Oral History of Richard (Dick) Bayles

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Recorded: June 1, 2009
Mountain View, California

CHM Reference number: X5384.2009

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Richard Bayles

Conducted by Software Industry Special Interest Group

Abstract: Richard (Dick) Bayles reviews his extremely varied career from his first experiences with computers at Project Mac at MIT and his work at Lincoln Labs. He then joined the start up of what became National CSS, a major timesharing company. He was a jack of all trades at NCSS, from heading up program development, and building new data center facilities, to even becoming the Controller of the company. After NCSS was sold to Dun & Bradstreet, he developed SalesNet and then left D&B to join Alan Brigish in another start up called Videolog. When that was sold to Schweber Electronics, he became a consultant at Capital Cities/ABC working on a number of projects there until it was reorganized and he then worked for Fairchild Publications which was part of Disney. When he left Disney, he continued to work on various new projects on an opportunistic basis.

Chris McDonald: This oral history interview of Richard Bayles is being conducted on June 1st, 2009, at the Computer History Museum in Mountain View, California. This interview is part of a series of oral histories sponsored by the Software Industry Special Interest Group, which is part of the Computer History Museum. I am Chris McDonald and I'll be interviewing Richard Bayles. We normally start all these interviews with some personal history, so tell us where you were born and a little bit about your parents as a start.

Richard Bayles: My father was a naval engineer during World War II at the Philadelphia Navy Yard and I was born in Philadelphia. My parents moved half way between two small towns in Pennsylvania, about 50 miles east of Pittsburgh between Greensburg and Jeannette. My first five years of school were in a two-room school house, two rows per grade, six grades. Half way through the fifth grade we moved to Atlanta where I was assigned to a school of 1200, which was a little unnerving. We stayed there for two years and then moved to New Orleans where I went to junior high school and high school and I went off to MIT in the fall of 1959, with no clear understanding of what field I was going to be in. I thought it might be mathematics, astronomy, or chemistry.

Education and Project Mac

McDonald: Was your father a college graduate?

Bayles: He had to drop out. He was three years at Brooklyn Polytechnic, but he had to drop out during the depression. So he never actually got a degree. My mother had no college at all. So after fiddling around at MIT for a year, I'd pretty much concluded that I was going to be an organic chemist.

McDonald: How did you come to that conclusion?

Bayles: Chemistry was the only part of MIT that I enjoyed except for working. I went down the organic chemistry track instead of mathematics. I took an elementary "number theory" course as a freshman elective, which convinced me that I was never going to me a mathematician, at least not in that style. Midway through my sophomore year I ended up getting married and started working about a third of the time in the admissions office. And that lasted through the summer and in the fall of 1961 I essentially needed to work 40 hours a week. The highest paying job on campus was keypunching for $1.95 an hour, which back in 1961 wasn't so bad. So I did keypunching work for three or four months. I ended up paying more attention to the programming, though I had no programming background whatsoever.

McDonald: This was your first exposure to computers.

Bayles: Yes. It was an IBM 704 which is the size of this whole floor probably. I ended up paying more attention to the programming - key punching is not a very imaginative thing. I started looking at the output I was handling for an MIT Sloan school professor and he had me key punching some programs.

McDonald: This was being fed into the computation center?

Bayles: It was all punch cards. You put them in a bin and then went back the next day to pick up the print out. Ended up reading the printouts of what was FORTRAN. One of the outputs for the FORTRAN complier was assembly code. It showed you what it turned the program into. So I started studying that on the way home on the subway. The next job, which was essentially full time, was working for the registrar's office with what were then electronic accounting machines. No computer. It was all punch cards, printers, collators, sorters. I worked there for probably four months. Here's an interesting anecdote. There were a couple of students who were working there with me and there was some full time staff. We used to have a contest. The IBM 407 was essentially a giant printer with a control board that looks something like a plug board that you wired. The contest was: Here is the application. Who could do it the most efficiently? So one question is how do you measure efficiency? Well, we measured it by the weight of the board. So you started out with an empty board and then the fewer wires or the shorter wires you used the less the board would weigh and that would designate the winner of that contest. It was an interesting time.

McDonald: Sounds like it.

Bayles: Then, still not doing any programming at that point, I went to work for the mechanical engineering department.

McDonald: At this point where you still an MIT student?

Bayles: Yes, I was a full time student. I got out in four years, which is hard to do these days in any college, based on my kids' experience. I was working full time and going to school full time. The department of mechanical engineering had a couple of government contracts, one of which was studying the propagation of stress factors in solid rocket fuel. Once a crack started because of a vibration, we were modeling what happened based on the properties of the solid rocket fuel itself: how the cracks would propagate. And another one I used to work on was the Mariner One Flyby Mission. By then I was programming in MAD, Michigan's version of FORTRAN. It was a slightly jazzed up version of FORTRAN with symbolic labels and some other odds and ends. When those two projects ended, I was hired under a DARPA - Defense Advanced Research Project Agency --contract, to work on computer-aided-design. This was the summer of my junior and then senior year.

McDonald: Now this was part of Project Mac?

Bayles: It wasn't yet. I spent probably six months before I went over to Project Mac working on an old IBM 709. At this point it was computer time from 2:00 in the morning until 6:00 in the morning. That kind of stuff was convenient for me since I was going to school. That was through the middle of my senior year. And then they moved that work to Project Mac. I was continuing to work initially for the ME department under the DARPA contract but working at Project Mac on a computer aided design console that was hooked into the CTSS [The Compatible Time-Sharing System] time sharing system.

McDonald: You had an oscilloscope or a CRT?

Bayles: A CRT and it was a custom-made machine. I was doing the supervisor side coding of that machine. In CTSS there was an A side and a B side. The B side was the user side and the A side was the operating system side, basically. And I was coding on the A side, still using the editors and such on the B side. I don't think that we had email back then. This was 1962. It turns out basically all of my programming background was self-taught, looking at other people's work, experimenting, reading manuals. I ended up taking one programming course in my senior year because I needed an overload of hours to graduate in four years and they had one programming course where I happened to know the instructors because I'd

worked with them. So I got what was in MIT's parlance 12 hours of credit, which was enough to get me over the hours required for graduation.

McDonald: So at this point were you still thinking that chemistry was something you were interested in or was it just something that you were stuck with?

Bayles: Chemistry was something I couldn't switch. I had to do a thesis in organic chemistry. I tried to find somebody in the chemistry department who was interested in some aspect of organic synthesis that would involve computers either for modeling or something. But I could not find anybody who was interested in the professor staff. So I ended up having to do a classic lab organic synthesis project. I got out with an organic chemistry degree and basically never looked back. I haven't touched a test tube since 1963. Without a PhD in the physical sciences there is no work. You can wash test tubes: that would be about it.

By then I was really enjoying programming, I was doing well at it. I was working full time. So I stayed at Project Mac from 1963 to 1965. Initially on the computer design effort and then Project Mac made the decision to go to a GE 645 Multics System [Multiplexed Information and Computing Service], sometime probably in early 1964. I got involved in programming disc drum strategy models for Multics. There was no physical machine there at the time. It was just essentially programming without a chance to put it on anything yet. Well, IBM approached me in late winter of 1964 and talked about a virtual machine project which was a 360/40 specially modified for relocation. So I joined a team of, at that time it was probably three people. Yes, there were three other programmers on CP-40.

