



Judith Scott

Interviewed by

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Welcome to the Archives of Information Technology. It's the 11th of December 2018 and we're in the offices of the Worshipful Company of Information Technologists in Smithfield, London. I'm Ian Symonds and I've been working in Information Technology and management consultancy since 1976, a period of enormous change in the industry. Today, I'm talking to Judith Scott. After taking a postgraduate diploma in computer science at Cambridge University, Judith started her IT career in Canada as a systems engineer. She later joined Gandalf Systems, working in market research and long-term corporate planning. She then managed the UK subsidiary until 1995 when she became Chief Executive of the British Computer Society. We'll be talking about Judith's background influences and some key events that shaped her career in the interview today. Judith, welcome.

Welcome.

Just to kick us off, where and when were you born?

I was born in Altrincham, just outside Manchester, in 1942.

And your parents, what were their occupations?

My mother was a dietitian, but practised as a schoolteacher and my father was a doctor.

Okay. Was there any pressure on you to follow in your parents' footsteps and study medicine or anything like that?

[0:01:38]

My father's family were all medics, but my father was not keen that I should pursue medicine, per se, because he said it was very – at the time – it was a very difficult career for women to pursue and he thought I might be better doing something else. Not that he didn't want me to have a career, but he just felt I didn't need to put myself in a difficult position.

Okay. That's intriguing. Your father, or your grandfather was in medicine as well, wasn't he?

He was a surgeon, yes.

Yeah, yeah. So it was a family tradition.

And his cousins were pharmacists, so...

Okay. And your early schooling, as I understand it, was abroad in Malawi.

For nearly a four-year period, yes.

How did the family end up there?

My father qualified as a doctor in 1939 and got called up into the Royal Army Medical Corps. And at the end of the war, the Health Service hadn't been formed, but it was clear it was going to be, and he had no, he would have had to have bought a practice and then had it privat... taken out from under him within a few years. And the Commonwealth Office were busy recruiting at the end of the war for doctors for the colonies, and at the time, Malawi, which was then Nyasaland, was a crown protectorate so we did a tour of duty in what's now Malawi.

[0:03:07]

Do you remember much about it?

Bits of it, yes. It's in the Great Rift Valley in Africa, at the southern end of it, and it's, it's actually quite a nice climate because it's got some altitude to it. The country at the time was very, it was coming to the end of its period as a tribal nation, not overly populated, there were very few Europeans there, just at the administration really to run the government, and a few professional people like doctors and so on. But it was a, it was almost idyllic in a kind of Garden of Eden type of way, before all the awful things that Western Europeans do to countries had happened to it. [laughs]

So you take away some pleasant memories from there, by the sound of it?

Very pleasant, yeah.

But anyway, in 1949 your family came back to the UK.

Yeah.

[0:04:10]

What was your family life like, generally?

Well, my father being a practising GP – and at that stage he had the premises in the house – so we lived with him being a doctor and having to sort of manage our lives around the fact that there were things going on in the house that we couldn't have anything to do with. Which was fine, I mean it was a big house, it needed to be a big house to have the surgery in it. But it was, I mean life was not all that easy in the late forties and early fifties, there was still rationing in place, but my parents were encouraging and...

Supportive.

Supportive and so on.

Did you have brothers and sisters?

I have two brothers. Both younger than me. They were born in Malawi.

Alright. And what were the important influences on you in your early life? We'll come on to your education in a minute. I suppose, was there anything at this stage that you can look back on?

Well, my parents, I mean my father, we came back from Africa because I was going to, not too far off being eight, and schooling was not possible in Malawi after that, so I was going to have to go away to school and my parents weren't happy about doing

that. So we all came back to the UK and I didn't go away to school. Not at that stage anyway.

[0:05:48]

So, tell us a little bit about your education after you came back to the UK then, what schools did you go to...?

Oh well, I went to the local primary school. Which was not equipped with a school at all, it operated out of the village hall.

And sorry, where was that again?

Bocking End Primary School. It operated out of the village hall. Well, yeah, community centre you'd call it these days. If it's a village it's a village hall. But they had two classes of 40 children back-to-back in it, in it for teaching purposes. So it wasn't exactly an ideal learning environment. It was okay. My parents opted to send my brothers to private school, rather than put them in there. But I didn't have all that long to do there and I fared okay, I mean I got through my eleven-plus.

And then you went to secondary school, where was that?

That was in Clacton, and I did go – it was a Church of England secondary school – and I did go as a boarder then. The- Essex, which is where we were living, didn't have enough grammar school places so I qualified for a grammar school place, but they offered to pay the tuition fees at private schools if the parents paid the other side of things. And I would have had to have gone to Colchester anyway, to go to a grammar school. Which meant travelling every day.

