

An Interview with

JOHN BAXTER

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Conducted by Thomas J. Misa

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Abstract

In November 2013, CBI director Tom Misa conducted a series of oral history interviews with 13 former employees of Control Data Australia (1963-89) including the details of each person's career, before and after working for Control Data. Topics that are common to many of the interviews include Trevor Robinson's key role in organizing Control Data Australia; the early computer sales in Australia to the Bureau of Census and Statistics, Department of Defence, Postmaster General, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Bureau of Meteorology, and several prominent Australian universities. Control Data Australia did business data processing for such large concerns as Broken Hill Proprietary (BHP), Telstra, and others. A distinctive emphasis was its work in developing computer systems for race-track betting for the state of Victoria's Totalisator Agency Board (TAB) as well as for other Australian states and New Zealand. Other topics include relations with Control Data's headquarters in Minneapolis, business data processing, data centers, database management, networking and Cybernet, and projects done in several Far East countries.

Interviews were conducted with Richard Bament, John Baxter, Ron G. Bird, Tony Blackmore, Lyle Bowden, Marcel Dayan, Ian Downie, Julie James, George Karoly, John O'Neil, Garry Pearce, Rob Robertson, and Bruce Wilson.

Misa: My name is Tom Misa; it's the 22 November 2013. I'm here in Melbourne, Australia talking this afternoon with John Baxter. John was with Control Data Australia from 1969 to 1987. He had several different roles as a programmer, analyst programmer, in the Data Centre Division; and then various leadership roles as a leader of Software Support; as a District Manager Professional Services in both Melbourne and Sydney; Marketing Support Manager for the Educational Division involved with the micro PLATO project; then Marketing Product Line Manager responsible for computer systems and educational products; then also, a brief period as acting National Marketing Manager. So several different roles, and a number of projects that we'll need to talk about today. John, just to start with, could you give us a bit of your own personal background, just how you ended up getting interested in computing and how you ended up entering the computing industry?

Baxter: Sure. I found computing accidentally. When I was in final year of high school, trying to work out what to do at university, I went to a lecture at one of the local universities that was conducted by the head of a computing center and it was unusual in that the topic was advertised as being computer programming. But the man himself had thought that it was about linear programming, so he got a bit mixed up. By the time he worked out what the topic was meant to be, he adapted his talk to be computer programming, about linear programming. And that went for maybe an hour or so and when we came out, most of the students with me were sort of shaking their heads, wondering what it was all about.

Misa: What is linear programming? [Laughs.]

Baxter: And I thought to myself, I understood that; maybe there's something there. So investigated further, and he was the head of computing at what was then Caulfield Technical College.

Misa: Caulfield, okay.

Baxter: The name later became Caulfield Institute of Technology, and later became part of Monash University, which it is now. So investigated it further and enrolled in a diploma course at Caulfield Tech, so that was my entre into computing. Caulfield Tech, at that stage, had a single computer, called a Ferranti Sirius, which was a very slow, very small capacity machine that ran on paper tape input and output. We wrote student programs to run through the Ferranti Sirius. I also managed, as did a few others, to get a part time job in the evenings as a computer operator in the computer center. So that helped me just with the interest, if you like, and also earning a couple of dollars. Dollars? Were they pounds then? Yes, they were still pounds, before we switched to decimal currency back then. So it's that long ago, 1965.

Misa: 1965, okay.

Baxter: Caulfield Tech later got a much larger, much faster computer called a Control Data 160-A, which readers of this might know, is essentially a desktop machine. And that

was interesting, and I got to program that. After finishing at Caulfield Tech, I joined a company called Felt and Textiles.

Misa: And what year, do you recall?

Baxter: Late 1967 that would be, because I actually joined before I finished the course, so I was working part time and studying part time. So I worked with Felt and Textiles on Honeywell equipment, mainly writing what we'd call commercial programs to manage processes, invoicing, and stock control, and so on, for carpet manufacturing.

Misa: So on the financial side.

Baxter: Yes, the financial and the physical stock inventory side. In parallel with that, a friend of mine, a member of the baseball club that I played with, was a sales representative for Control Data's Data Centre Division. We were talking fairly late one night, I guess, or maybe it was after a baseball game one time, but with a bit of lubrication, and we got into betting. "I bet I can get you a job at Control Data." "I bet you can't." So we went like that for a while. He arranged for me to have an interview with the manager at Control Data, who offered me a job, not quite on the spot; matter of fact, between when he told me he was going to offer me a job and when I got the offer was nearly two months. This was in 1969. So I joined Control Data in July 1969, about a week before Armstrong walked on the moon.

Misa: Yes.

Baxter: One of the early things I did was sitting in a darkened room with a black and white TV, watching the moon landing.

Misa: Okay, right.

Baxter: So it was a Data Centre Division; we operated a CDC 3300 computer running what would then have been called traditional service bureau programs. Our customers were commercial companies running accounting, stock control, financial type systems on the 3300. They prepared their data input; we would've written the programs for them, in many cases. A lot of the business was transaction-oriented, and a lot of the charging to customers would've been transaction-based. So if they put in 200 invoices, they might be charged \$5 an invoice for the customer processing.

Misa: That was here in Melbourne?

Baxter: That was here in Melbourne, yes, all of that here in Melbourne. So my role at that stage when I first joined was writing programs to run some of these financial and accounting systems.

Misa: And what languages did you use programming?

Baxter: COBOL language.

Misa: COBOL, which for Control Data, was a move out of the scientific FORTRAN.

Baxter: Yes. But we did a lot of COBOL. We would've had 20, maybe 25 COBOL programmers here in Melbourne, writing commercial software for the Service Bureau. Back track a little bit; while I was a student, as well as having the computers at Caulfield, we used to some of their processing offline. We'd write programs, and they'd be put onto punch cards, and taken off to places like Monash University, which had a CDC 3200, or sometimes the Victorian TAB, but at that stage were just getting up and running the 3100s. And so I had a history as a student, of dealing with Control Data equipment at some level, and that, obviously, led me to respect for the company, if you like; served as part of the interest there rather than be interested in IBM, and Honeywell, and others. As I mentioned, at Caulfield we had a 160-A. We also had a 160-A in the Data Centre after I joined there, and nobody else in the Data Centre, I think probably a couple of engineers, but nobody else in the programming side had ever worked with a 160-A before so I had some knowledge of a language called OSAS [One Sixty Assembly System], which was a machine-oriented assembly language. And one of the jobs I was given was to look after the programs that ran or that needed to be written for the 160-A. That's one of the particularly interesting projects that I worked on. It had already been started before I joined so I didn't initiate it but I helped look after it for a number of years. The Melbourne *Trading Post* was then a newspaper and you might liken it to a newspaper version of eBay, people buying and selling. People would phone in advertisements and

they would be charged for the cost of the advertisement after the product had sold. It'd run for maybe two editions. It came out every week or maybe every two weeks. I think it was every week that a new edition of the *Trading Post* came out.

Misa: We used to call it classified ads, in the U.S. at least.

Baxter: So it was classified ads, yes. But this was a specialized newspaper run by a small company and that's all it did. It didn't do news, or movie reviews or anything like that; it was just classified advertisements, personal buying and selling. The way it worked was that the *Trading Post* people, receptionist, telephonist, whatever one might call them; they took advertisements over the phone. So if I wanted to sell a piece of furniture, I would call the *Trading Post*, they would type the details onto a continuous fanfold sheet. They were typed in an OCR optical character recognition font, using special typewriter font, because attached to the 160-A we had a thing called a CDC 915 page reader, which was a high speed optical character reader that could read one page at a time. We'd take the data directly in from the *Trading Post* typists, convert it onto magnetic tape, and that magnetic tape would then be taken onto the 3300 to run in the main applications. And that was two things: one was an accounting application that would take the details of the item to be sold and how much the customer was going to be charged, and so ultimately, the invoices for the customers would be printed. The other program that ran on the 3300 was an automated typesetting program that had been written by a local typesetting house.