IBM Cambridge Scientific Center

McDonald: So let's talk a bit about--this is the Cambridge Scientific Center right?

Bayles: This is the Cambridge Scientific Center, which when I joined was originally called the Cambridge Systems Research and Development Center, but they changed the name.

McDonald: Can you tell us a little bit about the origins? Do you know where this came from?

Bayles: Where the Scientific Center came from?

McDonald: Yes.

Bayles: Herman Goldstine's title wasn't Chief Scientist but he had a long history in the computer field. He talked IBM into sponsoring scientific centers at what they considered key educational sites: Stanford, Palo Alto, one another in Grenoble, in France. I'm trying to think of

where else in the states [editor's note: there were other IBM Scientific Centers located in: Los Angeles (UCLA); Austin, TX (University of Texas); Chicago (University of Chicago). The idea was that in almost all of these places IBM had essentially donated a machine to the computation centers. All the machines that I had at MIT except for PDP stuff, which was a different animal, were all donated. It was donated by IBM in an effort, and I think a successful effort, to promote getting a cadre of people coming out of these schools who were IBM oriented. So that started probably in the Cambridge Scientific Center; it was founded in probably 1962 or 1963, because they were involved in trying to convince IBM to produce a relocation version of the System/360 that could compete with the GE proposal. And by the time IBM finally managed to do that it was too late [at MIT].

McDonald: So the time that you were recruited to the Scientific Center they were already working on CP-40. It was an ongoing project?

Bayles: We didn't have a machine. In fact, during the first summer, I had to learn the System/360 first of all. The instruction sets were completely different; it was a byte machine not a word machine; completely different from the 7000 series equipment that I was familiar with. But what we basically had to do was build the virtual machine concept. There were two virtual machine projects at IBM. And the earlier one was the 7044X, which was at the IBM Research Lab in Yorktown Heights. It was meant to be a time sharing machine. But the virtual machine there was not the same as the physical machine. It didn't mirror a physical machine. The idea at the Scientific Center was to provide a multiple user machine where the each individual user had the real physical full instruction set and everything else of a standalone machine.

McDonald: Right. Was this was the original reason for creating this CP-40?

Bayles: Well there's a slight difference of opinion on that.

McDonald: Okay, what's your opinion?

Bayles: My opinion is the justification for doing it was to be able to measure performance of operating systems. I think that was a smoke screen. The TSS [Time Sharing System] project for the 360/67 was the official IBM product which I don't' think was ever successfully installed. I'm not sure. It was a disaster. So, I don't know if it was in something Norm Rasmussen said or Bob Creasy said, those were the two key architects of the Cambridge project. Norm was the Center Manager and Bob Creasy was an ex Project Mac guy who joined the Scientific Center. In my mind it was all a ruse to build a multi-user relocating 360. It was never going to be used to measure operating systems.

McDonald: So they just used that excuse so that they wouldn't be shut down?

Bayles: They did that to not get the camel's nose under the tent, so the Systems Development Division, SDD, wouldn't come after them with pitch forks and whatever. The Scientific Centers operated under what was the Data Processing Division, which was the sales division. The DP division was the sales operation at IBM back in the early 1960s and we were buried under that. So we were essentially invisible for a long time from the SDD people. And we got enough money so we could essentially pay to have the 360/40 in part re-micro coded, to provide dynamic address translation.

McDonald: Just to back up, the scientific centers were underneath sales because they were seen as sort of the marketing department in universities?

Bayles: Yes. Essentially they funded graduate students. Research projects were funneled through the Scientific Center and it was all part of the effort to make sure their people were coming out of key universities with an IBM background. And sometimes you had to blow smoke. There were a couple of others we worked very closely with at the time including Nicholas Negroponte. He became head of the MIT Media Lab. He was a graduate student who worked in the same place as I did. He had an office next door, and he was working on computer aided design graphics, computer aided architecture - that kind of stuff. He was an architectural student. I joined the Scientific Center in March or April of 1965. We had no physical machine of any type - not even a real Model 40, forget the modified Model 40. And we set out essentially programming blind. I mean programming without a real live machine to test with for three or four months. The machine was being re-micro coded at the Boardman Labs in Poughkeepsie [New York] and Les Colman, Bob Adair and I were the three CP people; we were ignoring CMS for the moment. Bob Adair and I went to Boardman Labs three times a month to essentially try to shake the machine down. We would come down at four in the morning. We had to take apart the Model 40. The micro code in the Model 40 at the time was Mylar strips the size of punch cards. And the way you programmed them was by punching codes in these Mylar strips. They came in a big stack and you peeled them off. You had to find the right things to fix, either patch a hole or punch a hole in order to get the machine to work correctly. So we did that for probably three or four months. We took delivery of the modified 40, probably in the fall of 1965. And had it running from a control program called CP; and two or three months later it was up and running. Now a parallel effort was CMS which was the Cambridge Monitor System.

McDonald: And this was also part of the Scientific Center?

Bayles: It was part of the Scientific Center. They had a staff of about three or four or five people who were doing the user side of things. Most had come out of project Mac which was the time sharing operation on the 7000 series. And they were essentially emulating a lot of the functionality that the users saw from the user interface point of view.

McDonald: Onto IBM machines. They were emulating it on?

Bayles: On the Model 40. Now they could test their software because they could get test time on the Model 40 in the branch office since their whole design concept was that their machine was a one user system that ran on an unmodified Model 40. And only the control program underneath it replicated the functionality. They had something up and running probably by the fall of 1965. Then IBM came out with the relocating 360/67, which was a modified 65.

IBM CP/67 Project

McDonald: But at this point-- at what point did it become where the two projects started to sort of talk to one another and become one?

Bayles: Well we were always right next to each other. I ended up writing the editor because their proposal was for an editor which was line number editing. I said, "We can't do this. This is awful. This is three steps back." So over a weekend I wrote the basic editor and I probably debugged it for another two or three days. And so that editor became the editor. So that was one cross over thing that we did. When IBM announced the 67 and the TSS/360, which was the time sharing thing, Lincoln Labs probably got the first 67 in, I'm guessing it was the fall of 1966. And by then what we had done is we had programmed a part of the control program CP-40 to look like the 67 so we could run 67 code on CP-40. And this was a clear case in my mind, this is not measuring operating systems, this is time-sharing. TSS/360 is a disaster. So let's go ahead and build it. It wasn't my decision, it was Norman Rasmussen's. Bob Creasy had left at that point. So we essentially stopped work on the CP-40 except for what was required to emulate the 67 and put together a team to essentially rewrite CP-40; although certain portions were actually transferred, but largely we rewrote CP-67, which became VM/370. We started that project in maybe the second quarter of 1966. Again, we had no machine to test on and I don't think that SDD knew that we were doing this; otherwise they might have stopped it. They found out after Lincoln [Labs] became our first customer, if you want to call it a customer. They were part of MIT. The TSS people had an early machine. The TSS/360 people were there and the Lincoln Lab management was not at all happy with the way that was going. So, one version of the story is that Lincoln Labs actually talked to Rasmussen and convinced him to do the 67 work. Or he put together people from IBM UK, Grenoble, myself and Union Carbide, which is another whole story.