Sure. And what subjects did you study or did you do for A levels at...

At A levels I did maths, physics and chemistry, but up until, in fact when I finished my, what were then O levels, I was torn between doing classics and sciences, because I enjoyed Classics.

Okay. And what swung you, d'you think, in the end?

I could always do Classics for myself, science was going to be difficult to do for myself.

I've heard that said. Yes. And what was the relationship like with your teachers and tutors at school?

[sighs] It was fine. The sixth form at the school was quite small and I was the only person doing maths, so I had, well, I had very good teaching and a very good maths teacher. It was a bit, it was a bit on my own in the sense that I didn't have colleagues to share things with and talk about the stuff out of school hours. So in retrospect I would have probably asked to have moved, but I didn't know that at the time.

Okay. And then, so you did well in your A levels and you then went to university in...

St Andrews.

Yeah. In 1961, I think. So we're at 1961 now, at St Andrews.

[0:08:53]

I had trouble getting into university.

Why was that?

Because I was female and doing maths. [laughs] And they were short of science places in Britain at the time. There were disproportionately more arts places than science places. So, for example, in Nottingham where I was interviewed, I was interviewed in lots of places, the professor there said he had a hundred candidates who could all do the course and he only had ten places. So, you know, it was a tough time to be trying to get into university to do maths.

What did they say to you then, that made you think that because you were a woman it wasn't appropriate or...

Well, the chap at Nottingham was quite clear. He said I'm going to have to give this to the people I think that will use it later.

It's interesting, isn't it, just as a reflection of the times now, how things...

Yes. I mean it was the times and I actually felt sorry for him because he had a difficult problem. How you choose ten people out of a hundred, all of whom are capable of doing the course, it anybody's guess.

But anyway, you were accepted at St Andrews, which is a very good university.

Yes.

So you did alright.

Yes, I did. [laughs]

[0:10:04]

And what was your life like at St Andrews then?

Oh, wonderful. In retrospect I'm really glad I went there, because it's a small university and you get a much – and I think it still is quite small, it's a bit bigger than it was when I went there – but you do get a good opportunity to interact with the academic stuff if you're in a small university, which I think is not as easy if you're in a big metropolitan university like Birmingham or, for example, London. That while there's some opportunity, we had a lot of lectures that were changed into tutorials because the numbers were so small. And they were much more engaging and informal and so on.

And what was your relationship like with your tutors and so on at university?

They were great. I mean it's a period I look back on, I'm sure many people do, with great fondness. University's a time for growing up, but it's also a time for exploring ideas and...

And did you, I mean did you have any other enthusiasms and interests outside of your academic work at university?

Yeah, I did a bit of sport, did a bit of- I was part of the Highland dancing team at the time.

What sports did you play?

Oh, a bit of tennis and, I didn't like field sports in the winter, it was too cold up there. And I did some walking and stuff, I mean it's a lovely part of the world to be up in. And I had a range of friends who, again, that's because of the small university it was possible to have friends that were outside the faculty. So I had friends that were in dentistry and some of the other science disciplines and in medicine and in history and Classics. I mean it was a great place because you got the opportunity to have a wide range of contacts.

[0:12:08]

And who and what would you say were the most important influences on you at this time?

Erm... [pause] Probably... well, certain the academic staff in the maths department, because I was reading maths as a degree, but in the research arm of the department there was somebody working in computing in the very early stages of computing and I had encountered him, and that's what got me interested in computing as a possible career, what he was working on. And, well, I didn't do anything with it formally in the sense of my degree, I did have the opportunity to spend a bit of time, and that certainly shaped what I thought about for a career.

Okay, and computing didn't play any, there was no programming or anything as part of the degree at that time?

No, I was doing a pure maths degree.

Yeah, okay. And what parts of pure maths did you specialise in for your finals?

I don't remember any more. [laughing] It's so long ago. Other than knowing I didn't want to go on doing that forever, I mean it was a good discipline and I certainly had enjoyed, we had to do applied maths in the first two years and I'd enjoyed that more than the pure maths subsequently. There was nothing wrong with it, it was just I knew that when I was done with that, that wasn't going to be my thing for the future.

Okay, but you got a good degree?

Yeah.

[0:13:51]

And then you went on from there, so you talked about developing an interest in computers at this time and then obviously when you graduated you went to do a postgraduate diploma at Cambridge.

At Cambridge, yeah. I could have gone, I think at the time it was possible to go to Cambridge, Southampton and Manchester. And I quite fancied Cambridge. [laughs] Also, the Maths Lab had a very good reputation there. I could have done a Masters at the other two, Cambridge only ever did the diploma programme. But everywhere else it would have been run as a Masters programme. And it was a wonderful opportunity. I'm sure Manchester would have been and Southampton would have been as well, but the maths lab was a wonderful place to be in those...

