John when I called him for a phone meeting because I was starting a new laboratory in graphics and computer science. At that lunch, the first thing I noticed is we both had beards. We both were still married to the same women we had married originally. We both had three kids, two boys and a girl. We were both mathematicians. But the real kicker was we both refereed at AYSO soccer.

So, I hired him. The best hiring decision I ever made. There was one other great hiring decision I made years before at PARC, a man by the name of Ed Taft, whose name has come up. Probably one of the best programmers ever. At any rate, John and I started working together. I told you a little bit about this yesterday. We got to the point where we had done Interpress, discovered that Xerox was probably never going to get it out into the market place or at least not get it out in a way that it would have a chance of becoming a worldwide international standard for printing. So, John and I sat down in my office and we decided, "Well, we could get old and gray," and as John said, "Stay in the sandbox for the rest of our lives."

It would be fun, but engineers dream of building something that millions of people will use. That's their ultimate goal. Frankly, I don't think many engineers are motivated by money; they're motivated by having an impact. John's thesis advisor, Dave Evans, happened to be on the board of Hambrecht & Quist, so he made an introduction and we went up to talk to Bill Hambrecht. We told him we were thinking of starting a company in which we would put together computers, laser printers for proofing, and plate-making equipment for making printing plates and allow the Fortune 500 companies to bring all of their publishing production in-house. He loved that idea because he hated financial printers. Financial printers ripped him off; they were always late and he just was not happy. For that reason alone, he thought this would be a great idea.

Grad: When was this?

Geschke: Oh. This is was the summer of 1982. He said, "Have you ever written a business plan?" I said, "Well, I've written lots of operating plans." He said, "No, no, no. A business plan." And I said, "Well, no, not really," although I certainly knew what one was. He said, "Fine. I'll write a check for and hire a guy to work with you to write the business plan, because I need that to go out and raise the money."

He hired this man and we worked together. In a few months we had a business plan. We had speculated on how much money it was going to take and did a little bit of guessing about what the opportunity was in terms of revenue and so forth. We took the plan up to Bill in San Francisco. He looked at it and said, "Fine. Quit your jobs." I looked around and said, "Quit our jobs?" He said, "Well, you've got to do that." I went in and talked to my boss at Xerox, and he was okay. He was not thrilled, but at any rate, we left.

Company Philosophy and Hiring

Geschke: As we were starting the company we said, "You know, we really want to build a company that we would like to work at," because we felt if we built a business or a company we'd like and hired the kind of people who were sort of like us, we could work very effectively. We didn't want to have a whole regimen of a whole bunch of rules and behavior and all that kind of stuff. We just wanted to make sure that people understood that honesty and dependability and inventiveness were the key attributes. As we began to hire people, we focused not on hiring the youngest, least expensive engineers, but people we had a relationship with that we knew, that we trusted, that we felt could pretty much work on their own without a lot of micromanagement. We began to build a team.

In that process, before very long you discover that there are a whole bunch of constituencies that you have to deal with. You have your employees and the people who manage them. You have your customers. You have the vendors who supply things for you. Eventually, you have either your investors or your shareholders, and you also have the communities in which you're operating. The trick about that is that all of those constituencies are mildly in conflict with one another, because what's good for one is not necessarily good for the other, so they're all trying to pull you in a particular direction.

Since we didn't want to write a manual of behavior, we said, "Let's make it simple. Let's make the Adobe way of doing business that you treat every one of those constituents the way that you would want to be treated," and that's the Adobe way. Now a lot of people say, "Well, that's a religious principle and it comes from Jesus Christ." Actually, if you look at every religion that has ever been on this planet, somewhere in the beginnings it has that principle. It's in the Koran. It's in the Jewish Bible. It's everywhere. We wanted it to be the way our company was thought about.

We also decided fairly early on that we wanted to make sure that we convinced the people who worked for us as they were beginning to hire people that they had a philosophy of hiring extremely talented people. This is the catch phrase we used: "You should always hire people who are smarter than you, because it's a much bigger population from which to choose your potential employees."

That has been our philosophy, and it has worked out extremely well as a company. We also felt that we wanted to pay attention to the communities in which we operated, because we wanted to be welcomed as co-citizens. From the very beginning, we decided as we started to make a profit that we would take a small percentage of our profits and create an annual charitable fund, which originally we had a group of employees run. That fund now is quite large on an annual basis, so we have to hire some people to manage it, but that same philosophy is and always will be part of our company.

This came later, but we also decided that the environment was something that we needed to show some leadership in, so we decided that we would upgrade our headquarter buildings in San Jose to be platinum LEED certified. A lot of people said, "Oh, God, that's going to be a lot of money or a lot of waste." We did it, and it paid off in about two years. We now sell power to PG&E. Our urinals have no water in them, so we save a lot of water. Today, roughly 50 percent of Adobe employees around the world work in platinum LEED certified buildings. We have the oldest platinum LEED certified building in the country and perhaps the world. We upgraded an old brick warehouse in San Francisco that was built in the 1880s all the way to platinum LEED certified. Of all the people who work for Adobe, 75 percent work in buildings that have some LEED certification associated with it. Our employees love that. They're so proud of it.

We probably have one of the lowest attrition rates in the industry, particularly of the people who are the outstanding performers. Our employees typically rank us at the very top of the companies that they like to work at. That's been something that's been extremely important to John and me, because we can look back now after roughly 35 years in business and say that we're very proud of not only what we've accomplished in our financial performance, but more importantly, in terms of the cultural style in which we have done that and the way our company is respected.