McDonald: So at this point it became a much larger project?

Bayles: Yes. But we still probably had no more than five people on the CP/67.

McDonald: Okay.

Bayles: I'm a big believer that big groups tend to build elephants and not race horses. With TSS/360, they weren't building an elephant; they were building, I don't know, maybe a dinosaur. You just you can't build anything like that, I don't think, in my opinion. So I think CMS probably had added two or three people and CP added two or three people and we ended up installing the first version on a 67 at Lincoln Labs probably by early fourth quarter of 1966. Frank Belvin would know a lot more about the time line. And we got it up and running in two days.

McDonald: So at this point, once you had it installed, did any complaints start to come from higher up in management?

Bayles: Yes that's when SDD reared its ugly head. We had audits done. We were trying to sabotage the TSS effort, with Lincoln Labs telling IBM, "Don't fool around with these people because they built something that works." The customers protected us somewhat. Lincoln Labs protected us somewhat from the SDD concerns. They had a machine installed and we installed the software there and by the end of 1966 and early 1967 it was in actual production use in Lincoln. And we shared our code with Lincoln and Lincoln people shared some of their code with us because they had some people working on general user oriented improvements because we hadn't hit performance barriers yet. We would, but we hadn't hit them yet. So there was a lot of user oriented stuff that was done by the crew at Lincoln.

McDonald: So how many users were Lincoln running?

Bayles: I don't honestly know. If I go 10 months later, if I go back to the first CSS [Computer Software Systems] installation, on a 256K machine, which I think is what Lincoln had, this is bytes.

McDonald: Right.

Bayles: We probably still were going to run out of steam at about 20 users, which was ultimately fixed-- and with a lot of work by people at Lincoln and people who came from Lincoln who joined National CSS so a lot of performance tuning that was done by some very sharp people. So my guess is they were probably running 15 or 20 users. They might have had a bigger machine than we did. I don't remember.

McDonald: Were there any assumptions about what kind of scale should be possible?

Bayles: Frankly, no. At least none that I was a party to, anyway. Now whether Jack and Norman had talked about something I don't know. Although I was the project manager for CP/67.

McDonald: So it was just a "whatever it could handle" deal?

Bayles: It was-- whatever it was, was better than whatever else they had. That ended up being the final answer to that. It clearly outdid any other IBM compatible time sharing system on the market. There was only ours on the 67 because TSS I don't think was ever installed anywhere. And so the answer on that is to the best of my knowledge there were no expectations about performance. There were expectations on functionality and reliability but no real expectations on performance, though we ended up having to do a lot of work to get it to a point where it was profitable from a commercial point of view. Ultimately, by the time all the tuning was done, we probably ended up having 70 or 80 users on a 256K 67; as long as you had drum storage, you had some fast paging stuff.

National CSS

McDonald: Well let's talk about how did you transition from the Cambridge Scientific Center to National CSS?

Bayles: Well Dick Orenstein, who will be here tomorrow [at the Timesharing Pioneer meeting], was at Project Mac and had moved to Connecticut.

McDonald: And you knew one another at Project Mac?

Bayles: We were acquainted with one another. We never really worked together. He knew me and I knew him but we were never in the same space, because I was doing computer aided design work at that time probably. Because when they made the Multics decision, he left. I'm not sure really what triggered his leaving to go to Connecticut but he did some consulting work, some programming work in Connecticut. So he heard about this-- probably we'll go into this tomorrow, Perkin-Elmer, which is based in Wilton, Connecticut.- big instrument builder, photo optics builder. They built the Hubble Telescope mirror, the one that didn't work. They had a rudimentary time sharing system, might have been an SDS-930 [editor's note: it was an SDS 9300 coupled to an SDS 930]. And they wanted to put in a bigger time sharing system. They were used to using it for program development. That's what they did: optical programming. So they cast about. They finally decided not to do it, but that triggered Dick Orenstein and Bob Bernard, who were consultants to Perkin-Elmer, to look around for what the art of the possible was. That's how they heard about CP/67. So they called up and we started talking and it really wasn't a long drawn out discussion. They had a time table. We put CP/67 into the IBM Type III library, on May 1, 1968. The Type III library includes programs that were not written by SDD, but were typically applications done by, but not officially supported by, IBM staff. So you couldn't get an IBM Systems Engineer to work on them.

McDonald: At that time where you still at IBM?

Bayles: Yes. I left IBM the day it went into the Type III library. You know already Jack Arnow of Lincoln Labs was looking to do the same thing: that is to start a commercial time sharing service based on CP/67. And he never talked to me, interestingly enough. But I had just gotten divorced, which is frankly the reason I wanted to get out of Massachusetts. So even if Jack had talked to me I probably would have gone with CSS [editors note: The company was called CSS at the time] just to get out of Massachusetts. <laughs>

McDonald: Change states.

Bayles: And so I left. We took two people from Lincoln, I think, later in the year after we had a machine. We took-- one was the contractor for IBM who was working at Lincoln, Bob Jesurum. Hal [Harold F.] Feinleib, worked for Lincoln, had worked for SBC, Service Bureau Corporation, which was a consulting arm of IBM at the time. We didn't take anyone right away from the Scientific Center. Six or eight months later we ended up hiring some people out of the IBM operation and from the MIT Computation Center, incidentally. But originally it was just a guy from RPI, a guy from Dartmouth, myself that's about it, three of us. And Hal joined us by the end of the summer, I think. Hal joined us so we were four. CP/CMS went into the Type III library on May 1 and I left, went to Connecticut.

McDonald: Did it require convincing anyone to get it into Type III? To get the CP/CMS into the Type III library, would that require convincing someone high up?

Bayles: No, essentially it was the decision that the DP Division could make by itself. So the SDD wasn't involved at all. And anybody who used it had to essentially sign a disclaimer saying that this is not official IBM code, don't talk to us about bugs, whatever, System Engineering won't support it.

McDonald: So when you started at National CSS, what was the sort of long range business plan or the vision for the company at that point?

Bayles: Well long range was probably very short range. The first long range plan was getting enough money together to convince IBM to rent us a 67 because IBM wasn't selling machines then, you had to rent them. We had revenue projections and expense projections which needed some serious reevaluation when we got to real performance figures. When we started to add users to the system we had two choices. We had to raise the price or we had to improve performance dramatically. We never raised the price. So all of the ultimate profitability came from improving the performance of the systems to a point where we could sell enough time to make it profitable. The one key distinction between ourselves and IDC, which was Jack

Arnow's company, Interactive Data Corp., is we made a decision early on probably altruistically - I don't ever remember it really being debated. We said we would only charge for time spent in the user's code. Equivalent to being on the 7094 B side, if you will. Time spent by the operating system, by CP, would not be counted, wouldn't be charged, which held our feet to the fire even more in terms of our performance. And we picked a price, which was 40 cents a CPU second. That price stayed forever as far as I know. It might have actually gone down as the 168's came in and anything else, I'm not sure.

McDonald: So at this point in time in the late 1960s there was a lot of talk about computer utilities and this sort of utility concept. Was that something that you guys considered?

Bayles: Computer utilities in what sense?

McDonald: The idea that a time sharing machine would allow you to sell computer power as if it were electricity.