And you came into contact with a number of sort of some of the pioneers...

Roger Needham.

Tell us about a few of those.

Well, at the time that I was there, while I was there, they turned EDSAC off, if you know what EDSAC is. EDSAC was the first computer that Cambridge had and it was Maurice Wilkes' great sort of pride and joy. And it provided the computing services for the university from somewhere in the mid-fifties through until the early sixties, at which point it was being replaced by an ICL system. Or it would have been ICT, I guess, at that stage. I forget the company names and how they changed. And it was late being delivered, so EDSAC ran for a whole year longer, and Cambridge got a cheap deal on the computer because it came with no software. So the Maths Lab staff - David Hartley, David Baron, and those sorts of people - were all busy writing a software suite to run the new computer when it came in. So I was there for the swansong of EDSAC and the early stages of introducing the computing system. And I learnt a huge amount from them because they were having to think about issues to do with multi-user timesharing, multi-tasking. I mean there were lots of things that hadn't been addressed commercially that Cambridge were just doing at the time. They may well have been going on in Manchester as well, but it was, because they were having to do it from the ground up, and they were having to write all the compilers, just everything, all they'd got was machine language, which I learnt to use. But it was a fascinating period to be involved in a department that was just doing everything for the first time.

[0:16:43]

What would you say, what were your most important educational achievements, would you say? From your whole, of your education?

I mean I got a good degree from St Andrews and I then had my interest in computer science really ramped up by the diploma course in Cambridge. And I knew that that's where I wanted my career to be, as a software engineer, that's what I was doing.

And...

Except we didn't call it that then. [laughs]

And so, tell us a little bit about your, well, your choice of first role in the IT industry, because at this time you decided to go to Canada.

Yes.

And I know there were reasons for that, but can you tell us a little bit about that?

There were twelve of us doing the diploma course at Cambridge in the year that I was there. And when – and it was six men and six women, it was very egalitarian. I don't think Maurice designed it like that, that's just the way it worked out, because there were no preconceived ideas at that point. But the British businesses offered the women half the pay of the men, and I was cross, I said I'll go and work abroad. So I applied for several jobs abroad and I took the first one that I was offered, because I'd got no savings, you know, I was at the end of- I had enough money to go somewhere, but that was about it and I needed some guaranteed employment. I took the job in Canada, which was with a defence electronics business. When my male colleagues discovered what I was going to make in Canada, several of them then applied for jobs abroad as well. One of the people in my year ended up as the director of IT services in CERN, for example. So, you know, we scattered ourselves. There was the brain drain going on in Britain in the mid-1960s. I mean it was disappointing that a new industry should have inherited all the workplace prejudices and peccadilloes that they had.

But that was the way it was.

[0:19:09]

That's the way it was. And it was very difficult to be entrepreneurial in Britain at that time. Very difficult.

And we're talking – this was 1966, wasn't it?

'66, yeah.

But this was when, I can, well I know that Harold Wilson, the Prime Minister, was talking about 'the white heat of technology', wasn't he?

He was talking about it but he wasn't doing much about it. [laughs] I mean people like the Lyons stuff had happened, I mean there were people, there were businesses experimenting with using computers and doing some quite imaginative things, but the development of the fundamental underpinning infrastructure, I think they lost their way in Britain, and then the Americans just took it over.

[0:20:00]

You went to Canada...

Yeah.

...so presumably, culturally and everything that was fairly easy to adapt to, was it?

Very, yeah. And it was, I mean in Canada if you were willing to work, the world was your oyster, basically. There was plenty going on.

And you spent, well, I mean it was about fourteen years, I think, you spent in, I know it was with more than one company, but you were developing sort of real-time systems and telecommunication software weren't you?

I was there twenty-one years altogether, yeah. Yes, I did, I did...

But in the initial stages.

In the initial stages I did.

I mean presumably you were working during that time as software engineer, were you, and designer?

Yes, all that time.

Very much at the coalface.

Well, people hadn't done it before. You know, providing- I did a lot of stuff in the, of data communication software, multiplexers, routers, that sort of thing. They hadn't been developed before so I mean what we did was a bit... life went on and there were algorithms and protocols that were developed that improved on what we'd worked on, but we were dealing with the US universities who were developing those sort of base level protocols. We did some experimental stuff with taxi dispatching remotely over, using voice lines. I mean most of the telecommunication facilities were very basic, as would have been true here, and the telephone companies were very restrictive in what they would allow you to do with the bandwidths. In fact they said a lot of this stuff was impossible with copper wire. It was pretty difficult where you got bridged lines, so I learnt a lot about electronics as well, because I was right at the interface with where the electronics and software came together, and I had some very interesting discussion with the electronics engineers who had no idea about programming.