The other thing we decided from the very beginning is that printing and publishing was a worldwide, international business, and it was critical that we demonstrate that our technology could be used everywhere. We began in Europe. That's where we did the Mergenthaler deal to get a license to their type library and develop with them the first PostScript image setter. I think I mentioned yesterday that I went to Japan and couldn't get a deal with the number one printing company, but we did get a deal with the number two company. All of a sudden Japanese all use PostScript for their printing. That's also true in China, the Far East, everywhere.

Startup Investment

Grad: Let me go back to the beginning a little bit, Chuck. How much money did you raise?

Geschke: \$2.5 million.

Grad: How far did that carry you?

Geschke: That was supposed to carry us for two years. The first person who came to visit us from the outside was Gordon Bell, who was from DEC, who when I first knew him was my hardware professor at Carnegie Mellon. We showed him what we were doing, and he looked at it and said, "Hmm. That's really pretty cool, but I don't need computers because I'm with Digital Equipment and I already have a deal with Ricoh for a printer, so I don't need that. But the group trying to get the software to make the computer talk to the printer is getting nowhere. Why don't you sell me that software?" We said, "Gordon, we have this business plan. It raised us \$2.5 million, and we have to do certain things. We can't do that." He said, "Well, I think you're nuts."

A couple months later, Bob Belleville brought Steve Jobs by. Steve looked at what we were doing. He said, "I don't need a computer. I got this Macintosh. And I don't need a printer; I got this deal with Canon. Sell me the company and come work for me because the software between the two isn't working." And we said, "Steve, we don't want to work for you."

Grad: A very wise decision.

Geschke: Okay, I'm sure we said it more positively than that.

Warnock: We did.

Geschke: We said we wanted to start our own company. He said, "Okay, that's fine. Sell me that software." And we said, "Steve, we have this business plan." He said, "You guys are nuts."

Then we went and talked to the guy who Bill had put in as chairman, and he said, "Steve's right. You guys are nuts. Throw the damn plan out. It was just there to raise the money. Now you know what your product is and who your customers are. Go out and sell them."

Grad: Who was the chairman?

Geschke: Q.T. Wiles. He was a crusty old guy from Nebraska who ran a valve manufacturing plant that was the only business in a small Nebraska town. If he hadn't brought that company back to life, the town would have died. He was a local hero, but he was a tough guy. He was fairly far right of Barry Goldwater, but he gave one piece of advice to John and me: "Don't ever complain about taxes. If you're paying taxes, you're doing well," which I thought was a very refreshing point of view.

Warnock: You never lose money paying taxes.

Additional Investment from Apple

Grad: This transition takes place in the first six months or so?

Geschke: Yes. We went to him in the summer right after we talked to Steve. He told us to call him up, so I called up Steve and he said, "What do you want for the company?" I said, "Steve, still not for sale." He said, "Okay. Let's do a deal." So, we began negotiating, and he agreed to pay us 5 percent of the selling price of all of the laser printers that he could sell.

It was a good deal. In return, we had to write this software in Mask ROM. We had to help design the hardware that would run it, which we also did. We put together this project and signed a contract right before the end of our fiscal year, which began on December 1 of each year. He paid us a prepayment of \$2 million, because he wanted to make sure we stayed in business. He bought 19.9 percent of the company for \$2.5 million, which was five times what the original investors put in, so they already quintupled their money. He did this, as I said, in our first fiscal year, so we as a company were profitable every year.

Grad: Your \$2 million was for stock?

Geschke: No, that was separate. That was a prepayment on future royalties.

Grad: What did he pay for the stock?

Geschke: \$2.5 million.

Grad: So, you now had \$2.5 million from your investors, and you had a \$2 million advance from Apple, which you obviously put in deferred revenue.

Warnock: Right.

Geschke: We had \$4.5 million to work with.

Grad: And you had another \$2.5 million that Steve Jobs bought in stock to own that patent.

Geschke: Right. That was the deal, and we went off and started working.

Grad: How much of the stock did you guys have? What percentage?

Geschke: We each had 10 percent at the start. Hambrecht & Quist owned 50 percent. The rest of it we retained for employees. We had 30 percent for employees.

Grad: When Steve bought stock, did he buy yours?

Geschke: From the investors, I think.

Warnock: Yes.

Geschke: We kept our 30 percent. and the investors were fine with that, except I got one negative phone call from one who said, "Now I have to pay taxes."

Grad: Isn't that terrible.

Geschke: Life is hard.

Warnock: The way the accounting worked, the advance against royalties was nonrefundable, so Adobe was profitable from the first year.

Grad: That's why I asked about deferred revenue, because technically until you've performed, you can't claim that as revenue.

Geschke: Right. They couldn't take it back.

PostScript Software Development

Grad: At that point in time, when you made these deals, what did you have working in the way of software?

Geschke: We essentially had the entire package sort of working, but it wasn't running in Mask ROM; it was running on a Sun workstation that was hooked up to a Canon printer.

Grad: How did you have it ready so soon?

Geschke: We hired really good engineers.

Grad: You built from scratch. You didn't take any code from Xerox PARC?

Warnock: No, we did not.

Grad: That was what I was trying to understand. So, within what, six months?

Geschke: It was nine months maybe, but there were bells and whistles and pieces that were not yet done. We had enough that we could print a letter on a sheet of paper.

Grad: That's impressive.

Warnock: The implementation of PostScript, the basic engine, is relatively straightforward. To get it to perform to the level you need to is a much harder task, but to get a proof of concept, it's fairly straightforward.