Bayles: Yes, right. Well that's essentially what we were doing. The mousetrap, which is I think what virtually everybody else was doing originally, they were being sold as program development tools. This is my perception at least at the time. What made our mousetrap a little bit better was that we were IBM, we had IBM languages. And IBM had 70 percent of the computing business back then which was primarily mainframe computing business. Now it's probably 10 or 15 percent, but it was about 75 percent or 70 percent of the market share back then. So we felt that providing program development capabilities to an IBM compatible user audience was going to be a good mousetrap. It turns out later on that some applications became very important. The big transaction database applications became substantial, but they were never the largest generator of revenue.

McDonald: At the beginning, in the early years, you were working on technical stuff, on the code?

Bayles: Yes. I probably worked on the code until, well I ended up taking three months off for reasons I can't remember. I don't why they picked me. I had ended up building the computer facility at the Scientific Center when the 360/67 came in. So I ended up building a computer facility at CSS. So I kind of became the de facto facilities person as well as a chief technical person. We decided in the late first quarter of 1969, that if we were going to sell time to users on the West Coast, then we had to have a machine on the West Coast. Communication costs back then were enormous. There were no packet switched networks, none of that. You leased a line from point A to point B. You could have multiple users sharing that line on either a frequency division or time division basis. You could maybe only get 10 users on a line for $3,000 a month and you'd have to have multiple ones. If you were going to service the West Coast from the East Coast you would have to have a huge number of lines.

So we made a decision to build a data center in the West. So I spent four months in California, out of the technical side from an actual hands on programming point of view, building the West Coast Data Center.

McDonald: This was a second 360/67?

Bayles: This was a second 360/67, yes. And when I came back I went back into managing, but I probably wasn't actually doing any programming by late 1969. We had some really good people and I probably didn't feel like I was managing somebody. We talked about that I managed the Cobol Debugger Project, but I wasn't actually coding it. I was in the management side of things, but I wasn't actually doing any physical coding probably by the end of 1969.

McDonald: So IBM eventually created the VM operating system around this.

Bayles: Right.

McDonald: Was it a complete fork or was it a continued interaction between the two of you in terms of work at the time when National CSS was created?

Bayles: We had a lot of interaction with-- and we shared-- we didn't share all of it. But we shared a fair amount of stuff with IBM, which they could choose to use or not to use. And we were presenters at SHARE which is IBM's large mainframe user group. They had meetings once or twice a year around the countryside for IBM users, large IBM users, and we were active participants. I was an active participant in SHARE talking about problems. IBM people were there. Customers were there, their users, our users were there. CP/CMS became VM/370. I don't believe on the CP side of VM/370 there was much actual reprogramming done. The 370s, from a relocation point of view, looked just like the 360s, so there wasn't any massive undertaking you had to do. When we put in our first 168, which was the 370, we got it up and running in a day and there wasn't any big deal.

McDonald: So about when approximately was that?

Bayles: When did we put the 168 in? We had a 148 first. The first 370 they announced with relocation was a 145 modified for relocation, which became the model number 148. Because we were bugging them, I mean we were bugging IBM, "Come on. Come out with a machine." Because we had at one point I think 10 67's running.

McDonald: There were in data centers all over the country?

Bayles:　　　Just two. We had three of our own in California plus one running at Standard Oil which we managed and one running at Bank of America that we managed.

McDonald:　　Did those run entirely for those companies?

Bayles:　　　Those were dedicated to Standard Oil of California and B of A. But we had a facilities management contract and they were running VP/CSS. We probably had five or six at our Data Center in Stamford, Connecticut. And I'm trying to think of when IBM announced. I'm guessing it was probably 1973 or 1974. We ended up buying an Amdahl machine. Amdahl made a relocating 370, a clone with relocation. We bought one but had to use water cooling. It was a real nightmare from a physical facilities point of view. And Amdahl sold not a whole bunch but they sold enough of them that maybe IBM finally decided they were going to lose some of the market if they didn't come out with a relocating real 370. So we built a building in 1972 and the Amdahl went in1973.

McDonald:　　This was in National CSS headquarters?

Bayles:　　　We had five locations in downtown Stamford. We had the original data center, which became the main offices and we had them build just a plain data center building across the street and we had one up the street and one down there. We had five because we were growing and running out of office space. We ended up moving headquarters in 1973 to Norwalk, Connecticut.

McDonald:　　So when you had these various facilities how did you manage incoming service requests? Was there some sort of switching system or was it that particular calls went to particular computers?

Bayles:　　　In terms of how things were routed to what machine?

McDonald:　　Right.

Bayles:　　　We routed them by remote office. Essentially we still were running time division or frequency division multiplexers at the time. And they had to go into a 2703, so we basically had multiple 2703s. The lines from Boston would go into one machine. The lines from New York would go into another machine. As the offices became unbalanced in terms of work load, we would actually physically move the lines to another machine. We started at our own packet switching network in 1973 or 1974, and we had it up and running in 1976, probably it was PDP8s or 11s, I'm not sure, probably 11s. We had to write our own because DARPA essentially wouldn't let anybody piggyback on what was then the Internet. So we did our own and I think

Tymshare might have done their own. I'm not sure. But load balancing was done by essentially adjusting and sending users to different machines based on average loads from branch offices.

McDonald: And so once you had the packet switching network in place, then you used the network?

Bayles: Well we still had the issue of disk files. So we didn't have to physically move the lines that users were associated with for each machine. If we could balance individual users at that point then we'd have to balance the whole branch offices. But there was no shared file system. All these machines had their own set of 2314's and so you did have to tie a user to a machine. And it ended having to tie multiple users from the same company to the same machine because we did have a mechanism for sharing virtual disks across users that we did fairly late in the game probably 1975, is a guess.

McDonald: So let's back up a little bit to around 1970. Like a lot of smaller computer companies you ran into some financial difficulties in that era.

Bayles: Yes. A lot of which were of our own making. We had two private rounds which by today's standards were meager. One was $800,000, I think and the other may have been $600,000. Dick Orenstein has all the numbers. And we went public in January of 1970 for the magnificent sum of $1.8 million I guess. That was a big number back then. Now $1.8 billion would be a big number. We ended up burning up a fair amount of money basically through overstaffing. We finally realized what we had done which was the third quarter or late second quarter of 1970. We turned profitable overnight by essentially cutting heads, the 1970 version of General Motors or something. We went from unprofitable to profitable, once the severance ran out, in the space of a month. And we were profitable ever since. We had problems in 1969. We had to keep tuning the machine so we could get enough revenue out of it to carry our overhead. When we started out, we could probably barely get enough revenue to cover the cost of the machine itself. Forget power, forget people, forget rent and all that stuff. Most of 1969 was spent tuning the machine. We took delivery of a duplex and dual CPU 67 in, I think it was probably 1970, the latter half of 1970. And with some quick modest coding we were able to really crank up the performance because we didn't have to have two copies of the operating system where we could spend more time we'd get more CPU cycles to sell on the user side of things because we didn't have to consume memory and everything else for dual set up-- the operating system. So most of 1969 was spent doing some bug fixing and reliability improvements and stuff but mainly it was focused on performance.

McDonald: And at that point you were helping out with that or were you also in Sunnyvale for part of that time?