Okay. You worked for two companies didn't you, during this period?

Yes.

[0:22:08]

So just tell us a little bit about those two companies and what, why you moved from one to the other.

Okay. The first one was a defence contractor.

Computing Devices of Canada, this was.

Computing Devices of Canada, which is where I had a job to go to, and there were a lot of expatriate Brits working there. So they recruited in the UK because they knew they could get well-qualified people. They had a very interesting project when I got there and I was working on it, but it was a NORAD project, which is a joint project between Canada and the States, and the Americans changed the rules for NORAD contracts partway through. It didn't affect the project that I was working on because I was already committed, but it was highly classified stuff and it was clear that the interesting stuff was all going to get so classified and because I wasn't a Canadian

citizen I wouldn't be able to be part of the core development stuff in the future. The other thing about the defence industry is that they are all feasts and famine, they've got piles of work and they get well paid for it and then you get a fallow period where you're doing make-work projects and when I got into the make-work projects it was a bit tedious. I wanted more out of life than that. And I'd met up with a group of people who were forming a new company, so I went in with them and we did a start-up.

And this company, its mission was to do what?

Well, it was going to be a service bureau. Well, it was a service bureau in its initial incarnation. It would allow remote access to large computing facilities that were not generally available. Lots of companies wanted to use computing but couldn't afford the great big mainframes, so the idea was, somebody had to develop the software to enable that to happen. So I was brought in to, my role in that, we had to raise money on the stock market to do it.

[0:24:08]

And you were part of the team doing all of that?

Yeah. Doing that, yeah.

So that was great sort of exposure to business.

Oh, we were all in our twenties and we were so naïve we probably wouldn't have tackled it if we'd known what we were going to get into, but it was a great learning experience, and we grew it. We didn't ask for enough money. That was the business lesson I learned, is that you don't, we didn't ask for enough to cover the cash flow requirements of the business, because we were none of us business people and none of us had business qualifications. But it was a pension fund that funded us. Well, they didn't do all of it, but they were key in getting the underwriting done, and I thought it was enterprising of them to take a punt on a start-up in a field that they knew nothing about.

What persuaded them? You must have been very persuasive to get them to do that.

Well, I think they were looking for things for the future with growth potential and there weren't many kids on the block doing what we were doing at the time. So the attitude to investment in North America generally, and I think in America in particular still continues to be, that if you're going to invest in new technologies, you need a broad portfolio of things you invest in and if one out of ten makes it, you've made your money back. Whereas here we try and pick winners, and that's not a good idea, because it's very difficult to predict in the start-up phases which ones are really going to work and which ones aren't. I mean it's a combination of the people and the ideas and the viability and so on. So they were looking for a range of companies to invest in. I mean, it was a wonderfully formative opportunity which wouldn't come my way now if I was that age, you know, life's not like that any more.

[0:26:05]

Okay. And of course you developed, set up this company with colleagues and so I guess you were sort of forming a team as well?

Oh yes.

And how was that? I mean that can be quite a difficult process sometimes, can't it?

It was fine. The two principal, the two people who'd originally thought of the idea and then formed this sort of team round them, they fell out, which was almost inevitable because they were about as unlike as chalk and cheese. But the team who were delivering and one of the two principals who was technically capable, we got on well together because we knew what we'd got to do to deliver this stuff. And I mean we did some daft things but... Canada was one of the first countries in the world - in fact I think it was the first country - to put up domestic communication satellites in the early seventies. And we ran all the launch software for that, and at the same time we were running the clearing for the banks. And I mean managing the time so that all the deadlines were kept was quite, quite a challenge.

A very broad range of customers then, that you had for your services.

Yeah. And we had to get engaged with what they were doing. And so we were very, particularly when Anik 1 went up, we were very engaged with the launch, because we were collecting all the data back. When they put a satellite, communications satellite up, it goes into geostationary orbit, but they put it up in a big elliptic orbit first. So we had station keeping in Guam and in Canada and we had to collect all the data and calculate the orbits and then work out which orbit to fire the apogee motor so you stabilise the satellite at the right point for the geostationary orbit. We felt very engaged with that process. We didn't do the station keeping because that was a much more long term and you could use a much smaller computer for that. But doing the calculations of the big elliptic orbits and making, the decision making stuff on when to fire the apogee motors was, required big computing power, which we provided.

And you spent eleven years, didn't you...

At those two, yes, all of that. Yeah.

At Computel, which was the name of this company. And you, well, I mean you became the Research Director, didn't you?

Yeah.

Was that immediately or did that happen as...

Probably about...

Did you emerge as Research Director after a period of time?