Startup Operations

Warnock: Back to Q.T. Wiles; the other advice he gave us was, "Know when to fire yourself. You will make every decision in the beginning of the company. You will buy the furniture. You will buy the artwork on the wall. You will pick the color of carpet. You'll clean up. You'll do everything. As you get bigger, be very careful that you delegate and very careful that you don't become sort of a monarch. Become a manager." That was a very good set of advice.

Grad: Where were your first facilities? Where did you set up operation?

Warnock: We had a teeny facility in Mountain View. It was 1,700 square feet.

Geschke: Then we added a little bit to it.

Warnock: Liz Bond [now Crews] came to work at that facility.

Grad: One of your first employees?

Warnock: Yes. We had Steve McDonald, who was head of sales. We had Dan Putman, who was an engineer. We had Doug Brotz.

Geschke: And Tom Boynton.

Warnock: Bill Paxton.

Grad: About 10 people total?

Warnock: Yes, and Linda Gass.

Geschke: Was Dick Sweet in by the end of the first year?

Warnock: Eventually, but not yet.

Grad: 1,700 square feet for 10 people is not a lot of room.

Warnock: No, that wasn't.

Grad: Did you have any equipment there, or were you using somebody else's equipment?

Geschke: We had leased a VAX. When we hired employees, we gave them a modem, a phone line, and a terminal for their homes because we wanted them to continue to have a family life. We've done that for everybody.

Warnock: We borrowed a Ricoh printer from DEC.

Geschke: Yes.

Grad: On premises, you had what equipment?

Geschke: We had a printer. And the VAX.

Warnock: And a Sun workstation.

Grad: You had that in 1,700 square feet?

Geschke: Yes.

Warnock: We then moved very quickly to Embarcadero Avenue in Palo Alto, and there we had a lot more square feet.

Geschke: Eventually, we took over the whole building. It was right across from the golf course there on Embarcadero.

Initial Licensing Deals

Grad: Once you made the deal with Apple, you decided you were going to be software-focused. Is that correct?

Geschke: Yes.

Warnock: Yes.

Grad: What did you see as your business plan?

Geschke: We were designing hardware, but we weren't going to manufacture it.

Warnock: We were contemplating at that time building a typesetter, because at that time there wasn't a raster typesetter that was available until we discovered the Linotronic 100. But that never went anywhere. It was very important in our concept that we not only build a laser printer, but that we also build the capability of driving a high-resolution typesetter.

Grad: Your sales through Apple were going to be their sales where you got a piece.

Warnock: Yes.

Grad: But you kept the rights to the software.

Warnock: Yes. It was a license.

Grad: What did you intend to do with that? Who were you going to sell it to?

Warnock: We felt very strongly that we wanted PostScript to become a universal standard used by everybody. Our very first contract was with a company called QMS out of Alabama. They made laser printers in the early days. Our very first implementation was on the QMS, and the QMS came out before the Apple LaserWriter.

Geschke: About two months before.

Warnock: Yes. They were an OEM (original equipment manufacturer), and Steve was trying to contact everybody. We were trying to sell to Hewlett-Packard. We were trying to sell to IBM. We were trying to sell everybody who produced printers.

Grad: What were you going to sell them?

Warnock: Licenses to the software.

Geschke: Same deal we did with Apple. That's when I started going to Japan and talking to NEC and Canon.

Grad: You weren't trying to sell the use of the software directly; you were going to sell through OEMs or others.

Warnock: That's right.

Geschke: Yes.

Warnock: They were all licensing deals. They licensed the software, the fonts, all of that stuff.

Grad: Nobody wanted an exclusive, or you wouldn't give them?

Warnock: We wouldn't give them. Steve wanted an exclusive.

Geschke: He wanted to buy the company.

Warnock: But we said, "No. PostScript will become useful if it is a broadly accessible platform."

Grad: You weren't selling. This is what's different about the model; you weren't selling to an end user.

Warnock: No.

Grad: You were selling to basically someone who was going to improve some product.

Geschke: We only had two sales people for a long time. Only had 25 or 30 companies to talk to.

Grad: That's a terrifically different model than the normal software company.

Warnock: We eventually had deals with Prime Computer, Wang, and DEC.

Liz Crews: And IBM?

Geschke: Eventually with HP and IBM.

Warnock: By 1987, we had roughly 35 OEMs, and the business was growing, doubling every year.

Early Competition and Growth

Geschke: At that point, there were somewhere between 50 and 70 clone developers trying to compete with us. They were building an implementation of PostScript, and they wanted to undercut our price and sell to the same people we were trying to sell to.

Grad: When you speak of an OEM, they were really not just someone packaging other people's hardware and stuff; they were actually producers of printers. Is that correct?

Geschke: They didn't necessarily do the xerography, but they did the controller hardware and put it all together with our software and sold it as an end-user product.

Warnock: They would sell the whole package.

Grad: In terms of staffing, you started to grow. You had about 10 people initially. By the end of the first year, do you remember how big you were?

Geschke: Less than 15, I think.

Warnock: Actually, we have all the annual reports. I'll give them to the Computer History Museum. The annual reports show the growth rates.

Grad: Did you ever get much more equipment of your own?

Geschke: Yes.

Warnock: Tons.

Grad: You weren't using a data center, then. Were you using your own equipment mainly?

Geschke: Yes. We always ran our own equipment. We immediately started using Macintoshes as soon as we got the deal with Apple.

Grad: Did you ever need more financing?

Warnock: No.

Geschke: No. that \$2.5 million dollars is now worth \$70 billion.

Warnock: Our revenue in 1986 was \$16 million.

Geschke: \$16 million, and \$39, \$83, \$129 million in the following years. We went public in 1986 in the summer. We had a huge offering. It was for \$5.5 million.

Grad: What percentage did you sell off?

Warnock: It was small.