Misa: Typesetting.

Baxter: Typesetting.

Misa: That's notable.

Baxter: Yes. And it took the straight typing characters, words, formed them into columns and did justification, whatever, to set up for an offset printing machine, so that from phoning to place an advertisement to receiving the newspaper or receiving the invoice, it was all automatic.

Misa: So it was typed once, is that right?

Baxter: Yes, typed once, run through the OCR, put onto magnetic tape, and then split into two streams, one which became a set of ads themselves in the newspaper, the other which became the invoices that went to the customers.

Misa: So this typesetting program, you said, was done locally by CDC or by a third party?

Baxter: By a small third party software house. It was a very small software house, but as part of Australian history, I guess, was a company called Computer Power.

Misa: Computer Power.

Baxter: Computer Power, that became a very large company, and one of the leading companies in the industry of the time. But at that stage, it was essentially a two-person typesetting house in late 1960s, early 1970s.

Misa: Computerized typesetting was something pretty new.

Baxter: Yes, there was a lot of computerized typesetting going in in the sense that there were front ends that you could directly input into the typesetting machine, but this one was taken from one step further back, doing the pre-typesetting and some degree of proofreading available on the 3300, before then going to the actual typesetting machine to produce the galley proofs, and the data to go into the printing machine. So it was, I think, if not a unique application, certainly unique within Control Data and I think unique within Australia because there was nobody else in Australia doing that sort of thing those days. It was quite different and it's just an example of the sort of thing that set Control Data Australia apart from the rest of the Australian industry, as well as setting it apart from the rest of the Control Data world.

Misa: Setting it apart from the rest of Australia in the sense that . . . ?

Baxter: In the type of application that it was. It was fairly speculative in that a typesetting program might not work and, in fact, needed quite a lot of maintenance. Every now and then we'd get a phone call from the owner of the *Trading Post* saying, my

paper's come out and produced like this, like this, like this. So we had to analyze the typesetting program because the Computer Power people would say well, it's something to do with your computer doing it wrong, and of course we'd say no, it's your software.

Misa: The software, right. [Laughs.]

Baxter: So we'd get into a cooperative problem solving thing.

Misa: So Melbourne *Trading Post* would be coming out every week, you said.

Baxter: Think it was every week, might've been every two weeks, a couple times a month at least.

Misa: Well, today you would say it's a graphics problem to try to line up text in columns, and then directly setting the adverts.

Baxter: Yes. So it was quite different.

Misa: And what kind of work did you end up doing during that?

Baxter: I was maintaining the software on the 160-A and helping to maintain the software and interfacing with the Computer Power people on the 3300. And occasionally needing to interface with the *Trading Post* people themselves; but that was more my

manager who dealt with them when they had problems, or when we needed to sell them an extension of their contract, or whatever.

Misa: And you mentioned that Computer Power became a larger company; I don't know the principals who were behind Computer Power.

Baxter: At the initial time, the principal was a guy named Jack Vale, who was an expatriate American. But he'd likely got investment from a guy named Roger Allen, and Roger Allen became one of the leading lights in the computer industry in Australia and then made so much money out of doing all that that he became a venture capitalist.

Misa: As a venture capitalist; you start out with lots of money and then multiply that if things go well.

Baxter: Yes, but I'm not sure if he's still doing that or if he's retired now; he's getting on a bit. That last time I saw Roger would've been about seven or eight years ago. So that's an example of the sort of stuff we did. The scenario, then, we had the 3300 in Melbourne; we had what one might call in the 1960s, traditional service bureau customers doing transaction processing, sending us data, receiving printed outputs from. Now, in parallel with that, the Sydney Data Centre has been established, based on a CDC 6600, which was doing more in the nature of scientific and technical work.

Misa: And a 6600, of course, would have been at the time the top of the line of large capacity machines.

Baxter: It would've been the most powerful computer in Australia; that individual one. So it was based in Sydney, but we had a number of customers in Melbourne who used it and there were two ways of accessing it from Melbourne. One is that we had a couple of terminals connected into it, so we could read programs or data on punch cards, transmit them up the line to the Sydney Data Centre and process them there, then have the results come back and be printed. Or if there were large scale printouts, as a result they might've been printed and physically shipped down. So as a result, we had a public access for that. We had a number of customers who just had small, occasional requirements and a couple of the larger customers had their own terminals, so terminals in their own premises that were connected into the 6600; companies like BP, British Petroleum; and BHP, which is Australia's largest company. So they were doing technical processing; BP doing things like analysis of oil exploration or of petroleum mixtures going to refinery application.

Misa: Did I understand this correctly, focusing on the larger customers, British Petroleum or BHP, that they would have terminals but then the terminals would also have a measure of public access?

Baxter: Not in their places, their premises. They had their own terminals.

Misa: Okay, so those would be . . .

Baxter: Leased terminals with a leased line connection directly into the Sydney Data Centre.

Misa: So that wasn't public access, that was strictly then for their own [pause].

Baxter: We had public access in the Melbourne Data Centre. Indeed, representatives of both of those companies would come in and use the public access terminals until they developed enough data volume, usage volume to get terminals in their own premises. Then they were connected by land line, the leased line, directly to the Sydney Data Centre.

Misa: The terminals that you had connected to Sydney, those were also through a telephone line?

Baxter: Yes.

Misa: Were there any special requirements for the telephone line?

Baxter: Well, the telephone lines at that stage were fairly low speed and they needed to be fairly good quality, so they needed to be structurally not just a normal dial-up phone line.

Misa: Those would be the so-called leased lines that were quite expensive to operate?

Baxter: Yes, they were quite expensive at the time. Telephony in Australia, at that time, was quite expensive because of disparate populations with lots of space in between. The whole data communications was really just getting off the ground, if you like, at that point.

Misa: The distance between Melbourne and Sydney is . . .

Baxter: About 600 miles.

Misa: 600 miles.

Baxter: Yes, 1,000 kilometers.

Misa: Thousand kilometers, so that's a long line.

Baxter: Yes. So with that scenario, the business volume out of Melbourne became such that we had, in fact, installed the highest speed terminal in the public access area. And then at that stage, Control Data in the U.S. had developed a system called Shadow, which allowed our 3300, or 3100, or 3000 series computer to connect to a 6600 and to be used as a terminal. So we had the 3300 in Melbourne and installed the software on it to

effectively emulate a high speed terminal, and connect into the Sydney Data Centre via high speed telecommunications line. And part of my job at that stage [interrupted]

Misa: And that's different than the high quality leased line . . .

Baxter: That's different, yes.

Misa: . . . for larger internal capacity?

Baxter: Internal 20 times the speed. The leased lines were typically 2400 bits per second, and the high speed line that we ran between the data centers was 40,800 bits per second.

Misa: 40,800.

Baxter: Yes, 40.8 kilobits. So my role, I'd moved out of the commercial programming side of the data center into software support, so I was supporting and maintaining the operating system on the 3300 at that point.

Misa: Just let me clarify, Shadow would be running on the 3300?

Baxter: Shadow was a set of programs that ran on the 3300 and imitated a high speed data terminal so that the 6600 thought it was talking to a terminal. The 3300 was running special software to emulate the terminal, so we were then inputting data over the counter,

or via local terminals connected to the Shadow system. Then the data would be pumped up the line to the 6600, which would run the programs, and the data would then come back down the line and the results would be printed, because we're still talking about printed data at that stage. We're not talking about graphical representations, so it's all printouts.