Bayles: I was in Sunnyvale for those four months. I wasn't doing any programming from probably mid-1969 on. As far as NCSS was concerned, I probably didn't do any coding since then. Worked our database stuff -- this was all assembly language coding at the time. There was no C language back then at least not that was available to us. It was all assembly language code. So I wasn't doing any programming probably from mid 1969 on. Programming management yes, facilities management, yes, but not programming and being responsible for staffing the staff. In my view, and this is true of my job since then, my job is to find the people, give them the resources they need and stay out of their way. We have some super people. So I probably would not have been as good as they were at it. I might have been once but I wasn't then.

McDonald: So what do you think was the reason for the overstaffing in 1970?

Bayles: We had delusions of grandeur, frankly. All of a sudden we had more money than we knew what to do with, wisely anyway. We made some investments in-- investment is the wrong word. We got involved in working out a deal with the head of computing at Brown University where we would be able to use grad students in order to do some programming in return for funding-- us funding some of the grad students with no clear objective. We decided we were going to do that because it sounded like a good idea. It was kind of the IBM Scientific Center approach. But we didn't have anything-- we didn't have a target. We didn't have a project. We didn't know what to expect out of it, let's put it that way. That went on for probably six months with us spending money on that effort and overstaffing of some other areas, not huge.

We finally realized that we were running out of cash and we had to do something. You may have seen references in some of the notes to what we call the "Night of the Long Knives," which is when we met over one weekend and decided some serious changes had to be made. And the following Monday we let go, Dick Orenstein would know, maybe 15 percent of the staff, maybe not that high. We probably had 300 people working for us and this is an off-the-top of my head number. So we might have actually cut 30 or 40 people. And we turned profitable overnight. We also had frankly not paid all that much attention to collecting bills. We were good at billing but there was nobody around to beat them over the head if they didn't pay. So we actually invested money in additional accounting staff to make sure that at least we got paid for the time we sold because that was actually fairly lax. We had bad receivable issues back then. And it got cleared up. Most of our customers were big companies, with rare exceptions. So it wasn't an issue of them not being able to pay it was just that the squeaky wheel gets the grease and we didn't follow up often enough. So that was the night of the long knives which was the jargon we used back then, black humor. Four or five years later, we had a "night of the pen knives" which was a much smaller layoff operation. That was done in like 1975 or 1976. It was much smaller. And I don't remember exactly what triggered doing that. But Dick Orenstein will know tomorrow.

McDonald: So what were the major things that you worked on during the 1970's, over the course of the 1970's at National CSS or sort of the bulk of your career there?

Bayles: On the nontechnical side?

McDonald: Yes.

Building NOMAD

Bayles: Well I was still on the technical side managing the projects. We put together the Cobol Debugger. We did our own version of Basic which was something which the sales force said we needed because you had to have it to check the box. You had Basic even though it wasn't an IBM application. It wasn't an IBM program development material. We worked on the specs for a financial modeling application called InfoTab, which became a fairly sizable application. It was the equivalent of VisiCalc in a much earlier form or Excel, if you will, in a much earlier form. In 1972 one of our bigger applications was called RAMIS, which was a database application. That was written by and owned by Mathematica Corp. and we had a license to use it. They actually collected a surcharge on the revenue from the programs that used RAMIS. So they were getting money from use of RAMIS and we wanted to extend that agreement that ran out in 1973. They didn't want to extend it or they wanted to extend it under terms that we just felt were unrealistic from a financial point of view.

So, we commissioned a project to essentially write our own database system. That decision was made probably early 1972 and I was the project manager of that from a specification and management point of view. Never did any of the coding on it. In fact, the specs that I wrote or that we wrote I was actually skeptical that we'd be able to build it because it was light years ahead of RAMIS, which was the other application. It was essentially a relational database before there really were any. Nomad, which is what we called our new system, had a lot of similarities to SQL. Sometimes when I tried to use SQL later on in my life, I kept going back and reverting to the Nomad way of doing something. I would have to say to myself, "Now wait a minute that's not the way SQL works." We had a team of 5 people. Hal [Feinleib], Judd [Boykin], Nick Rawlings, Nick Pissaro [Jr.], Mike Bayuk.

McDonald: And that was the team that you put together?

Bayles: Yes, they were all from inside CSS. I put the team together; put them in their own building-- we freed up some space in one office building across the street that was maybe something the size of this room. And we developed the specs and locked them in a closet essentially for, I guess 18 months; I think that's what the development time ended up being. When did we announce that? We will have some data tomorrow that tells when we did it. And

that ended up being light years ahead of what RAMIS was or frankly what anything else was at the time. I don't think SQL had even been spec'd yet, at the time.

McDonald: Was this was something that was compatible with your existing RAMIS customers or not? Couldn't you just port your stuff from RAMIS into Nomad?

Bayles: Oh, well we could put the data in but we didn't want to get involved. First of all RAMIS had some severe limitations even though it was pretty good for what it did. It was essentially a linear file manager. I mean it had no structure to it. There was no schema to it. There was no structure to the data; it was just a flat file, a big flat file. And you could report on it and its abilities were to report on what was in this big flat file. But we wanted a lot more flexibility than that. And it also allowed us to do things that the relational database allowed us to do-- to specify things that you could never have done with the RAMIS approach. So we chose to invent something new rather than a clone which might have gotten us into legal trouble anyway. I'm not sure that would have been the right decision even if we'd made it that way. We had to invest a lot more time and money, five people for 18 months, and it became our single largest application. Still, maybe only 25 percent of our revenue came from Nomad, as a guess, but 25 percent of a $120 million was a reasonable return on five people for 18 months. And the programming staff did a phenomenal job. I mean they did things that I didn't think of when I wrote the spec. I said what can I put in the spec? This spec is a wish list essentially. I mean that's really what it was. We documented how it should look, what it should do and everything else but it was a wish list. There might be things in there that you can't build but they built everything.

McDonald: And the spec was something that was you think of as a group effort?

Bayles: Well it was-- I was the leader of it. But it was all done jointly. I ended up doing actual writing and prodding and documenting and all the rest of it. But it was clearly not done in a vacuum. Hal and Nick Rawlings and Nick Pissaro, there were probably three people who worked heavily on this spec with me. And then we added two more programming people after the spec was done. And they did a great job.

Acquisition by Dun & Bradstreet

McDonald: So once you finished with leading the Nomad team, what was your next big project?

Bayles: Well I got an MBA in finance in 1975.

McDonald: Why did you choose to do that?

Bayles: I was kind of bored, frankly. I wanted to try something different. So I went and got an MBA in finance and ended up ultimately as the controller.

That was just really weird. I ran the internal data processing operation, budgeting and planning staff, which was three people, facilities, we had probably a half of dozen people in facilities. I was still involved in the SHARE effort. I was still a public persona for CSS with respect to VM/370 or CP/67. So I was still doing all that. We went through a couple of controllers, essentially the kind of chief accounting managers if you want to call it that. We went through two fairly quickly because nobody felt that they could do the job. So I ended up becoming controller for probably 18 months.

McDonald: When was that?

Bayles: I'm guessing it was probably mid to end of 1977 until we were bought by Dun & Bradstreet in 1979. So I was doing something completely different.

McDonald: Is that what you owed to your MBA or was it something else?