[0:28:59]

Probably about two or three years in. It was, because I was doing a lot of the software development we needed a bigger team and we were looking into new ways of doing things and new ways of optimising system performance. I mean it was all, it was very much at the heart of the system. So I ended up with a team of about twenty. I always regret that they were all male, but we never had any female applicants so it's a bit

difficult to recruit women if they don't apply. We did get somebody once who took a punt and we saw him just because it was so bizarre, because he was a funeral director. And we said, why do you think you're qualified for this job. He said, oh, I just fancied a change. [laughs]

Okay. So no personality testing or anything like that? Great. I mean, did you yourself have, did you have aspirations to management at this time?

Not particularly.

It was just the way things went.

I'm a great believer in things appear and you decide what you're going to do with them. I had no career plan at all when I was in my twenties, I just... I mean when I'd left for Canada people said to me, oh, you won't survive there. And I said, well, I'm young, I can always come back to the UK if I want to. You know, this is not permanent and I'm not, I'm not... I've got no particular ties to Canada, when I went.

But nonetheless, becoming Research Director took what sort of special skills and experience do you think made you successful in that role?

There were things that I'd noticed in Cambridge about the development of all that software and the need to organise and I borrowed some of that in terms of how I thought about it and other people hadn't had the chance to do that. So it was one of the things that I really got from Cambridge, was not just that you needed to be excellent at all the bits, but you needed to have project planning and stuff that would integrate all of that stuff and you needed to think about the interfaces and how they were going to work. And it required some organisational skills that I'd observed in other people there.

And you were managing the team as well.

Yes.

So presumably you had the people issues and so on?

Oh yes, all of that. I hadn't had much... and you do it. In a start-up you do that, as you go along you learn how to do that.

So presumably you were looking at the areas that the company was going to move into, were you, and trying to plan the approach?

A bit, yes. It became clear to me in the early seventies that the general purpose computer service bureaus weren't going to have a long life, the technology was moving on, many computers were coming and people would take their own, have their own systems, this was a stage in the life of development. But what there was an opportunity for was specialised databases, which would be very expensive to construct. So you could shift the business from being a general purpose one to being a very specific purpose, and in Canada, seismic data is, for oil and gas exploration, is – and mineral exploration actually – is a highly prized thing and it's a very big industry and they're willing to, that's one area where all the companies are willing to share the core data in terms of the industry as a whole. So, in fact I was part of a team that negotiated to move the company, it merged with somebody else who'd got the industry knowledge for the database, I mean the technical, the content side of the database. And the two companies were merged and the centre of activity then shifted to Toronto, which is why I left at that point, because I was by then married, with a husband with a career.

[0:33:31]

I was going to say, you got married during this period didn't you, to Gordon, who's an architect.

Yeah.

He was working, doing that in Canada, was he?

Yes.

Was he Canadian?

No, no, he was a Scot.

Okay.

From Glasgow.

And you had two children, were born during that time as well?

Yeah.

So you were combining bringing up a family and...

And I worked fulltime.

And working fulltime developing a company as well.

Yeah.

Was that a challenge?

Oh yes. Not many people did that at that stage. And there were no laws, I mean again, because I was in a company where people knew me well and they just accommodated what I needed, so I called the shots. I didn't have a lot of time off, but I was very flexible about when I worked. And I also wouldn't do jobs when they were little where I had to travel. I just said I'm not doing the travelling, you can, somebody else can do that.

Do you think it was easier in Canada at this time to balance a career and child rearing than it would have been here?

I wouldn't have wanted to do it in a conventional business, but start-ups, they're special teams and you know the strengths. And I mean they didn't want to lose me,

which they would have done if they'd been very difficult about it. But there's a great deal more flexibility where you can adjust and rearrange things so that they work in a smallish team. It's the big, big organisations with their fairly rigid structures.

[0:35:09]

I don't know whether during this period you had anyone you would describe as a manager, but if you did, was there anyone or any of them that were particularly influential on you?

[pause] That's very difficult to answer because of the fluidity of the arrangement. The person who was my immediate, ended up being my immediate boss, I am still friends with and saw them this autumn in Canada. But he and I got on very well and we shared a lot of ideas. He had done an MBA at the Wharton School in Pennsylvania, so he was much more up with it on business issues. And in fact he had quite a long leave of absence from the company while I was there, doing other things. He did come back eventually. But he, he and I, I mean, yeah, if I wanted to discuss anything, even when he wasn't there, I would quite often call him up, and he remains a friend today.

And what was his name?

Andrew Wyszowski.

Okay.

I won't let you spell that. It's full of, as you might guess, 'y's and 'z's and stuff.

[0:36:50]

Okay. So in 1979, well, I was going to say that you'd already started, from what you've just been saying, you'd already started thinking strategically about the way the industry was developing. And in 1979 you joined Gandalf, Gandalf Data Limited, as it then was. And...