Misa: Right. You said that the business volume was growing. Do you remember some of the larger customers or some of the sources of that growth?

Baxter: A lot of the source of that growth was in the construction industry. We were doing a lot of finite element analysis of structures and structural engineering, as well as a lot of financial modelling so the data volumes had got high. For example, one of the customers; there was a tragic incident here in Melbourne, with a bridge called the West Gate Bridge, which is a quite a large bridge over the lower part of the Yarra River. When the West Gate Bridge was in the process of being built, it fell; or part of it fell. I think 35 people were killed. A lot of analysis was then done as to why did it fall and how can we design it better so we can build a proper one next time. So the company that had the structural design contract for the rebuild was a customer, and would come in and run its structural engineering programs in the Melbourne Data Centre, but using the Sydney computer. So they'd run through the Shadow system. And typically the output of a structural engineering analysis might be a couple hundred pages of numbers that an engineer would then need to interpret. And we were doing processing for many large engineering companies in buildings, in water works, not so much in electrical works. I

suppose there were some electrical works; but also oil exploration, and mining exploration, and mining design.

Misa: So these would still be more scientific-type applications, rather than business applications running payroll or financial things. So this was number crunching intensive.

Baxter: Yes, it was relatively little of that at that time; yes, big intensive computing stuff.

Misa: At some point in time, I'd be interested in your experiences with Cybernet.

Baxter: We'll get there.

Misa: We'll get there, okay.

Baxter: Yes. In fact, the 6600 in Sydney was part of what became Cybernet. It wasn't called Cybernet back in 1971, which is about the time we're talking about, but it really is what became Cybernet. My role at that point, at the start of all that, was to get the Shadow system on the 3300 and get it to talk to the 6600, and there were two complications very early on. One is that we'd been advised by I'm sure very competent and very highly paid people from another part of the world, that yes, we would be able to run Shadow on the computer that we had. Then we were advised that no, we would need to buy some more memory for it, and then we were advised that we could only buy this much memory for it, and that should be enough, and then we discovered it wasn't. We

had 81k words of memory on the 3300 and we really needed about 120k words. So those of us on the software team used to spend lots of time, usually late at night, trying to prune the programs so that they'd physically fit in the memory of the computer.

Misa: As compact as possible.

Baxter: And these are programs that are running fine on 3300s in the U.S. where they have larger configurations. We would have to take a lot of unused code out of them to make sure that they'd run, and, of course, then verify that they in fact still run, that we hadn't taken important stuff out. So that was one of the interesting challenges that took quite a bit of time, really, to get it running. The second complication was that the local Communications Authority, which was then the Postmaster General's Department [PMG, later became Telecom Australia, and is now called Telstra]; they had never implemented a long distance wideband line before. They had done short distance, like building to building, high speed data communications but never anything over maybe a kilometer or so; and certainly not something that went 1,000 kilometers. So their engineers needed quite a lot of assistance in debugging the interfaces. Our engineers worked with them to make sure that the hardware talked to the hardware. But then we had to make sure that the software correctly talked to the hardware, and then correctly talked to the computer in Sydney. So there was a lot of work by the PMG engineers, extremely competent people but just doing something they'd never done before. So that took a while and there's complications; and then something still didn't work. And we discovered eventually that was simply due to the distance; that some of the timing in the software was assuming that

you'd send data and you'd get a response by such-and-such a number of milliseconds. And in fact it didn't work because we were operating over a longer distance than any comparable configuration in America, so even though we were doing essentially the same job that data center and Shadow systems were doing in the U.S., because of the distance, we had quite a lot of chasing of problems that hadn't been encountered elsewhere in the world.

Misa: I think, from the e-mail that you sent to me, it was also the case that it was a bit complicated because there wasn't just one line but there were two local lines, relatively short . . .

Baxter: Yes, they were.

Misa: . . . but this long line was really the main technical challenge.

Baxter: Every time you have to go through the switching mechanism you're potentially introducing another delay. So there was that sort of delay.

Misa: That's right. The local computer, the local line, the long line, and then back to the local line in Sydney or Melbourne.

Baxter: Yes. So essentially, we send some bits or send a packet of data and wait for an acknowledgement. We don't get the acknowledgement, we assume the line's dropped

out. And in fact, the line hasn't dropped out, it's just that he's received it and sent the acknowledgement and then he doesn't get anything so *he* thinks the line's dropped out. By that time, the software's given up and we have to get it to work longer at both ends. So we had to get our colleagues in the Sydney Data Centre to modify their software, which they really didn't want to do.

Misa: Because each one of these millisecond delays to a computer is a vast amount of time.

Baxter: Yes. We're talking about milliseconds.

Misa: Milliseconds, not microseconds.

Baxter: Not microseconds, milliseconds, yes. And our computer 6600 had a cycle time if I remember rightly, of one microsecond; and the 3300 was something like six microseconds. So the computers themselves were all fast enough, except that the software we had told to expect a certain amount of time, but it needed to wait a lot longer than that. So it was interesting, it was all solvable, but it was something that hadn't been encountered elsewhere and it took us quite a bit of time to get it all running. When it got up it ran really well.

Misa: This is part of the history of networking that we tend not remember correctly because we think that the ARPANET was the first network. That's far from true because

all the big companies, Control Data, and DEC, and IBM were also running their own proprietary networks with some of the same kinds of experiments with networking, and distributed computing, and on and on and on.

Baxter: Yes. In later times, we were also running internal e-mail systems before anybody was using the term “e-mail.”

Misa: E-mail, that would be useful to record today, too.

Baxter: Yes. The key word there is Technotec.

Misa: Technotec, okay.

Baxter: T-E-C-H-N-O-T-E-C, which was our [CDC] system that ran somewhere, that effectively was our internal message switching system. But we think it was used quite a lot as the normal communication method. You could send faxes or whatever, which weren't really being used much then. So it was a rudimentary form of e-mail.

Misa: And you could use that not only to communicate within Australia, but then also to the U.S.?

Baxter: Yes. That was the main thing; we used it to communicate to the U.S. a lot. Most of the year, we didn't have an overlapping business time.

Misa: Right. I'm still puzzled at the plus-seventeen-hour/minus seventeen-hours; and I'm still scrambling to figure out what time it is.

Baxter: Right. So we're talking to Minneapolis or to the East Coast, we used to [pause]

Misa: So being asynchronous was a huge help then, in terms of being able to send messages?

Baxter: Yes, send something and get a response the following day. Yes.

Misa: Do you remember when you ended up getting Technotec here, roughly?

Baxter: It would've been in the early 1980s, I think, when we first started using it because I remember one issue I had with it. I was traveling to the U.S., traveling to Minneapolis on a business trip, so that was when I was in Sydney Professional Services, in 1981, and I'd been in communication with some guys in Denver. We did a lot of mining computing work out of Sydney. We had what we called Cybernet Mining Data Centre, where we did analysis for mine planning, and geological exploration, and so on. They were doing similar things in Denver; that was where the mine activity in the U.S. in Control Data was happening. And I'd been talking to a guy who'd been visiting us. He'd visit with us from Denver for a few weeks. So I was going to go to Minneapolis and I thought it'd be interesting to drop in to Denver and see what they're doing. So I was

communicating using Technotec and was getting no reply. I discovered later that in fact they had been replying and wondered why I hadn't acknowledged their reply. We were using the international Technotec and they were using the local North American Technotec, and they didn't realize that what they were sending out was going into a different network hub and it was never getting to us. Minor issue.