Geschke: Small, 10 percent. Less than that.

Grad: You had a valuation of about \$55 million.

Geschke: Yes. We had a market cap of \$55 million.

Growth in Printer Manufacturing

David Brock: Did the availability of PostScript and the fonts lower the barrier to entry, essentially grow your customer base? That is to say, with the availability of PostScript, would that make it easier for me to contemplate introducing a laser printer of my own?

Warnock: Oh, yes.

Geschke: Yes, absolutely.

Warnock: The hard part is the software.

Geschke: We did the hard part. We think it was the hard part.

Brock: Lower that barrier and grow that laser printing market overall.

Warnock: Yes, Canon was competing with Matsushita, Ricoh, and Fujitsu. All of the printer manufacturers didn't have that component.

John Scull: Just for my edification, what was the deal you cut with all the other OEMs during 1986–1987?

Warnock: Same kind of deal.

Scull: Did you do the same prepaid royalty, or by then did you not need to do that because you were cash flow fine?

Warnock: We were cash flow fine.

Geschke: The reason we still did prepayments was to keep them serious.

Scull: Of your revenues, how much came from Apple, and how much came from others during that period?

Warnock: I'd have to go back and look. Apple was a big chunk of it, and it was expanding. QMS was not terribly large, but it was adequate.

Scull: How much was prepaid? The prepaid would get stuff going before actually any sales really took place.

Warnock: Yes.

Scull: In my mind, by 1988 Apple was less than 50 percent, but prior to that, it was kind of the lion's share of what was in there.

Warnock: We were starting to sell to multiple typesetter companies with Compugraphic and Autologic and all those guys. Did we ever do a deal with Monotype?

Geschke: Never.

Warnock: They didn't have a raster printer, I don't think. Anyway, the business was growing, and the number of licenses was growing. We worked about two years on IBM. The big breakthrough was in 1986 when IBM signed a license for PostScript.

Geschke: Within a month, we signed with Hewlett-Packard.

Warnock: Once IBM signed, Hewlett-Packard said, "Well, we sort of have to sign."

Grad: What group at IBM were you working with?

Warnock: Out of Boulder.

Grad: Oh, with the printer people.

Warnock: Yes.

Font Licensing

Butler Lampson: What about the font business?

Crews: We licensed the fonts from Mergenthaler and ITC. Originally, the licensing or the font fee that people were used to in the industry paying was like \$35 a face. We convinced them that the volume of our opportunity was much higher than they had in the past, so that fee was not acceptable.

Warnock: We negotiated good deals.

Crews: A very good deal.

Grad: How far down did you go?

Warnock: Boy, I can't remember.

Crews: A dollar.

Warnock: A dollar?

Crews: Yes, a dollar.

Grad: That's a good negotiation. I want her to negotiate for me next time.

Warnock: The font revenue was not significant.

Crews: No, but it was important because we built into that first printer, the LaserWriter, those 35 faces, and we've always paid royalties for the use of those typefaces. So that was \$35.
<laughs>

Product Expansion

Thomas Haigh: I think the general perception is that as laser printers became less expensive into the late 1980s and the 1990s that PostScript became too expensive as a chunk of the overall cost to be viable on lower-end printers. Do you think that's true, or is it just an excuse? Also, did you ever consider a different model where you would have gone for a larger percentage of the base and a lower cost?

Warnock: Well, 100 percent of Adobe's resources were devoted to OEMs and building the printer business. In the 1986 timeframe, we said we don't want to be a one product company. Our first foray into the applications business was selling fonts, so we started packaging extra fonts, selling those, and trying to build a distribution channel, which was not terribly successful. Both Chuck and I made the decision that we had to have new products. If we only relied on PostScript, we were going to be a one product company that wouldn't last. We started the development of Illustrator in about 1985.

We took some of our very best engineers and said, "You are not allowed to work on PostScript. Period. No exceptions. No matter what kind of fire drills they have." We were working on display PostScript at the same time, but we started working on Illustrator. I think it was in 1986 or so that we demoed off of our printer some of the very first Illustrator images, and we announced it in 1987, I believe.

Crews: It was 1988.

Geschke: Yes, it was 1988.

Adobe Applications Division and Photoshop

Warnock: Then we founded what we would call the Applications Division and building. We thought people would very quickly understand the value of Illustrator. The Applications Division grew rather slowly, but more and more resources went into it. We started acquiring some other products, and a lot of them weren't terribly effective.

Geschke: But one was. Photoshop.

Warnock: In 1989, the Knoll brothers came in and they demoed this photo. They came out of Industrial Light & Magic, and they demoed on a Macintosh with 512 Kbytes of memory with this little teeny black and white screen. They demoed this photographic product that they had developed, and Industrial Light & Magic wasn't interested in commercializing it. They had been shopping it around; they shopped it to Apple and to us. You have to remember that then Macintosh was a black and white bitmap display. There were no scanners in the world commercially available.

Geschke: There were, but they were the size of a refrigerator.

Warnock: There were Scitex machines and things like that. They were very high end. The maximum hard drive you could buy for a Mac at that time was 20 Mbytes. No memory. I took a leap of faith and said, "We're going to license this because memory's going to get cheaper, and machines are going to get bigger." There were no digital cameras, but digital cameras would eventually come along.

They started building Photoshop for the Mac and rearchitecting it so it could be ported. I said, "Maybe we'll sell 200 copies a year."

Grad: You considered Photoshop part of the desktop publishing world.

Warnock: Oh, yes.

Grad: Tell me why.

Warnock: Well, because photographs are a part of our life. I firmly believed that the digital cameras were coming and that film was going to go away.