One of the people that was there had been at Computing Devices with me in the late sixties, so it was somebody I knew.

Always helps. [laughs]

Yes.

But you joined as Market Research Director, is that right?

Yes.

In sort of doing long-range corporate planning.

Yes. Because the product line was electronic devices and I wasn't an electronics engineer so I couldn't, I couldn't function as an engineer in there, but what I could do was, because I'd done a lot of how users use data communication devices, and there were plenty of people coming along at that stage who were good software engineers, but dealing with large-scale integration in a way that I hadn't had to do previously, which is much more specialised area. So yes, I went in. They'd been a bunch of engineers doing their thing and I think I did a bit of – well, hang about a minute, we need to talk about how people are going to use some of this stuff so we know how to do the initial positioning of this equipment. The chairman of the company was a pure marketer, whereas I was doing market research, but with a- and I retained my technology interest throughout my time there, I just said I don't want to be divorced from the technology because I want to be able to say to the engineers, if you could do this, though I need to do something that I think they might be able to rise to the challenge of, there's no point in asking them to do something not clever.

And, well just tell us a little bit about Gandalf's main products and what their mission was, what customers did they serve?

Well, they started, before I joined them they did, limited range modems was their first product and then they did switches, the data equivalent of exchange switches. Then they did routers and multiplexers and they made the taxi system and varieties of

things along those lines. I mean it was a range of data communications equipment designed for developing digital networks. I mean we had a lot of dealings with people producing ISDN for the first time. I went and talked to ARPA about ARPA networks. I mean it was all of that stuff. And understanding how the layers worked from the- because the people doing the electronics were sometimes not au fait with how some of the algorithms worked for recovery over long distances and we did stuff when satellites came into play and we had to deal with the half second delay in each direction and how you keep the bandwidth up for that. I mean there was a lot of stuff, so I was sort of mid-ground between, I wasn't quite an engineer but I did a lot of, had a lot of contact with the engineering staff.

Okay, and where did Gandalf sit in the market?

Oh, it was...

You say there were lots of companies working in this area.

Not in data communications, and in Canada, there was a reason that data communications developed in Canada, because in Ottawa the department of communications had a research laboratory there and Bell Northern Research, the telephone company, had its research facilities. So there were a lot of people coming out of those organisations with good ideas at the basic telephony and next level up, type stuff. And so there were a lot of start-ups and data communications is a Canadian expertise, area of expertise.

Hm. I didn't know that.

And there are about, well - certainly were - about 200 companies in Ottawa, all in hi-tech stuff. I mean they've gone on and done other things since. But it was an era when a lot of that stuff needed to be evolved and dealing with the telephone companies and getting them to change their views on bandwidth and talking about, I mean I chaired the Canadian delegation for international standards development for how you exchanged documents in a standardised way so that you could, that networks

were useful. I mean it's evolved on from where we got it to, but it was an area where we were looking again at making the thing underpinning and universal.

Good, yeah. Okay. So after eight years there, you then returned to Europe?

Yeah.

[0:42:23]

As Managing Director of the UK subsidiary. Just tell us a little bit about how that came about.

Well...

Did you decide to go to Europe and they offered you this role?

No.

Or was it the other way round?

Happenstance again. I was working for the Chairman of the company, doing long-range corporate planning, and I'd spent a lot of time- and I was, and it had suited me because the children were little. I was basically based at home, you know, I didn't have to travel much, and it was very interesting working on the infrastructure of how hi-tech businesses develop and what they need to do and how the growth patterns work and it was much more business related, that end of it. But I decided that I needed to get out and do a line job – it was a staff job, I really liked working with the person I was working with, but, I needed a staff job and my children were by then old enough that I could take on a new challenge. And my husband had just retired early, so we were in a position that we could move if we wanted to. And the job in the UK came up. And I applied for it and I talked to my husband beforehand, because I said I'm going to apply for this, I want it really to be a signal that I want something else. And I said I can't apply for it and not take it if it's offered, I mean I can't go through this. But I think it's unlikely I'll get it, because of where I was coming from. And I did get it, rather to my surprise, and to the enormous annoyance of the people who

were here, because I was imposed from Canada, bringing with me the corporate strategy and direction and all of that stuff. They were playing a very independent game at the time, so there were some interesting personnel challenges to be dealt with when I got here. And the idea was originally that we'd do it for two or three years and then probably go back to Canada. But what happened was that I got, what I was looking after expanded, so I ended up looking after Holland and France and basically the rest of the world except North America.

How did you deal with the personnel challenges then? Was that something you relished or was it...