Misa: We think of e-mail as seamless but in the early days . . .

Baxter: There were certainly seams. [Laughs.]

Misa: Is it a good time to pick up the coming of Cybernet here?

Baxter: Yes, sure. Quite appropriate, because as time went on; as the whole data processing grew larger, it was determined that the amount of compute power that we had in Australia for Cybernet wasn't enough, that we needed more than just the one 6600. And this had been upgraded I guess a couple of times, by that stage. So in 1974, when the ultimate installation happened, in 1974; so the decision would've been in 1973 to install essentially a replica of the Sydney Data Centre based in Melbourne. So we had our own high speed scientific computing hub, and that was a Cyber 74, which is an upgraded technology version of the 6600. It ran the same operating system and had the same amount of onboard memory, but it could support larger volumes of mass storage; it had more data channels. And so we installed that in a customer's premises. One of our customers was BHP, in the city of Melbourne [about 2 miles away], so not down here in

St. Kilda Road. And they had worked an arrangement where they got some over the counter access to the data center, and allowed it to be installed in their building, so the special purpose computer room was built in their building. We installed the system probably in 1974; I guess the early part of 1974. So I was the site system analyst/manager, site support manager. One of the interesting things that happened very early in the piece, we had a dramatic failure of the hardware. The Cyber series and the 6600 were all water cooled computers and the hardware failed because the water pressure within the building BHP has was much higher than we had been told it was, and much higher than the tolerance of the computer. So, effectively, some gaskets blew in the cooling system and sprayed water throughout one bay of memory.

Misa: Oh, good gravy.

Baxter: And the first I knew of that was when I turned up one morning and the engineering leader came out and said, do you know anybody in the electronics industry in Melbourne? Well yes, I do. Do you know if they have a vacuum drying oven? I don't know what's a vacuum drying oven; so we got over that little problem. So I rang my friend in the industry and he said yes we do have a vacuum drying oven. And we put all the memory modules into trays, put them in the back of a taxi, and sent them out to the company that my friend worked for, and dried them out in their vacuum drying oven. And those memory modules were much, much better than the other memory that we had from then on, because they'd been cleaned. [Laughs.]

Misa: The memory modules, what would be the form of memory? Core memory or semiconductor memory?

Baxter: They were core memory. Were those core memory? Yes, I think they were. Yes. It was the next, the Cyber 170 series was semiconductor memory; the Cyber 70 was still core memory. And so our memory module would've been about six inches long, by about six inches wide, by about three inches deep. But anyway, there was a bay of a number of modules that made up the whole core memory of the machine. Those all had to be unscrewed and taken outside to be dried in vacuum.

Misa: They weren't damaged, they just needed to be dried out and cleaned up.

Baxter: Yes. They had received some spray or I think in some cases, some physical drenching, and in some cases maybe only a bit of vapor, so [there was some] condensation. That was interesting. But we got it sorted and we got the system up and running.

Misa: The vacuum drying oven did the miracle.

Baxter: Did what it was meant to do.

Misa: Okay.

Baxter: So in 1974, that machine was, I think, of those that we're allowed to know about, the most powerful computer in Australia — for about three weeks — until they put a CDC 7600 into CSIRO in Canberra. Mind you, I think there are other computers in Australia that we aren't allowed to know about, that are probably bigger. So the Melbourne Cybernet customers, and indeed, customers in other cities — Adelaide, Perth, Tasmania — connected into the Melbourne Data Centre instead of the Sydney Data Centre. So they were operating completely independently but we did have the ability to transfer data between them. But it wasn't a regular thing that somebody dialing into Melbourne to run stuff on the Sydney computer.

Misa: So almost two parallel systems, and some matching.

Baxter: Two parallel systems, yes, with communication between them. The next stage of Cybernet was the installation of a time-sharing machine in Melbourne, running the KRONOS operating system. So the two previous earlier data center machines ran SCOPE, which was more a batch processing oriented system, multi programming, meaning you have a number of programs in various stages of execution at the same time. The programs would sit in the computer and run, whereas the time-sharing, somebody would sit at a terminal and interact with the program. And so we installed that machine in the Melbourne Data Centre to run the time-sharing KRONOS system. In some cases, we could input data into the KRONOS system and send it to the SCOPE system, so we had more of a true network at that time. And that was set up in 1977, 1978, that sort of time.

Misa: So was the KRONOS machine a separate machine entirely?

Baxter: It was a separate machine entirely. It was a Cyber 73 and it was a completely separate machine, in a separate building because the Cyber 74 was in BHP, up in Melbourne city. Cyber 73 was installed down here at 499 St. Kilda Road, which is where Control Data had moved to by that time. No, sorry, it was in 598 St. Kilda Road. It was before they'd moved.

Misa: So there were two high end machines in Melbourne, but aimed at so to say different types of applications.

Baxter: Different types of applications, yes. Different levels of customer, I guess; in that some of the customers on the time share machine would've been possibly students or companies that would have one-off occasional computing requirements. Some of them were, I know, financial companies that maybe had dial-in terminals and would connect to the machine that way, from a portable dial-in terminal.

Misa: So it's a network they'd be running remote terminals over phone lines.

Baxter: Yes, sitting in their office, that they'd plug their telephone handset into the data port of the terminal and would dial in [pause]

Misa: Acoustically coupled?

Baxter: Acoustically; yes, mainly acoustically. Some of them were probably connected in a different way, but most of them were acoustically coupled. Many of them were portable, equivalent size like a typewriter but about the size of a large laptop computer these days. And it had a little printer instead of a disk drive. Often a thermal printer would've been part of the computer.

Misa: All of a sudden then you've got access to a quite powerful network.

Baxter: Yes.

Misa: Interesting to think about what kind of a psychological experience that may have been for people.

Baxter: Yes, that's right. So that takes us into the late 1970s and Cybernet. So some of the customers were larger industrial companies. One of the biggest customers that we had was Telecom Australia, which was the telecommunications authority, who were a major user of the Cybernet system in Melbourne. And they had a lot of specialized application software, some of which we had written for them.

Misa: My understanding is that the Telecom applications generated a lot of business and a lot of revenue then too.

Baxter: They generated a lot of revenue for our Professional Services division, and in the late 1970s I was the District Manager in Melbourne for Professional Services so I saw a lot of that revenue come across my desk. They also generated a lot of revenue for Cybernet and, in fact, if Professional Services hadn't gotten its revenue by writing the programs for Telecom, then Cybernet wouldn't have got its revenue either, so it was a hand-in-glove type of situation.

Misa: The two sides actually worked together. Could you comment on something that people have told me? In their perspective Cybernet, when it first came to Australia, was more directly coupled not to CDA, but to Minneapolis. Then over time it was more regularized and then run as a division of CDA.

Baxter: Yes, that's right. It wasn't called Cybernet back in the late 1960s, but it was physically in Sydney. The director of that division was in Sydney and reported back to Minneapolis, rather than to somebody in Control Data Australia headquarters in Melbourne. So business wise, it was somewhat autonomous from the rest of the Australian business and, yes, that was a bit of a challenge, I guess, for both parties. The structure changed in the early 1970s so that Data Services division [later Cybernet] reported as part of the regular Control Data Australia management. We went through a period where there was a lot of distancing, because of the different goals of the different business types. Cybernet, Computer Systems, Engineering, Professional Services, each had matrix management lines into Melbourne and back into Minneapolis; and had certain

business goals. Sometimes the business goals of one division got in the way of the business goals of other divisions.

Misa: Do you have an example?