Bayles: I was doing financial modeling. I had responsibility for all of that stuff. I was doing financial modeling and we had better programmers than me at the time. So I ended up wanting to do something different and the company needed it so I ended up doing it. I was still in charge of facilities. I ended up building 140,000 square feet of building, which took a fair amount of time.

McDonald: And this continued to be centered in Stamford?

Bayles: The headquarters were in Norwalk. We moved the headquarters from Stamford to Norwalk. We kept the data centers in Stamford. We had a five year lease in Norwalk and anticipating the expiration of that lease, we made an installment purchase of land in Wilton, Connecticut, two or three acres of land. And built an initial 70,000 square foot building and a follow on 50,000 square foot building and moved all of the program development staff there. The data center still stayed in Stamford and we moved all of the rest of the people who were working locally into that building. Of course the fact that I was in charge of finding the location, the fact that it was a mile and a half from my house had absolutely nothing to do with it. So once D&B bought us, which was April of 1979, they brought in their own accounting people and that was fine. My tag line is that I was a chemist by training, a programmer by trade, and a controller by accident. Maybe it was out of desperation.

Once D&B came in I spent six months working with D&B Canada on converting their database into Nomad; this was Dun & Bradstreet Credit Reporting, the credit reporting operation in

Canada. And then in the tail end of 1979 George Feeney, who was one of the founders of GE Timesharing, came over to Dun & Bradstreet in some kind of a technical management role like a chief scientific officer or something like that. I don't know what he was actually called. And he came up with a scheme-- he made a proposal to Dun & Bradstreet that they build an automated telemarketing system. Now we all love telemarketers. <laughs> So I was drafted to commute to New York for 3 1/2 or 4 months from Connecticut to build a prototype of this thing which we did; we got it up and running. And that's weird because I was the only programmer on at that point so I'm back into programming in COBOL on a Wang machine. I'd never programmed in COBOL before but you never know what you can do until you have to. So we built that and they used it in a test case to do the automated telemarketing of Yellow Page listings to businesses. And that worked so well they decided to make it into a division of Dun & Bradstreet called SalesNet.

McDonald: So how did the system work in a little more detail?

Bayles: It was essentially scripted telemarketing so that based on the questions the telemarketer says and based on the answer, it picks A or function key 1 or something and that triggers another script, which is the same as what you hear today people doing when they drive me crazy, telemarketers. But it worked well enough with R.H. Donnelley, which was the principal Yellow Page marketer in the U.S. at the time. They decided to make it a freestanding business. So I moved back to 542 Main Street, back to Norwalk, the space that we'd vacated when CSS moved to Wilton. Put together a programming staff, operation staff of, I don't know how many people we ended up having, probably five to eight people on the technical side. And we refined that system. We made that system more easily customizable to a particular customer. So we were out selling things for Xerox not just for Yellow Pages. Xerox had an insurance company. So that actually became a successful, reasonably successful venture. I left that in 1983. So that was probably started in early 1981. I stayed there for probably 18 months, again doing technical stuff, but not hands on programming at that point.

McDonald: So we're up to 1983?

Bayles: We're up to the end of 1982, early 1983. Probably about 18 months at SalesNet.

McDonald: So let's backup a minute. Let's talk about the Dun & Bradstreet acquisition. How and why did that come about?

Bayles: Well rumor has it, I don't know whether this is substantiated or not, that Dun & Bradstreet had a huge computing facility in New Jersey, based on SDS equipment. Essentially doing batch stuff for all of their credit reporting operations. Anyway, it was a huge amount of data. They felt apparently, and I was not involved at that level in the discussions, the early ones, that buying a technology company, particularly a timesharing company, would allow them to provide a different level of service to their customers than they could do with their existing

operation and they felt that the best way of doing that quickly was by buying somebody as opposed to trying to build it from scratch. Now conventional wisdom has it that they talked to Tymshare first which was somewhat larger than we were. Tymshare essentially said flatly no. And then they talked to us.

I think this happened fairly quickly. I was in Paris at the time and I was told to fly back. I was spending two weeks there on business, calling on customers. I still got involved in customer calls even though I wasn't doing any active programming. I got a call to fly back, and this apparently had been put together in the space of a week as I understand it. Now Dick Orenstein may know more than I do.

At this time let's go back to the CEO issues. Bob Bernard was the original CEO in 1968; he was essentially moved out in August of 1970 as a part of the Night of the Long Knives. Dick Orenstein became CEO in August of 1970 until the end of 1974. And Bob Weissman, who was the VP of Finance of the company, became CEO in January of 1975. He ultimately became the president of Dun & Bradstreet. He worked his way up that ladder and became president of D&B. I think there were a lot of people who were looking for an exit strategy. I don't think we actually foresaw what I would call the death of timesharing or the rapid rise of PCs and all that stuff. I mean I don't think we really had a firm forward-looking notion that that was going to happen. But I think there were a lot of investors who were looking for an exit strategy.

McDonald: Was it that revenues were flat?

Bayles: No, they were still growing. Now there was no sense of we needed to do it from an operating point of view. I don't think there's going to be anybody who actually knows why or how it started, or we said yes. I mean Tymshare said no for their reasons. Hindsight being perfect, I think it was the right thing to do. I mean two or three years later timesharing was in a rapid decline and we got what then at that time, by Google's standards it's nothing, but by 1980 standards, we got what we thought was a fair price for it. And there were some synergies, I guess. I think the reason Dun & Bradstreet wanted it was that they saw some synergies with respect to providing different levels of service. They ended up using our packet-switched system between all of their D&B operations after the acquisition. They relabeled it DunsNet, so I think they saw some synergies. They offered us a price and I guess we took it, although I wasn't involved in that level of discussion. I think there were probably three people involved: the chairman [Bernie Goldstein], a senior VP and Bob Weissman who was the president, I guess. There were rumors around that Tymshare was being talked to. We felt there was something going on, let's put it that way.

McDonald: In that period in the 1970s who did you see as sort of the main competitors in the landscape? Was it Tymshare?

Bayles: Yes; and Interactive Data which was the other CP/67-based or VM/370-based competitor; they really concentrated on the financial industry. They were funded by Chase, and they were really concentrating on that. We concentrated on essentially program development, database stuff, some financial modeling. Tymshare wasn't running IBM equipment. GE Timesharing, I think, had gone out of business by then. Maybe not. Comshare wasn't running. We were the only people running essentially publicly available programming development and database facilities for IBM equipment.

McDonald: So your market was people who had IBM machines but wanted more access to interactive time?

Bayles: Yes, Well it turns out that wasn't necessarily true of Nomad because Nomad wasn't available except through us. So we did have 20 percent of the revenue that was really keyed on Nomad database capabilities. And I don't honestly know, I guess I could say we never really saw Tymshare as a direct competitor although they started before we did. They were a little larger than we were. But we rarely came head-to-head with them from a sales point of view. We weren't talking to the same people, the same kind of companies and the same people in the company. Now some of the marketing guys may disagree. We don't have any marketing people from NCSS here, but the perception was that Tymshare was doing their thing, we were doing our thing. Comshare was doing its thing, and we rarely banged heads.

McDonald: Was there any sense that networking or the Internet was going to have a big impact on this landscape in some way?