No, I didn't enjoy that, but it had to be done. I mean, no, I did not relish that. I don't think anybody would, actually. But they had to accept the fact that I was in charge and that was the way it was, it wasn't their little fiefdom to run the way they wanted.

But you were in charge and you continued to be a member of the executive board in Canada, didn't you? So...

I did. So I was travelling every month, yes.

Every month you had to go back to Canada to do that, so...

Which was a contact that they hadn't previously had. I mean I brought with me the corporate planning, but I was on the main board in Canada. And I was on the main technology board still, looking at the investment in research and development and where that was going and so on. But the business, Canadian companies get a fixation about America, and they decided – before I moved actually, this was already an issue – they had to have a subsidiary and the subsidiary in the US, which was based in Chicago, was losing money hand over fist and they really needed to do something about that, but they didn't want to rock the boat because they had to have an American subsidiary. And it got worse while I was in the UK. And it was clear to me that it would in the end kill the company if they didn't deal with it, which they didn't. And I had an opportunity, probably two or three years before it came to a head, where I could have made a bid to become the chief executive in Canada and I decided not to

because I didn't think I could deal with the US problem. I didn't think that the US people would accept.

So what sort of things were happening in the US then? I mean was it financial issues or technological?

It was financial. They were all marketing and no substance and they were losing money. They paid no attention to the money. I mean it was just unbelievable, and they were allowed to carry on doing it. But it was primarily financial and although America in some ways was okay with female executives, the reality was, it was going to be very much harder work if I did it than if somebody else did it. And I had no standing, US standing, I had no network in the States, because I'd not worked there. Well, I had earlier, but not for a long time. And I thought I was just going to push water uphill trying to deal with it, and wasn't at all sure I could. And in fact they brought in somebody who was a retired executive from IBM, who was no better at, well, he was rather worse at it than I would have been, but he didn't recognise he was going to be rather worse at it, and he was an American. I mean he had a shot at making it work, but failed.

[0:48:11]

And meanwhile, of course, the technology was developing apace, wasn't it?

Oh yes.

We're talking about, we're in the nineties now, and a lot was happening.

A lot was happening.

And...

Well, when I...

How did Gandalf keep, or did Gandalf keep abreast of those developments?

For the most part it did, but this goes back to my corporate planning days, I had told them before I came back to the UK, that they needed- they'd got a strategy of having an investment of about 10% of the turnover for future R&D and you had to get, you had to get – the shelf-life of basically investment in R&D is about two years, if you're lucky – and so you can go in at the bleeding edge and get quite good margins and then the price pressures come and the margins disappear. So you've got to keep the pressure on, but if you're going to do more than just growing, I mean that allows you to grow but it doesn't allow you to radically change your business. I said you've got to do something different if you're going to be much bigger than this. And I left a set of schedules and said if you just keep on doing this, more of the same, and the R&D department steps up to the plate and produces the stuff, this is where I think you'll be, but you'll not be exciting and you need to do something different. This was to the senior, the board and the executive. So...

What sort of, how did you, with your strategic planning hat on, where did you see that the industry was going then at this time and what would they have needed to have done differently to have been successful?

They could have done several things. They didn't... they didn't pick up the early stages of the web developments. They got buried in the nuts and bolts of ISDN, but they didn't get engaged with the overlay of the web stuff, which is where I said I thought they should spend some more time. But when you've got an investment in a manufacturing facility that's producing electronics, you need to keep that system fed, you know, it... And it was an interesting exercise that for some time the company – it had to... I mean it started off as an electronics in the garage, type thing with hand assembly, and over time it had built up automation and the level of direct cost had gone down, but the investment and the cost of overhead had gone up. And they were tending to manage the direct costs down, which were only about 4% of the total cost, of a product to death, and there wasn't a lot to do with it at the point it was 4%. And when I pointed this out to them they sort of said, I suppose you're right. I said, you've got to now look at the overhead costs of maintaining the machine, because the machine's hungry, you've got to keep it fed. You've done the right things in a sense for that stage of growth, but you've now got to look at the next stage of robotics and other things that are going to come in. And they didn't have the capital to invest in

some of that stuff. But I also said that they needed to look more at the overlay stuff of the web developments.

[0:52:00]

I mean, was just getting going at that time. And I mean, I suppose my question would be, you know, to a strategic planner, is it actually possible to know where things are going?

No.

Actually. I mean you know, it's so new and it's moving so fast.