Baxter: One example was in the late stages of Telecom, with Cybernet. The Telecom people were wanting to purchase their own computer. They were putting so much processing through it, arguably, it (the processing cost) justified them having their own system and there was a certain push for them to buy their own computer. Now, at that stage, the operating systems that were run by Cybernet and by hardware customers of Control Data were somewhat different. Cybernet had put different things into its operating system for data security, for accounting security, and so on. So the operating systems were a bit different. So what Telecom wanted to do was to have their own computer that wasn't shared with other people because it would be cheaper for them to run their own computer instead of paying fees to Cybernet. Our computer systems division was keen to sell them a computer because it would've been a fairly large sale, and Cybernet division wasn't keen to lose the revenue.

Misa: Because that was fairly large.

Baxter: Very large. So there was a non-sharing of goals to put it diplomatically that way. It got to the point where potentially there was an arrangement that could be worked out that there could be a facilities managed computer in Telecom premises, but managed by

Cybernet, but solely for Telecom's use so that the costs to Telecom would be as though they owned and operated the computer. Or, that computer could be in Control Data's premises but facilities managed as the Telecom computer, not the public use computer. And that could've happened; and it might've been able to be arranged so that Cybernet didn't lose the business but computer systems division got the business. And it never happened, and I guess in time Telecom went away.

Misa: Arranged a compromise or adjustment between those two competing choices of ongoing revenue versus a very sizeable sale.

Baxter: The business goals of the two divisions got in the way of each other. And there was some animosity locally between people in different divisions.

Misa: You mentioned security as being an important issue for Cybernet. Can you say a bit more about the computer security and what kind of a concern that was, and how Cybernet responded to that?

Baxter: I can give you a couple of examples. I remember in the early days, when we had the 6600 in Sydney, and public access terminals in Melbourne, I can remember one person from one customer having put his program into the computer, and waiting it to run, and watching — not watching it run because you couldn't — but watching it go through some time steps and waiting for his output; and sitting in front of the terminal and more or less wrapping his arms around it so that nobody else could see what was on

the screen, because in his case, I guess he's doing petroleum exploration or mining mineral exploration.

Misa: Somebody could've looked over his shoulder and gotten insight into something that was tradable knowledge.

Baxter: Might be tradable knowledge. So, you know, there's a degree of paranoia on his part. But when we then got to public access computers with data sharing, so that printouts would come to the data center, be printed on the data center's computer, and separated by job number by the computer operators. We needed to be sure that the job number for one customer went to that customer and didn't go to another customer. So there was a lot of control; lot of training of the computer operators. And within the systems, if we had terminals connected in, we needed to be sure that the data that was meant to be sent to terminal number three went to terminal number three.

Misa: And not to #4, or 5, or 6.

Baxter: I have an example. In 1976, we had by then sold a large computer to Defence Signals Directorate, which is the Australian equivalent of NSA, so they're doing code breaking and data analysis, at that time. And we were training them on the new system, because it was radically different from the old system. We had provided them with a terminal that was connected in to the Cybernet center so that they could run some of their programs, simply to make sure that the data worked properly, that their programs worked

correctly, and that their people were getting trained. I get a call from them one day — they were just across the way here, not too far, about a five-minute drive from the data center — I got a call from them one day: can you come around please. So I went around there and they showed me a printout that had come out on their terminal, from one of our other commercial customers.

Misa: Oops.

Baxter: Yes. We had a — I forget whether it was a hardware or a software fault — but there was some technical glitch that had meant that the wrong files had been sent to the wrong place. It was our concern that they'd seen somebody else's data. They were even more concerned that somebody else might see their data, because their data wasn't meant to be out of their building.

Misa: Right. And they're sending it into this public system.

Baxter: I mean, they were only sending non-secure stuff, but they were concerned at what does that mean with security of the operating system? And security of the data transmission? So there was also the data management and accounting, that typically saw that their operations were based on our program running and using so many computer cycles; or some many data processing seconds; and so much mass storage. So there had to be a lot of very accurate accounting of all that so that customers didn't get incorrectly billed.

Misa: In terms of security, there were also pressing concerns about data and program security within the computer, as well. Did you have any experience with that?

Baxter: Not that there was any issues with it, really. Within the computer, the operating system was set up pretty well so that programs couldn't interfere with each other and couldn't; every now and then you might get an issue, but not really. I think the operating system's internal security was pretty good.

Misa: I know with the proper time-sharing system, they're not supposed to be sharing resources or getting access to unauthorized resources. But, of course, sometimes that happens by accident or by design.

Baxter: Yes, well user names and passwords were probably not as secure as they are these days. So the general data security was to some extent to be learned as a new discipline back in the 1970s.

Misa: Right. And there's some parts that we're still learning today, actually.

Baxter: It's true.

Misa: Far from unsolved problems.

Baxter: The Cybernet operating system was different, say, from an operating system sold by Control Data on a computer going to a university, because the university didn't care so much about its student processing security or its research processing security because it was all within the university. And the industrial company, because it was all within the company. Whereas within Cybernet, we're dealing with the public, essentially, and each one thinks they're the only one there but of course, they're not.

Misa: Right, that's the illusion of time-sharing.

Baxter: So a lot of the software security needed to be at a higher level within Cybernet, for a higher level of surety. But the security was heavy, so part of what that meant was the features of the operating system, in many cases, tended to lag what was available within Control Data computer systems, simply because any security and data management features needed to be retrofitted whenever a new version of an operating system came out. So we had a large team of software support people in Cybernet doing that.

Misa: So you needed to get the feature but then you'd also need to make it secure for public access.

Baxter: Yes. One example we had, there was a new range of disk drives that Control Data released. They were available if you bought whatever model of Control Data computer to put in your building, you would get it with the new model disk drives. The

Cybernet system couldn't get handled by those disk drives because it needed some upgrades to the operating system, because it lagged. So it was sometimes many months before the newer model disk drive might be available on the Cybernet system. Even though when they were there, the even greater capacity, and high speed, and whatever, it just took longer to get all that stuff implemented because there were so many other resource issues.

Misa: Communication peripherals is, in fact, a security issue because of the nature of identifying the peripheral, and on and on.

Baxter: Yes.

Misa: A question on your contacts with CDC people; it could be in Minneapolis, but also there were other facilities, in terms of software; in California, Sunnyvale, and La Jolla, too, I gather.

Baxter: Yes, and Rockville.

Misa: What kind of contact did you have with those colleagues and what kinds of communications did you have with people in the U.S.?

Baxter: I guess we had, at that stage, if we needed high speed communication we could ring them on the phone but we were discouraged from doing that because it was

expensive. Did we have fax? We didn't really have facsimile transmission, so we'd send them something in the mail; and likely, we would exchange data with them because we would be able to dial in via the Cybernet network, or via the Technotec network I mentioned earlier. So we had that type of communication. But to a large extent, particularly through to the mid-1970s, we were pretty much on our own. In many cases, our sites, we had somebody from one of those other sites who had had the type of experience that; and our people would go there sometimes to spend some time to do some learning.

Misa: How common was that for somebody here in this part of CDA that you were involved with, to go on a regular or semi-regular basis to Minneapolis?

Baxter: Not very.

Misa: Not very.

Baxter: No. My first trip to Minneapolis was in 1979, for example. So I'd been through a lot of technical roles at that stage, and by that time I was the district manager professional services. My general manager arranged for me to go on a sort of orientation visit to Minneapolis largely because I hadn't been here before, but then to meet people who were doing similar roles to mine who'd been doing them a bit longer. And so I went to Minneapolis, and Toronto, and Houston, and a couple of other places. I was away for a month, at that stage.

Misa: A month.