Geschke: I used to go to Kodak on a regular basis and describe to them the fact that those little, yellow boxes were going to become obsolete. They said, "No. Film will be forever what people want for the high-quality output."

Then I went to Japan and talked to Fuji, which was the number two supplier of film. They listened and said, "Ah, Chuck-san. We understand." And they started building digital cameras.

Grad: I didn't realize it was that early.

Geschke: Yes. That was in the very early 1990s.

Warnock: Apple came out with a sort of mini, weak digital camera, but it was useful. We didn't fully appreciate Photoshop. Even though we knew that this was going to eventually happen, we did not anticipate the memory explosion at the pace that it exploded, the fact that the prices of memory came down and the price of digital cameras came down and everything. The cool thing about Photoshop was that because the Knoll brothers worked at Industrial Light & Magic, they had architected it where it had an absolutely superb virtual memory management system, so they could deal with large images.

We licensed it and paid them a royalty.

Geschke: We eventually bought them out.

Warnock: I'll tell you that story. The Knoll brothers were getting millions of dollars for the licensing of Photoshop. In 2003, they thought, "Gee, this is going to taper off, and we're not going to do this." So, Bruce Chizen, who was the CEO at that time, bought it for \$65 million, which was the best deal we ever made.

Pushback against Product Diversification within Abode

Haigh: Did you go in that direction because you had the revenue from PostScript to underwrite those other developments?

Warnock: PostScript was our main source of revenue, but companies don't succeed on one product. You have to diversify; you have to invent all the time, continuously invent and reinvent yourself as a company. Microsoft was never going to live forever on Windows. In the technology business, you have to move with the technology.

Grad: One of the interesting things we've always said was that in the software business the worst thing that could happen to companies was to be successful with their first product because then they thought they knew what the hell they were doing.

Warnock: Yes.

Grad: And most of them never got a second product out the door.

Warnock: It's very tempting. We were growing at 100 percent in the PostScript business. Every brain cycle went into PostScript.

Geschke: The people in sales and marketing and on the PostScript side of our business complained continuously to John and me. Why were we spending money on this barely

profitable applications business? That's the job in leadership. If you're going to be successful, you have to tell them, "Hell, no, we're going to do this because it's the right thing to do for the company."

Lampson: I would have thought it would have been crystal clear that PostScript is a wasting asset. The 70 clones, most of them were probably crap initially, but some of them would get better and the price was bound to go down, even if the volume went up.

Geschke: That was the scariest thing.

Lampson: That seemed kind of obvious, and you say that wasn't clear to your PostScript side of the house.

Warnock: No, it wasn't. It was clear to us, but it wasn't particularly clear to the board of directors. They pushed back on the applications business. We didn't make money in the applications business until 2000 or something.

Geschke: No, we made money in the mid-1990s.

Development of Acrobat and PDFs

Warnock: The thing is that you have to continuously look at the future, and you have to invest in it. The most telling of these stories is the Acrobat story. In 1990 or 1991, the machines were getting to be capable. The CPUs were getting faster. The displays were getting good. Color was becoming a reality. Bit Maps for larger displays were good. We had taken the PostScript code, and we had ported it to the next machine, so we had it operating on the computers. The rendering of PostScript was getting faster and faster, and the image quality was getting better. We had announced ATM (Adobe Type Manager, which solved the font problem for the screen, so we could render documents on the screen out of PostScript relatively rapidly. People approached me and said, "Well, why isn't PostScript an interchange machine where you send PostScript files around?" People were starting to send PostScript files around wide area networks and local area networks. But it's basically a bad idea to have a programming language as a carrier around a network. Would you agree with that?

Lampson: Totally. It's okay as long as it's sufficiently circumscribed, but PostScript is not circumscribed.

Warnock: So that's a bad idea. If you want to ship a document around, you really want to have page independence in the representation. I described the trick yesterday where you can change PostScript to flatten out the display list so that it is totally linear; the pages are

independent, it has no programming interface whatsoever. It is really a cool representation, because every PostScript file can get turned into a PDF file. We had two engineers, who I would call quick and dirty programmers, build a proof of concept. They built the first implementation, and we started showing it to people.

In the early 1990s, nobody got it. They just didn't understand. You would show somebody, and they'd say, "What would I use this for? Why do I want to send a document around a network? What a dumb idea." We'd talk to all the consulting people, and they would say, "Why don't you send Word files or Lotus 1-2-3 files? Why don't you send the various application files?" They weren't realistic because there were no implementations across platforms that worked worth a damn. Even Word files can't really work very well across platforms.

Lampson: You might have tried the tactic, "Do you use interoffice mail?"

Warnock: Yes.

Lampson: Then say, "Don't you think it would be nice to have a computer in it. Remember you tried that and it didn't work."

Warnock: No. People didn't really understand it.

Lampson: That's really interesting.

Warnock: Mind boggling. Then I said, "Okay, first of all, this quick and dirty implementation is not going to fly." We got Peter Hibberd, Richard Cohn, and Ed Taft to design the PDF file architecture. I said, "Here's the property. The thing has to be extensible. It has to be architecturally really sound and robust. It has to handle all media types. You have to be able to eventually carve it apart and do more things with it. This thing has to be extensible from a file architecture point of view and from the point of view that you can get to any page instantly and render it instantly." They built the spec for the PDF and implemented it. They were a completely separate team. Not the first team that did it, but a completely separate team. Built by our best architects. We announced in 1993.

Geschke: June 1993.

Warnock: PDF took off very, very slowly.

Geschke: I'd say we introduced it to a big yawn.

Warnock: The board actually thought we ought to kill it.