Bayles: Well we knew from a cost point of view that doing something other than stringing lines all over the place, even though you could ultimately get frame relay lines that were better, or more cost-effective, but clearly something had to be done from the cost perspective. Functionally I don't think the users cared whether they were dialing into a frequency multiplex or over a leased line to a 2703 or if it was running through a PDP11 that could switch to running over a line. I don't think they cared. I think it was important to Dun & Bradstreet to acquire that capability because they had a lot of offices around the country. Many more than we did. We had 20 offices around the country probably and D&B had way many more than that, so communications costs were important to them, especially if they were going to provide a computing service directly to customers rather than by printed reports which is what they intended to do. They wanted to be able to have people log in and get a credit report on XYZ because they subscribed to the service. That kind of access wasn't possible with the systems that were in place, so I think it was important to Dun & Bradstreet. It was important to us from a cost point of view. I don't think it was important to the average user.

Videolog

McDonald: Okay let's go back to where we were temporarily and talk about your later career.

Bayles: Okay so now we're at the end of SalesNet, some time in 1983. Four or five NCSS people originally, led by our old acquisitions guy. It might be true that all of them had left NCSS. I was still at D&B in SalesNet which was a division of D&B. We put together a team, myself, one, two, three, four, five people, all ex and current CSS people, to do electronic publishing.

McDonald: I'm sorry, who put it together?

Bayles: Alan Brigish was the president. We had me as systems; Rudy Polanski was the finance guy. He worked for me at NCSS, before. John Pryor was the head of sales. He was VP of sales for NCSS but had left NCSS, and Dave Dorlen, an ex-NCSS salesman. So the four of us were the lead and then there were five - Gary Holland was another technical guy. Not a programmer per se But anyway, the concept was providing access to an online database of electronic components, semi conductors, chips, whatever, in a form that would enable electrical engineers around the countryside to assemble a circuit, knowing that the parts were available. You get this part from this manufacturer, that part from that manufacturer. We didn't actually do any electrical design but we knew what he wanted to build and he could go in, find out what was available. The source of the information, I should be able to remember the name, was a company based in San Diego that produced a shelf of books: one for microchips, one for this, one for RAM, one for whatever. They published a collection of books: very fine-print stuff that comprised the known universe at least according to them of all commercially available electronic components. That was going to be the source of the data, so we had to combine that with a mechanism of displaying the information. This was before online graphics was doable. Again, there was no Internet. We ended up piggy-backing on CompuServe as a data network, but an important component of this was something called NAPLPS [North American Presentation Level Protocol Syntax] which is a graphic language. You know NAPLPS?

McDonald: Videotext.

Bayles: North American videotext. Yes, exactly. The name of our thing was Videolog. It was a video catalog. So this was the idea that we would essentially provide all this information in both searchable form and in NAPLPS form graphics.

McDonald: Did you use CompuServe as servers or just as a network?

Bayles: We just used them as a network, a dial-in network. We ended up putting in our own VAX/VMS systems, which is when I learned C. So that was the idea and then we were going to partner with Schweber Electronics which was the third largest distributor of electronic

parts after Allied and one other whose name I can't remember. So the idea was we would be able to have the data, present it to the engineer and if the engineer chose to he could actually order sample parts or test kits or whatever in prototype quantities from Schweber Electronics. The question was who's going to fund this thing? So what Alan Brigish did, he was a superb salesman - he originally had been a salesman at CSS. He was in charge of CSS UK. He at one point came to the US, became the acquisitions guy. *Electronic News* back in the 1980s was the leading electronics publication. It was a daily. It was thick, published by Fairchild Publications, which was a unit of Capital Cities at the time, Capital Cities Communications. So he made a pitch to the publisher of *Electronic News* and to the president of Fairchild at the time saying essentially why don't you invest in this? We think we can build a business out of it. He said that it kind of goes along with the electronics side of Fairchild publications. And he essentially made that sale. Capital City Communications agreed to fund the startup.

We got an Altair which was a small UNIX-based machine for me to build the prototype on, again in C, which was my first experience with C. We built that, it probably took three or four months, and it was just me doing the programming to have a demonstrable prototype that we could take to show as a sample. We got enough interest and Capital Cities agreed to go ahead with the next step which was funding. We had to get office space, build a machine room. We used VAX/VMS machines. I'm not sure why that decision was made. I don't remember. I'm sure I made it, but I don't remember why. They had C. CompuServe was VAX-based so networking issues would be fairly straight forward. Price/performance was reasonable. It was reasonably scalable. We hired some people to build us a machine room, hired a sales staff. I probably had five programmers maybe.

McDonald: It seems like one of the major tasks would be data entry to get all of this catalog information into the system.

Bayles: Right. That was the other side of the building where the people that actually generated the videotext from the images. We had to get the data into machine readable form and there was a huge amount of data, and it turns out we had some performance issues. Not from the point of view of retrieving data once it was loaded, since it was quasi-relational index sequential. We were fed data monthly as opposed to being incrementally changed. We got new tapes monthly. It would take two days to do the upload. We had one guy who was really good. Spent most of his time, after we got up and running trying to get the time for this uploading thing down which we finally did. They got it down to a reasonable time. We could do it over a weekend, actually one morning of a weekend. It wouldn't take two days. So we had a tech staff. I was still doing programming. At that point we provided our own floppy because it was floppies back then that would do the NAPLPS thing. The application ran on a PC that generated the graphics for the NAPLPS. That was my first exposure writing PC code. So I was actively programming on that for probably two and a-half years.

McDonald: How did that system work out? Was it successful?

Bayles: We ended up making some sales. It was marginally profitable.

McDonald: What was the model subscription based on?

Bayles: It was an hourly connect time. It wasn't CPU cycle like CSS was. It was just by the hour. So by late 1987 it was doing business. *Electronic News* had kind of faded away as a principal publication in the electronics business. So Fairchild and Capital Cities were getting less and less interested in continuing this. So we sold it to Schweber Electronics. We had successfully put all the pieces together so they could order the parts and all the rest of it. Interfacing a DEC machine to an AS/400 or System/38 at the time was an interesting task. So they sold it to Schweber at the end of 1987.

Capital Cities/ABC and Fairchild Publications

Two of us, Gary Holland, the other tech guy, and myself, were asked to essentially join Capital Cities. Backing up just a second, Capital Cities bought ABC in 1986, so it became Capital Cities/ABC. The two of us were invited to start a corporate consulting group, kind of a DP oversight group for the publishing side of Capital Cities/ABC which involved lots of magazines and newspapers. It was a sizeable piece of business-- they had five major metro dailies.

McDonald: And this was to help them develop computer systems?

Bayles: Yes, it was oversight of their procurement process, evaluating options that they had. They wanted to develop their own classified system. "Which one of these three that are commercially available might be the best one given the nature of that business?" We had to approve their DP budgets and their capital budgets. So there was no programming involved at all there. It was all essentially classic DP consulting stuff, and that lasted for three years. Fairchild Publications went through a big reorganization at the end of 1989 and essentially cleaned house from an operational management point of view. I was asked to be VP of IT at Fairchild, which meant commuting to the city which is a three and a-half hour per day operation to and from. It was the kind of offer I was told not to refuse or else, sort of.

McDonald: Right.