Baxter: Yes. But every now and then we would have software specialists associated with our computer systems division who would go over because we needed to run benchmarks to demonstrate to a customer that our computer would run the programs that they needed to run. So we'd get a suite of programs from the customer, debug them here probably, but then take them over to Minneapolis to run them on a configuration equivalent to that we were trying to sell to the customer. And so somebody might be away for a couple of weeks, or in one case, maybe a couple of months, finally debugging and then running benchmarks that they need to run on so we could demonstrate to the customer that yes, we can do 70 hours of computing in three minutes. It was quite common for somebody to be there; and hopefully, somebody from there who would — whoever that was — would then pass information around locally. And we usually had, maybe once a year, we would have a group of specialists come out on a marketing visit. So some marketing people and some technical people would tell us about what good new things were coming out and so we'd establish communication with those guys.

Misa: So it would be somebody from Minneapolis coming here?

Baxter: From Minneapolis or from wherever. We'd set up a conference for a couple of days, and run presentations, and have question and answer sessions. That happened at least annually; I think more often than that.

Misa: So that would be another type of communication.

Baxter: Yes. And there were regular publications that came out within the technical areas. We had the thing called *PSI*, which is *Programming Systems Information*, I think it stood for; it was sort of like a monthly newsletter that had inputs, went to and from people all over the world. And then now they were consolidated and published for people all over the world. So we might have somebody — in fact, we did because he later came and worked for us — there was a guy who worked in South Africa and he knew lots about the database software, and he would write an article about a certain aspect of the database software. He'd send that to Minneapolis and they'd publish it in the newsletter, and so everybody else would get to read about this particular thing that we maybe hadn't known before.

Misa: When did database software become a large concern for you here?

Baxter: First one I can really think of was in the early 1970s, when we were selling a computer system to the State Government Insurance Office in Queensland and we were trying to win them away from ICL. And so they had a number of programs and they had a transaction processing system, and so we needed to demonstrate that we could run their transaction processing and database.

Misa: That was the early 1970s.

Baxter: Must have been 1972, 1973, I think, because we ran the benchmarks on the computer at Melbourne University, and that's about when the Cyber 72 was installed at Melbourne University.

Misa: And were there other types of customers or other types of applications that database software became useful for?

Baxter: Well, the Telecom applications were mainly large databases, but they are pretty much custom written databases. Control Data had a number of different types of database systems suitable for different types of applications. Some of our customers might use one, and some might use a different one, depending whether they're transaction processing, or relational database, or whatever. But that was all coming to be, really, in the late 1970s, early 1980s.

Misa: So several different types of database management software, depending on the specific application?

Baxter: Yes, and some of those were database management software that was industry generic. The software that was written by a software company that might run on an IBM, or a Honeywell, or a Burroughs, and also on a Control Data computer and it would look the same, sort of. But it was the same piece of software, essentially, from that software vendor.

Misa: And what would be some of the, you said, industry generic software?

Baxter: One called Total. T-O-T-A-L, is one. It was originally written in France and there's another called IDMS, I think.

Misa: I-D-M-S.

Baxter: I think it was called IDMS. And there was another called Basis, which came out of Batelle Laboratories.

Misa: It's so interesting because databases are stable now, and relational databases have sort of ruled the roost, but in the 1970s, particularly, there were many different types of database applications and a great variety of different approaches.

Baxter: That's right. We had a couple of people that knew quite a bit about databases and advantages and disadvantages of different architectures. A lot of that you needed to know because if you got the wrong architecture on the computer of the day, it might run a lot slower; whereas today, more or less architecture independent. The computing system underneath it is so much quicker it nearly doesn't matter; ultimately it does, some way. But the computing speeds we're talking about and the data access speeds, the mass storage speeds, were such that choosing the wrong architecture could be really, really time expensive, or dollar expensive.

Misa: Yes. Do you have any examples where there was either a good choice or a not so good choice?

Baxter: No, not really; none that I can think of. But I can think of a couple of examples where somebody wanted to design — they didn't know it was going to be called a database but that's essentially what they wanted — and we spent a bit of time discussing what type of architecture would be more appropriate for the requirements at the time, whether it was a fully relational database, or index sequential, or whatever it might be. There was a bit going on there.

Misa: I was just looking at the e-mail you sent me. I think that we talked at least some about the 915 page reader . . .

Baxter: Yes.

Misa: . . . the wide band data link between Melbourne and Sydney; I think you touched on also the installation and commissioning of the Cyber 175 at Defence Signals Directorate. Are there other notable projects that we should make sure to include in our conversation?

Baxter: Well, the education stuff, I guess, was something different. It was probably in 1982 because I was in Sydney. I think it was for an Australia Computer Conference, or

similar. Don Bitzer [from University of Chicago Urbana-Champaign], who was one of the original architects of the PLATO system, came out to Australia and Control Data sponsored him, or at least hosted him when he was here. One of our specialists traveled with him when he was here for this computer conference. He lectured at the conference but he also did some customer visits while he was here. So that was the first exposure that we had in Australia to PLATO. And after that, we had some PLATO terminals set up that were connected into the U.S.; or connected into a PLATO system somewhere; don't know where.

Misa: Somewhere. [Laughs.]

Baxter: Somewhere. By that time, we didn't necessarily care. But I remember in 1982, I actually ran some training. I did a couple of training courses on PLATO to learn about mining engineering because we had mining engineering people working for us, working for me; so I needed to understand what this language was that they spoke. So I had some experience with PLATO doing some of that. We set up an education division, which was marketing what was then becoming available as micro PLATO.

Misa: Micro PLATO.

Baxter: Yes, so small computers running individual PLATO systems with portable courseware; so the courseware would come on a floppy disk and you'd load that into the computer and run your training course. And the business of this division was selling

courseware and selling micro PLATO computers and I got a little bit involved with that in the late 1970s. No, mid-1980s.

Misa: Mid 1980s.

Baxter: Yes. In fact, I took over the role of analyst manager of the support team. We had a half dozen people, some of whom had a computing background but some of whom had an education background. For example, one guy, who was based in the Sydney office; initially, he was based in the New Zealand office but then he moved over to our Sydney office; he had been an Air Force Officer and the head of personnel in New Zealand Department of Defence so he came from a personnel training background. Computers was not in his background; but he knew how to set up training programs so he was an education consultant. So we had a group of people who were educational consultants, who knew a bit of that computing, and then some people who were computing people who were getting to know a bit about how to deliver education on computers.

Misa: PLATO, of course, had tremendous front end potential but also tremendously high cost, so the micro PLATO was an attempt to get a cost that would be more attractive.

Baxter: Yes. And there was a number of organizations in the U.S. which were being set up with business and technology centers, which were walk-in centers for people, and one of the things they offered was PLATO training. And I guess as they were being rolled out, micro PLATO was being focused on. We actually tripped over our own feet at one

point because we were dealing with the Department of Social Security, I guess it was, here. They were wanting to set up training for their staff Australia-wide in their social security offices, which would be typically be offices in suburbs or towns. So we're talking thousands of people and they needed to train them in some of the new compliance issues or new products that they were offering, and they wanted network delivery of all this training.

Misa: So you make one change and have it go system wide.

Baxter: Yes. And so there was PLATO, which ran on a specialist computer, a new specialist terminal, which would've been horrendously expensive. We had micro PLATO, which would run on individual small computers, but you had an enormous distribution issue of the new courseware because you had to print up new disks and send them, and who knows whether they actually use them properly. But at that stage in the book, the "Red Book" it was called, which was the sales and pricing manual for Control Data.

Misa: The Red Book was the official list.