Business Model for Adobe Software

Lampson: Talk about the business model for Acrobat, for PDF.

Warnock: When we started out, we were charging for the reader, but within microseconds, we decided that that was a bad idea. So, we made the reader free. All of the software that produced it, PageMaker and everything else, we made money off of, but the reader was free.

Jonathan Seybold: It seems to me, when you were selling it to us, one of the big advantages was what you did with the fonts.

Warnock: Yes. You could subset fonts and the fonts travelled with the document.

Grad: You guys went into so many businesses. What did you mean by an application?

Warnock: Photoshop is an application, Illustrator is an application, and PageMaker is an application. FrameMaker is an application.

Grad: In all those cases, you were selling the software.

Warnock: In the applications business, we were licensing the use of the software.

Grad: To an end user.

Warnock: That's right.

Geschke: And the medium was on a disk.

Warnock: Users thought they were buying our software.

Geschke: I know they thought that, but they weren't.

Brock: Just as they do for any other application.

Grad: How were you licensing it?

Warnock: Well, you buy a package for Photoshop, and that's a license to use that package.

Grad: Was that a one-time thing? Was there an annual fee?

Warnock: It was a one-time thing. Just a few years ago, we switched to a subscription model.

Grad: You did make that change, but that was in the 2000s.

Warnock: We were one of the very first companies to make that change, and we had enough control over the graphic arts industry where we could do it.

Grad: Did you look at any of the other software companies in terms of how they priced their initial offering and their maintenance support?

Warnock: Yes, constantly.

Grad: Not just your competitors. In other areas as well?

Warnock: Yes.

Lampson: So, you studied Oracle's maintenance strategy?

Geschke: And we dismissed it.

Warnock: Quark and everybody else.

Grad: I guess my point is that most of the software companies had an initial licensing fee and then an annual maintenance fee that was running about 15 percent.

Warnock: Frame software.

Lampson: Not in this world.

Grad: No, they did in some of the others.

Warnock: Not in this world.

Geschke: No one in the PC World.

Grad: You considered this a PC license?

Geschke: It was.

Geschke: It only ran on two operating systems: Apple and Windows.

Brock: It's a completely different universe from the one you came out of.

Grad: Of course, the pricing models were so different when we moved from mainframes to minis and then down to the others, to a very different model.

Transition to Application Revenue Streams

Warnock: When Acrobat was announced, it was really useful on wide area networks and local area networks for within corporations and within industrial settings. It had a lot of appeal there. In 1994, the internet exploded. It sort of went, "Vroom." It turns out that people do understand that it's really useful to be able to store documents on the internet and to pass them around, ship them with email, and do all of those things. This was the thing that just sort of flipped the switch.

Grad: Let me use the year 2000 as a break point. What were your principle revenue sources at that point in time?

Geschke: Acrobat. Our applications.

Warnock: Photoshop.

Geschke: PostScript was probably what then? A \$300 million business?

Warnock: No, it only got to \$200 million.

Grad: Your starter thing that justified the company was no longer what was carrying the company later on.

Warnock: Oh, no.

Geschke: Of course. That's almost always true.

Brock: Look at Microsoft. Basic was what got it started, but it wasn't what was carrying it even 10 years later.

Warnock: The massive amount of revenue was really the applications business. Later on, we diversified and reinvented the company again.

Management Structure in the Late 1990s

Grad: The two of you were co-managers, correct?

Warnock: Yes.

Grad: Did you split your roles? Was one of you technology, and the other business, or vice versa?

Warnock: Mostly, we both participated in all aspects of it.

Grad: You didn't bifurcate.

Geschke: I did. Over time I did a lot more of the traveling internationally and selling and marketing. John tended to stay more focused on technology and things of that kind. But we both were interchangeable, which meant that we could lead a normal life.

Grad: You're bringing in operations management and so forth to help you, I assume.

Warnock: Yes.

Geschke: Oh, yes.

Grad: When?

Warnock: Well, there were other principles that were going on. Other than treat people the way you would like to be treated, we have always hated political infrastructures. In other words, it was very important that every group was transparent, that people traded ideas and technologies, that there became no power fiefdoms. We hired a set of managers, and they all thought we were going to retire. They all took their jobs believing that they were probably going to be the next CEO or something. So, we had a head of finance. We had a head of marketing. We had a head of products. We had a head of sales.

In 1998, the company started to stagnate. The growth rate had almost disappeared in the applications division. It was still growing, but the stock was sort of suffering. We had a set of five senior executives that just didn't work together. They were constantly making power centers

Geschke: They were undercutting one another.

Warnock: They weren't communicating, and nobody was acting as part of a team. The company was clearly suffering because of it. The atmosphere was toxic. Chuck and I met I think in July.

Geschke: August.

Warnock: In August, we sat down and said, "What are we going to do about this?" We went down through the senior executives and said, "Is there anybody we can fire that will fix the situation? Is there any bad guy among them that if we fire him, it'll be okay?" We concluded there wasn't, so we fired them all. We fired the entire executive staff in the fall of 1998.

Geschke: Then we did what we should have done from the beginning. We really began grooming a specific individual that we wanted, who had been with the company for five, six years, and gave him the chance to develop and grow so that he could become the next CEO.

Grad: In other words, the original five you had had all come from the outside.

Warnock: Yes.

Geschke: Right.

Grad: Then you decided to go to internal growth. And?

Geschke: What a bad idea.

Grad: It failed, I can obviously see. <laughs>

Warnock: Well, it did.