Bayles: So I did that, and this was what I did there. I did some hands-on programming later on but that was in database application. It was managing the IT staff, the operations staff and of probably 15 or 20 people. I ended up a year later being promoted to Senior VP of Operations, which meant I had printing, distribution, information processing, the photo

department, and facilities again. I had 150 or 200 people working for me. And most of my time was spent on non-DP stuff. At that point I had to replace two DP managers: the head of operations and the head of business programming. We replaced editorial systems. We went from a massive network, put in desktops instead of terminals. Instead of standalone keyboards wired to a mainframe, we put in digital photography. That was over the next eight years. Disney acquired Capital Cities/ABC in 1996 and over the next three years essentially sold all but Fairchild. All of the publishing operations including the newspapers and everything else and Fairchild was the only one left. I don't know why they kept Fairchild, frankly. In October of 1999 they sold Fairchild. They sold it to Advanced Publications which is S.I. Newhouse, Condé Nast, that crowd. I was the Y2K manager, obviously. So I got us through Y2K with no hassles and on January 8th of 2000 I was asked to retire, which I did. It was a reasonable offer. They wanted to bring in their own people. They had people at Condé Nast who were looking for a place to grow into.

McDonald: I see.

Bayles: Yes, and so they figured, "we don't need them." The president went. I was the next guy to go, and within a year there was nobody there. There was no senior executive when I was there, except for probably the head of the editorial department.

Restaurantrow.com

McDonald: Did you continue to live in Connecticut that entire time?

Bayles: Yes, ten years of commuting to the city. So here it is. First quarter of 2000 and I thought I'm too young to retire. So I ended up again through a connection with Alan Brigish, the Videolog founder. He knew somebody who had done a startup of Restaurantrow.com, which is an online restaurant information service that competed with Zagat and one other big one, OpenTable.

McDonald: Was that something located out here [California]?

Bayles: That was in Rye, New York. That was essentially right across the New York/ Connecticut border so it was a 40-minute drive which was perfectly reasonable. So we worked on the private placement document. Got our money, oh probably in May of 2000 and we proceeded to build a small staff there The president of the company was a good Web guy and a good SQL guy, which is all this was, a combination of SQL and webpage design. So I ended up being responsible for everything that wasn't programming or sales. I was the Chief Administrative Officer, the CFO, personnel guy, facilities guy. But we ran out of money. We got revenue in but not enough. We ran out of money by first quarter of 2001 and there was no more

money to be had for dot com startups in 2000 or 2001 or 2002. Essentially the money just dried up. I stayed on for a year essentially working for nothing, trying to make it go and I ended up not being able to.

Later Projects

In March of 2002, I decided I wasn't going to hang around. My wife and I made a decision to leave Connecticut. Property taxes were going up. She hated the north although she'd lived there all her life. So we started looking at places to retire to, and ended up in Sarasota, Florida, a place I'd never been to before except in the airport, hopping from place to place. It's a great place. Did a couple of consulting jobs, three actually. One was for the ex-CFO of Fairchild Publications who had moved to Hearst. He was the VP of Finance of Hearst newspapers. So I did some consulting work for him on the *San Francisco Chronicle* issues. I was an expert witness for a patent infringement defense which I knew nothing about. I thought I knew something about law. Patent law and regular law have a very loose relationship. I learned a lot about patents. That was interesting. I actually learned something. It was a lot of work too. I had to go to Washington probably three weeks a month for four months.

McDonald: Let me go back all the way back, ask one more question about your background. Were there any particular hobbies that you had as a young man?

Bayles: Chemistry was one. Chemistry and tennis, I guess, were the two things. I don't think they're allowed to sell chemistry sets anymore to kids. There are too many ways you can kill yourself. I probably tried several of them. I made nitroglycerin once. Don't ask me why.

McDonald: As a teenager?

Bayles: This was when I was 11 years old or something, just to see if it could be done. That's why I think I ended up in organic chemistry, that and tennis. I fooled around with electronics but nothing serious. Later on I built Heathkits, stereo systems and stuff like that, but that was not in my formative years. That was a hobby afterwards. Still tennis. I sailed for a few years. I had three boats at one point. The Nina, the Pinta, and the Santa Maria, I was accused of owning. They just happened to be timing issues. And woodworking.

McDonald: As far as the timesharing business as an industry or a subset of the industry, when did it sort of become apparent to you that it was not doing well?

Bayles: I would say 1982 maybe. I'm trying to think. I've got to juggle dates here to figure. My guess is by 1981. I think by then everybody had seen it. The potential for the personal computer began to become very obvious in 1980, 1981. And if you were selling financial

modeling or program development business, PCs could do a good job. It took a while for them to get to the point where they could handle sizeable data. But computing cycles themselves were going to become incredibly cheap, and if you based your business on selling computer cycles you'd be in trouble. Now D&B did try to hang on to Nomad and sell it as a software product, which I don't think ever got too far. Nick Rawlings was the Nomad guy, so he'll know more about that than I did. And I guess some other people. Comshare for example, turned into a successful software vendor. It managed to make the transition to software products. CSS never did that. It never seriously tried to despite the fact that they kept Nomad. D&B kept Nomad. I don't think they really tried to. They either didn't believe in it or I don't know what.

McDonald: So with Videolog was it because it had proprietary data, was that seen as protection against this?

Bayles: Yes, that was the theory. I don't think there was a big enough market in the electrical design engineering universe to have it ever be a sizeable business. I'm not at all familiar with where it all sits now inside Schweber Electronics. It was so long ago. I don't think that ever had the potential to be a big business. We thought it might but it didn't work out that way. Turns out somebody came out one or two or three years ago with what sounded like a very similar product, not based on NAPLPS, because you don't need that anymore; you've got plenty of other graphic capability. I don't know what happened to that either. I didn't think Tymshare would go downhill as rapidly as it did. IBM finally came out with some reasonable options to do program development, interactive program development on a non-service bureau basis.

McDonald: Do you think the motivation of businesses wanting to control their own systems had something to do with the rapid decline of time-sharing?

Bayles: I was thinking about it. I think it was just the availability of more fixed costs. One problem with using a service bureau is it is all variable cost. You can't control it. You really can't unless you're monitoring what the guy's doing every minute. I think it was more of their ability to control cost, as opposed to proprietary information. I don't think that was ever a big issue for us. It never was. Not that I was aware of. I think it was an issue of cost which is why timesharing disappeared, because there were cheaper alternatives. Cheaper, more fixed-price alternatives became available in the early 1980s.

McDonald: So you never had any serious incidents where there was some sort of loss of data?

Bayles: We had one bad one which I just read about. I went back over our notes that we talked about at an earlier interview with Burt [Grad]. We apparently for some reason, I don't remember the reason, failed to backup a sizeable amount of data from Bell Labs. Bell Labs was a big customer, and something crashed and we didn't have backup. It was the only one I know

of, and what we ended up having to do or what we did, and this is related in this other document I saw, was that we got all the printouts they had and we had them keypunched, reentered. I think it was program development work, so it was the programs that we had to reenter, not data. That's the only one I'm aware of that was a serious issue. But we managed to keep them as a customer because we really bent over backwards to make sure we could salvage the information.

McDonald: I think that's all I have for you.

Bayles: Okay.

McDonald: Thanks a lot for your time today.

Bayles: Thank you for the chance of rambling, the opportunity to ramble I should say.

McDonald: You're very welcome.