Baxter: The official, this is what you propose to the customer. There was a system called PCD2, PLATO Courseware Delivery, I guess it was. But PCD-2 was a large software application that ran on a mainframe computer, that could connect to more or less anybody's terminal, and it seemed like the ideal way to deliver this hybrid centralized

courseware. So we proposed it to a customer, and had a number of discussions with the customer, and wrote a detailed proposal. A couple of us went to Minneapolis to go through the final stages of getting the proposal signed off, and the vice president, when we presented it to him, he said, you are not allowed to sell PCD2; it is not what we are focusing on; we're focusing on PCD3, which is the standalone micro product. So why is it in the Red Book? I don't know why it's in the Red Book, but you're not allowed to sell it.

Misa: Okay. So PCD2 was a predecessor to micro PLATO?

Baxter: It was more a parallel.

Misa: Parallel, okay.

Baxter: But it seemed to us that it was ideal as a network; do your authoring centrally, do your courseware distribution centrally, but your actual course taking would be at remote systems. But we were not allowed to propose it.

Misa: So PCD2 was forbidden.

Baxter: Yes. Well, apparently, forbidden in any regard and nobody really knows when it really worked out how or why it was there, but apparently it wasn't [pause]

Misa: Why it got into the Red Book.

Baxter: Yes. I guess it was somebody's idea at the time. So we'd spent quite a few weeks and including a more or less specialized trip to Minneapolis to knock that proposal together.

Misa: That must have been somewhat frustrating for you to have it more or less taken away.

Baxter: A little bit, yes. And it was, I suppose, to some extent that was an example of *this* division's goals getting in the way of *that* division's business goals. This was a computer systems sale but using education division products.

Misa: Yes.

Baxter: But the education division apparently didn't want to sell *that* product, they wanted to sell *this* product. So, yes, frustrating is a good word. That's a polite word. [Laughs.] But it was great fun and working with the education division was particularly good. At that time, the whole computer-based education industry worldwide was starting to get some speed. Apple computers were just coming out and we, Control Data's education division in Australia, had a distribution agency for courseware, diskettes that ran on Apple computers, for example, Apple IIs. So nothing to do with anything that originated in Control Data Corporation, but courses that might've been written by Bloggs

and Company in England, ran on Apple IIs and taught people how to do *this*, whatever *this* might be; how to take apart a carburetor of an engine. And Control Data Australia had the agency to sell that type of courseware.

Misa: The agency, yes.

Baxter: So we were actively marketing.

Misa: Essentially, a license to do that for Australia.

Baxter: Yes. In fact, we had distributorship, so there were companies set up, which were book companies, so book stores; or analogous to that, anyway, and a little bit analogous to say a Blockbuster Movie Hire Store. So the public could go in and browse through and buy that diskette or that courseware, take it home and run it on the Apple II or later on the IBM PC. And so we had the distributorship for that, and we were then selling to these different stores to be the final retailers. So it was a distributor/retailer business model; quite different to anything that Control Data had been doing.

Misa: It'd be hugely different because most computer companies aren't involved in retailing anything at all. That must've been a real challenge to set up.

Baxter: Yes. Many of the retailers were maybe sourcing that type of material from elsewhere in the world. But for a number of types of packages, we had the Australian

rights to the distribution of it. And that, on the face of it, looked like a good business but I don't know what pulled it down or turned it off but it was a change in management and that business wasn't there anymore.

Misa: Would you like to make any comments about the more troubled times in the mid-1980s?

Baxter: Yes, I guess the mid-1980s was around the time when Control Data was probably primarily seen as a mainframe computer company and lots of the customer base were moving away from the mainframe computers to what we would call departmental computers. Digital Equipment, for example, was getting into universities and not selling a computer system to the university but selling a computer system to the physics department, and another one to the chemistry department, and another one to the electrical engineering department, who previously would've each done their computing on the computer center's main system. We didn't know how to compete with that because we really didn't have an offering that competed at that level, and there was a certain amount of blinkering, I think, within Control Data that said when those people wake up that they really need powerful computers they'll come back to us, when in fact, those people didn't wake up. Or if they did, they woke up to the fact that the existing computer provider could provide another, or a more powerful one of what they had. So to some extent, in the vernacular, they ate our lunch. And I think we struggled with that, and I remember I was given a paper by the then managing director here to review. At that stage I was in the marketing division and doing on the mainframe side of the business. He

gave me a paper which was talking about the five-year plan for production, or this next range of large scale computers. And it was still talking about water cooled, liquid cooled computers when, in fact, the cost of ownership of those things was so high because you needed to put in plumbing infrastructure as well as just plug it into electricity. You actually got more power out of it, probably, but the cost of ownership was just so high that others were able to buy two, or three, or four, or five.

Misa: And distribute them . . .

Baxter: Heck yes.

Misa: . . . and equivalent computing power without the hoopla of the water cooling.

Baxter: Yes, equivalent enough, anyway, for what they wanted, so. And the market here wasn't big enough or the individual customer weren't big enough to buy big computers. And so we needed sometimes two or three [customers] to share a big one, or a big facility, like a Melbourne University, to get a big one — which they did. But other universities and many companies were buying smaller computers simply because they were physically smaller, so they could put them in their own office building and not have to replumb the building in order to put them in. So that was something that was happening in the late 1970s and I think through the 1980s. Control Data was pulling itself in directions: is it a hardware company or is it a service company? And there were mixed messages coming to us here, probably, and mixed messages certainly going to the

customer base. You don't care about us anymore because all you're going to be doing is selling Cybernet. Well, that's not really true; we do care about you it's just that we might deal with you in a different way.

Misa: You felt there were mixed messages coming from CDC headquarters so in some way you're caught in between and had to deal with that.

Baxter: To some extent, yes. To us at CDA and to our customers. But I think the industry was having a big shake-out; starting to have a big shake-out at that time.

Misa: Oh, yes.

Baxter: That's before Burroughs and Univac rolled themselves together.

Misa: That's right.

Baxter: Yes, probably about the same, but later on, lots of those companies got divided up or eaten up.

Misa: Even IBM ended up basically being extremely profitable until the 1990s. So it was a fundamental transition; people just didn't see minicomputers, that's the departmental computers you're talking about; let alone microcomputers.

Baxter: Let alone microcomputers. Well, I know for a fact, we had a manager in one of our divisions; that was after the time that Control Data had acquired [IBM's] Service Bureau Corporation from the U.S., and we had a version of SBC running here, Call 370, and one of the managers in that division was fired because he was running a business on the side selling microcomputers and that was seen to be a conflict of interest.

Misa: We were just talking about sort of the challenges and shifts in the computer market in the mid-1980s and how different companies responded to it.

Baxter: I guess one of the things that happened within Control Data around that time, we'd been through a few managing directors in my time with the company, some of them locals, more of them expatriates.

Misa: Americans coming here.

Baxter: Americans [and other nationalities] coming out here, some of them coming out here — I'm going to be a little bit rude but I won't name names — I think some of them came out here to run the Australian business. Some of them came out in order to get experience running a business so that they could then go back and run a real business. And some of them came out maybe because they couldn't find any other place to put them. They were a mixture of them. Some of them I think did a reasonable job, some of them did a very good job, and some probably we were happy when they went back. But by the mid-1980s, the corporate mindset, I think, it seemed was getting pretty defensive.