Takeover Attempt from Quark

Warnock: The other thing we did is we changed our attitude toward Wall Street. We had never forecasted any revenues in any quarter ever. We were incredibly conservative about what we did. So, I got up in front of the financial group, and we worked this out with Bruce Chizen, who had taken over products. We said, "Okay. Here's going to be our revenue growth over the next year. We're going to put those stakes in the ground, and we're going to hit every one of them." <laughs> This is high risk business. We set down a plan, and we hit every number.

Geschke: Then we got either a piece of mail or phone call, I don't exactly remember, from a company called Quark.

They saw what had happened. Our stock had taken a tremendous hit because in addition to all the internal management problems, for some reason, Japan had a horrific quarter, and they were about 20 percent of our business. Our stock tumbled badly. So, our friends at Quark said, "We'd like to do a tender offer and take you over."

Well, I'm sure most of you in this room have dealt with Quark. They're a somewhat belligerent company, to put it the polite way.

Warnock: Paul Brainerd can speak to that.

Geschke: Yes. There was no way we were going to let that happen. In addition to what John had done initially, I went out on Wall Street and I talked to every major shareholder and I explained, "This is how we're going to fix this. There's no way you should be even thinking about the possibility of letting this company take us over." From the people that came with part of the Aldus acquisition, we had a development group up in Seattle that was working on a whole new way to think about how to do page layout. We said, "Okay. We normally never compete with another company directly. We do our own thing and it's always new. Here's a case where maybe we need to compete."

Within a year, at an Apple conference we introduced InDesign, and before long, we had the lion's share of that business. That was a painful time.

Grad: It sounds like a very difficult period you went through. Did it affect you personally, emotionally, in terms of confidence in yourself, that sort of thing?

Warnock: I think it brought out the vicious tiger in me. I was not going to have this. Personally, I was not going to let the likes of Quark take over, and we were not going to fail.

Geschke: I was a lion and he was a tiger.

Grad: You really went through a hostile takeover battle then.

Warnock: Yes.

Grad: I was involved with Sterling Software when they took over Informatics. They were both my clients, and that was the first hostile takeover in the industry. This was 1982 or so. Sterling won. They were one-eighth of the size of Informatics, but Informatics did not do what

you were capable of doing. Apparently, the investors had enough confidence in you to back you instead of forcing you to sell.

Warnock: Because we had put the stakes in the ground, because we said, "Here's how we are going to execute," they had enough track record with us that they said, "Okay." Essentially, we hit all the milestones and profit targets and the stock recovered. We had developed the infrastructure to build applications that was really a machine.

Adobe InDesign Development

Matthew Kirschenbaum: I would like to hear a little bit more about the story of InDesign. Was it all developed in-house?

Warnock: Yes.

Kirschenbaum: Anything else you could share that was memorable about that? How big a team was working on it? How long did it take?

Warnock: It was the ex-PageMaker team and researchers. After acquiring all this, we merged those programs so that they used CoreTech, and they used all the imaging models internal to Adobe. They used their object-level concept of documents, and they were really good engineers. They built a really extensible infrastructure for InDesign that was a really good product.

Naming the Company Adobe

Donald Knuth: Why did you name the company Adobe?

Geschke: Every name we applied for, somebody already had.

Warnock: In California, it's really tough. <laughs>

Knuth: Oh, I see.

Geschke: One day I was at home, and I noticed my wife was looking up some directions and there was a map of Los Altos sitting there. I remembered that at PARC, when we named a new project, we'd literally throw a dart at the wall where there was a map of California. Whatever it came close to was the name of the project. I said, "Boy, that creek goes nearby John's house." It wasn't too far from our house. "Adobe Creek."

Warnock: Adobe System.

Geschke: Adobe.

Knuth: Also, this morning as I came here, I passed by your old office, which is now Google.

Geschke: Yes.

Knuth: In front of it is this Thinking Man sculpture. Is it true that you had something to do with that?

Geschke: No.

Warnock: It came with the building. And the building is a teeny part of Google. <laughs>

Cofounders' Role in Product Development

Knuth: You mentioned Ed Taft. I was just wondering how much actual programming you did after founding the company instead of managing. Did you keep looking at code? How long did that last?

Warnock: I've always programmed but I've never done so at Adobe, I didn't directly participate in programming.

Geschke: I was the C programmer. I was one of the half dozen people working on the implementation, and my job was to do the font cache because you couldn't generate the characters on the fly and maintain performance. You had to remember the characters that you had already scan converted and set up a cache memory for them.

Grad: You wrote that in C?

Geschke: Yes.

Grad: And does that code still survive?

Geschke: I think it probably does.

Warnock: I wrote all of the test programs for PostScript. In other words, all the PostScript code that would test the PostScript engine.

Adobe's Influence in the Graphic Design Industry

Knuth: It seems to me one of the key things that happened that hadn't been mentioned involves the graphic arts industry as opposed to the printing industry, where you developed a really solid reputation among the designers, the artists themselves. In order to make Illustrator work, this was something that became part of every graphic artist's education. I know at some point you hired Russell Brown, who had a lot of credibility.

Crews: We hired him very early.

Knuth: Can you describe something about that, about going into the art world and building a reputation among the top designers of the industry?

Warnock: The basic architecture of Illustrator was a combination of me and Michael Schuster. Mike Schuster was the programmer.

Knuth: Wasn't there a Steve Schiller?

Warnock: Yes. The teams got much larger over the years, but it was essentially under my guidance that Mike Schuster built the code for Illustrator. It was sort of under his direction from an architecture point of view that the Acrobat code was built. Ed Taft, Peter Hibbard, and Richard Cohn were the ones down under. By the way, Acrobat is Adobe's single largest product in terms of revenue.