There were a couple of personnel cutbacks at the time; we had one that happened in probably the early 1980s, when Control Data Australia was growing and doing lots of good business. And I think there was an across-the-board 10 percent head count reduction, and we needed to take that because regardless of how well we were doing we needed to be seen to be sharing the pain. But in fact, most of the business turndown was in North America and Europe. That was disappointing; we weren't being recognized for as well as we were doing ourselves. But we had one appointment; a guy who was probably quite a good managing director; he'd been a marketing director in another large computer company and his basic method was getting out and spending money to try and get money to grow the business at a time when the corporation was contracting. So his operating style didn't fit and he probably was with us less than a year, probably not much more than six months, simply because his style didn't fit with what the corporation wanted to do.

Misa: It was a time of retrenchment, you could say.

Baxter: Retrenchment, yes. And probably if one was looking at it from the outside and looking at it from where we are today, it was signs that the business was starting to go out the back door. It was around about the same time that the ETA Systems [Subsidiary] was canned, for example. And there were new major computing ventures going on that were not going to be seen through because there were probably a number of different streams of advanced computing or supercomputing, not all of which could be supported. I know that the ETA I because I was at ETA for a brief visit; and in fact, I was there the

first day that they turned the first ETA on. It worked. I saw all the guys walking on air, didn't touch the floor. They turned it on and the thing worked.

Misa: It worked, yes.

Baxter: Yes. John O'Neil and I were back there at the time. But then we had another one of our young analysts go over there for a while and he rang his colleague in Canberra, fairly late on a Sunday night, and said I just came into the lab to do some work and there's a sign on the door that says all the employees meet at the, I guess it's the City Hall or whatever, at 9:00 a.m. on Monday morning. So we were probably the first people in the world outside of Control Data or ETA management who knew that.

Misa: To know that it's big news and not good news.

Baxter: Yes, that was the end of it. In fact, we'd sold one ETA. We sold an ETA-6 to Bureau of Meteorology, and we had a contract to deliver it. I was gone by the time that whatever got delivered, got delivered, but we lost our way a bit, in a number of different ways, I think. I ended up, had a couple of changes in management, and decided what I wanted to continue doing. So I left in mid-1987.

Misa: And what did you do following that?

Baxter: Well, my former manager had left a couple of months earlier and he'd founded a small software company that was dealing with expert systems technology and he was looking for someone to work on the technical side of that. So I went in and joined him, developing expert system applications for customers. And then later, retailing some expert system development software.

Misa: Somebody should come up with a list of all the companies that CDA people founded. It's a very large number.

Baxter: Yes. I wasn't there at exactly the start of it, but I suppose technically, I was employee number two and we ran that business for five years until, as they say, how do you make a small business? You take a slightly larger business. But the guy that founded it, he left after about a year; he decided it wasn't going well enough for his lifestyle and didn't want to stick it out. I stuck it out for a bit longer. I eventually got hired by a company that had been one of my customers.

Misa: Oh really?

Baxter: Yes. So that sort of worked out.

Misa: Which company was that?

Baxter: It's a company called Invetech, which has nothing to do with the computer industry. It's a technology development company.

Misa: Tell me the name?

Baxter: Invetech, I-N-V-E-T-E-C-H. Invetech. No "R" in it. Invetech, which I guess initially stood for *investment in technology*. But it was an innovation, product design, development, engineering company; the sort of company that would design components for a hovering rocket that was used as a target by the Navy. And that also designed the beds that were used in the apartments of the athletes for the Sydney Olympic Games.

Misa: Oh, so okay, bunch of different.

Baxter: Very diverse in technical design; some very complex engineering; chemical plants. And I was doing expert systems work, initially, and then simulation and then business strategy activities, working for small business clients devising their business strategy. So we were a very diverse company.

Misa: Do you have any overall reflections on the CDA times? Some aspect of the company that sticks with you?

Baxter: I think the thing that really sticks with me is that regularly, once a month, we get 15 to 20 people having lunch together. And it's not the same 15 or 20 people. We had, what, 25 or something this week?

Misa: Yes, not 30 but close.

Baxter: So that's a monthly lunch; and that would be; there's probably about 10 individuals every time, and then different other ones over a population of maybe 50 or more who would come. And then biennially, we have a reunion. I think the last reunion we had, I'm not sure, there was certainly more than 80, probably close to 100 people. But not too long ago, one had more than 200 people at it. So I think part of the culture is there are a lot of really, really good people who enjoyed working together, and enjoyed working in the place because it was fun. Now, I retired early last year from Invetech, and my attitude for the past four or five years has been I wouldn't mind not doing quite as much, but I keep doing what I'm doing as long as I'm having fun and as long as I'm useful. Having fun is my call; being useful is somebody else's call. And ultimately, we sort of made the call that I wasn't having quite as much fun and I probably wasn't going to be as useful. So it was a good time to retire.

Misa: Good time to retire, yes.

Baxter: Yes. And Control Data was like that. I hated leaving, but I needed to leave because I wasn't having fun. I'd ceased having fun in six months or so. And that was a

couple of management changes and things, and a bit of a role change; but I saw a tunnel in front of me rather than a light, put it that way.

Misa: Okay, yes.

Baxter: But it's been really good to maintain the contact with those people, some of whom I've now known for 40 years.

Misa: For some, almost 50 years now, I guess.

Baxter: I haven't known them that long, but about 45 years, now. Some of them aren't around anymore, but that's the way of the world. It was a really fun place to work when I first joined there, and I guess that's one aspect of that. I worked in a company [Felt and Textiles] that was a British-style managed company, I guess, a sort of management hierarchy was more British than American if you want to think about it that way. And I was paid a reasonable salary, and I had the interview with the guy at Control Data and he said how much do you think you'd want to get paid? And I said I'm not looking to move for the money but I wouldn't want to be getting any less than what I've been getting here. He looked at me and said oh, we've been advertising at 20 percent more than that.

Misa: 20 percent.

Baxter: We'd have to pay you what we've been advertising as a minimum. I said okay.

Misa: Suffer through that, yes.

Baxter: But I was happy, doing what I enjoyed doing, and as you can see from the discussion, I've had a number of different things, working on other peoples' programs. I'm dealing with the diverse range of hardware and I guess part of my education background was understanding how some of the hardware worked, not to the extent of being able to fix the hardware but at least understand the logical flow of things through the computer, and how the disk drive worked, physically, rather than just you're then stuck with a disk drive when it comes back. And so interacting with engineers, with hardware engineers, and quite often needing to debug a problem that we didn't know at the start, is this a software problem or is this a hardware problem. And usually he thinks it's a software problem and I think it's a hardware problem, but, so we each want the other one to fix it.

Misa: That's right. [Laughs.]

Baxter: [Laughs.] So there have been occasions when I thought it was a software problem and he was convinced it was a hardware problem, and so we worked jointly and yes, we fixed his hardware problem. So, you know, that was all fun; and then computer systems, the data networks, databases, education sort of things, marketing. I was responsible for marketing campaigns and so on, at one point, and getting marketing

information together and distributing marketing information to the sales force. I mentioned at different levels, technical management.

Misa: Yes, seeing the interesting sides of the entirety of CDA.

Baxter: I worked in the two different offices, but at different times, had contact with all of the other Control Data offices because when I was district manager in Melbourne, I had Adelaide and Perth professional services people reporting to me. And when I was in Sydney I had Brisbane, Newcastle, and Canberra reporting to me, so 50 people in one area and 30 or something like 35. And then at one stage when I was in the education area I also looked after the professional services people in New Zealand. So I had some knowledge of, again, a different business; a different scale; a different flavor of business that they were doing out of there. So a wide range of stuff.

Misa: Is there anything else of interest that we should make sure to record this afternoon?

Baxter: Nothing that I can think of, really. If I do think of anything, I'll append it to the transcript when it comes back. But no, it's been really fun talking to you and dredging up some things.

Misa: Yes, well great. Thanks a lot.

Baxter: That's alright.