Crews: I think Don's asking how we succeeded in getting the application into the graphic arts world. We hired originally some very talented graphic artists, and they adopted the tools very quickly. We went out to show everybody what we were doing. For example, I said, "If you can win every composition award or whatever, I'll pay for an entry, so get out there and show them what we can do."

Warnock: We've gotten awards from the Rochester Institute of Technology (RIT) and all of the graphic art schools.

Crews: We just put ourselves out there, showing people what the quality could be done in typography and in graphic design.

Brock: What was the competition for Illustrator?

Warnock: Just CorelDRAW for a while, but not really.

Dave Walden: That's what I thought.

Core Technology

Hansen Hsu: Regarding the consolidation in the creative content applications industry, can you talk about the acquisition of Aldus and the acquisition of Macromedia? I would also like to know about the transition on the Macintosh from the classic operating system to OS 10, both from the perspective of core graphics and cores being based on PDF. And can you talk about the task that you had porting your application suite from classic to OS 10?

Warnock: We built Illustrator for the Mac; we didn't build it for Windows because Windows didn't have enough address space to do it effectively. But we knew that in spite of the desires of Steve Jobs, that we wanted all of our applications to run on as many platforms as was practical. So, very, very early in the building of Illustrator and the building of all of our software, we built a layer called Core Technology. The Core Technology layer is essentially the thing that takes the interface between our applications and then interfaces to the operating system. We abstracted out of the operating system so that when we build a piece of code in an application like Photoshop, it interfaces to Core Technology, and Core Technology takes the job of interfacing to the various operating systems. There aren't multiple teams that are building the Mac version and building the PC version. That saves a huge amount of work. All of the font technology and all of the graphics technology and all of that stuff sort of live in part of the Core Technology.

There was also another thing we did. We unified all of the user interfaces. There's a basic philosophy in PageMaker, Illustrator, and Photoshop of how you do a user interface, and all of those are essentially the same. They've been rationalized over the versions that we've implemented. That also saves a ton of money. It also saves a lot of hassle for the users because the users have consistent user interfaces. As we get into the cloud, we're abstracting the clouds so that we can use Amazon Cloud or Microsoft Cloud or anybody's cloud and have basic system software that will interface to any of those. Because the economics of the cloud world change.

Grad: Once again, we're getting into the 2000s, not the 1980s anymore.

Warnock: But the whole idea is that in the software business, applications don't stand alone.

Mergers & Acquisitions

Grad: Tell an acquisition story. Besides Aldus, what was your next biggest acquisition in the 1990s?

Warnock: Macromedia. And a lot of little companies.

Grad: How did you find them? What did you do?

Warnock: We'd just acquire the company and the software and then integrate it into the mix.

Grad: Did you buy the company?

Geschke: We would see these people show up at the Seybold conference and start showing what they were doing. If it looked interesting and related to what we were doing, we'd get to know them better and make a decision.

Grad: Did you buy the company, or license the software?

Geschke: Mostly bought the company. Hired the people. Gave them stock.

Grad: Do you use an M&A (mergers and acquisitions) firm?

Geschke: Frank Quattrone was the primary one, but not the only one.

Grad: You didn't use Broadview, who was the primary one in the software company business. What kind of deals did you cut? You gave cash, stock?

Warnock: Some of both, but mostly cash.

Grad: Did you mostly keep the people who were running the company?

Warnock: For a period of time. Most CEOs don't like to work for other people. That's why they go somewhere else.

Geschke: We made sure the really talented engineers got very good stock options. That's what kept them, the options.

Grad: If you bought a company with 20 people, how many did you keep on?

Warnock: Most of them.

Grad: Would you keep the accounting people and others?

Warnock: No.

Geschke: Unless there was a fit.

Adobe Flash and the Apple App Store

Haigh: How do you feel about Flash.

Warnock: We have obviously enormously mixed feelings about Flash. Flash came with Macromedia. Flash was never architected to be on the internet, and that's its major problem. But it doesn't justify doing a complete rewrite.

Haigh: Because security's not important.

Warnock: We hope that over time it disappears.

Haigh: What will it be replaced by?

Warnock: Machines are getting faster. Animation software is getting better. There are all kinds of things.

Grad: Is it a significant revenue producer?

Warnock: No.

Geschke: No, it never was. The reason Steve was so upset had nothing to do really with the technology; it had to do with the fact that he wanted everything that went through the App Store to be fundamentally Apple.

Warnock: That's an important story. With the phones, Apple wanted all applications to get a tax on them to go through the App Store.

Geschke: Thirty percent.

Grad: What year are we talking about?

Warnock: 2006—2007. The story is that with Flash you could get onto an iPhone without going through the App Store. That was economically a pariah to Steve.

Geschke: He was not happy with that.

Change in Management

Grad: Eventually, you retired or changed your roles from active management to being on the board or chair of the board. When did that happen?

Warnock: Me in 2003, Chuck in 2002.

Grad: During the whole period we were talking about, you were still actively managing and running the company?

Warnock: Yes. Absolutely.

Geschke: John and I always paid ourselves the same and got the same stock options. There was never any reason for a division between the two of us. That was important.

Grad: You've been working together now for almost 40 years?

Geschke: Yes.

Grad: I think we'd agreed it was 39 last night. That's a tremendous relationship.

Geschke: We never parted company at the end of a day of work in anger.

Grad: You had such strong principles, and they seem to have dominated a great deal of how you ran the company, in terms of the people, how you treated the environmental things, and so forth. The only other company that I know of that was like that was SAS with Mr. Goodknight. He has a company with very much the same kind of principles, except he's a dictator, which you guys weren't.

Geschke: No.

Warnock: We are not that.