I mean there is a real difficulty, I think, for start-ups that grow and they have a thing to feed. It's less difficult with software things because there's less sunk investment, electronics, manufacturing and I suspect some of the biotech companies have the same issues where they've had to invest in lab facilities and so on, that you become... and you get a customer base that you need to keep happy and there's value in being good with them and the servicing of them and so on. So there's pressure to keep that end of the business going. It takes, it really requires somebody to be very brave. I mean IBM went for years without making that breakout and then did eventually. But you need capital to be able to do it and I think, well, they were not getting the business into shape to be able to raise the capital to do that. I mean this US thing was the death knell of it. But at an earlier stage they could have contained the US thing and invested some more in moving away from what they were doing. But they were feeding the customer base. I mean somebody doing a start-up didn't have all these customers ringing up saying, this doesn't work and I want it to just do that, and all of the, so on. So they had none of the sort of drag, which sounds a terrible thing to say, but the structure of the business gets very difficult. And you have to be very clear-sighted about doing that. And I don't think it's easy.

No. I'm sure the same's true now, isn't it?

Yes. Whatever industry you're in, yeah.

So it sounds like you sort of saw the writing on the wall a bit in the mid-nineties.

Yeah. Well I felt I hadn't anything more to contribute. They weren't happy to listen to me, we were making big profits on the UK business that I was running and they were spending them all in the States.

Okay.

Just keep covering the losses there, which is...

[0:54:36]

And you decided to make a move about this time?

I decided I had to go. I'd done enough, I mean I'd been there probably too long anyway. So I looked for another job, and I found the BCS.

And that meant you could spend more time at home as well, by the sound of it.

Yeah. Yes, I didn't want a job where I had to be on a plane all the time. I didn't mind a bit of travel, but doing it monthly to North America was hard work.

And you'd previously been involved with BCS anyway, hadn't you?

I'd been a member, yeah.

As a, in fact you were a Fellow, is that right, BCS Fellow?

I am a Fellow now, but...

Oh, not at the time?

Not at the time.

Okay. But you were a member of some specialist group there?

I can't remember now what I'd done before that. I mean I knew about the BCS, I'd been getting their magazine, I'd been just a member. But I was, bearing in mind I was in Canada for some of the time that I was a member.

Okay. So you moved across to this new role. That must have been quite different for you, working for a society like that, then being...

Yeah. And it had just come of, having got into quite significant financial difficulty, the hard work had been done in terms of sorting things out. But its confidence had got sapped.

So what was the first thing you did when you arrived? Was it to try and plan, I mean again, with your strategic planning background, were you looking to where the organisation should go?

Well, there was taking stock of what was there and what was there to work with. There were some things that needed doing in the first year. They'd got into a joint publishing arrangement with Oxford University Press for a magazine that was just going down the tubes. Well, it was financially disastrous, so one of the things I had to do was to go up to the OUP and say look, this is just not working, can we agree to close this down, make the last publication in December, or whatever the time was. And they said, oh, thank god somebody's come and said that to us, because we've not known how to broach this. There was an agreement on something less... less ambitious that would follow on for a little while and then we'd take stock about what we wanted to do. But it in fact meant that my relationship with the OUP was very good from there on in, because we'd solved what for them they could see was just a financial problem. But the thing that I did look at was the question of whether the, of where the future for professional bodies lay. I did quite a lot of talking with other professional bodies. And it seemed to me that it was always going to share the space with the IE, as it was then, on academic type publications and it would never have the wiring, regulations which the IE had to depend on, it was never going to have that sort of stuff. But the thing that it could do was to make a case for the introduction of, particularly post, well, the support of proper degrees for professionals so the courses

were accredited, so we beefed that up. They were doing it anyway, but we made some effort to make that, but the post-professional qualifications were things like software testing and so on, were where the BCS could actually add value to society. I mean you have to bear in mind you do this in the context of, you're a charity and you've got to be doing it for the public good. But there was real opportunity to take what was quite a small operation and make that much more valuable.

[0:58:49]

And you were able to put in the right management disciplines around all of that?

Well, there were people who knew about it. It was more a case of liberating people to get on with it than anything else. I kept being told for about three years while I was there that I wouldn't be allowed to do that. Because you've got this elected body that notionally run the BCS, but in fact the day-to-day delivery is the staff. That's always true, I mean that'll be true here, but it's a bigger staff in the BCS because it's got more activities. And what, the value that the members bring is their knowledge. So, developing syllabus, you want the members to be engaged with that. So we had to find the things that were right for engagement of the membership, but professionalise the delivery mechanisms, which is what we did, we worked on. And we had one or two things where we tested things and they didn't work out. And the other thing that came along through the European thing was the European computer driving licence, which, while less strategically important was actually valuable in terms of a short-term public recognition interest. So that got started in my time. And while I was there, the revenues, without any injection of capital at all, went from four million turnover to 14 million turnover, which on self-growth in seven years isn't bad.

No, that's quite an achievement. Would you regard that as your biggest achievement while you were there?

Well, I think the professionalising of the post-professional qualifications was the thing I'm most proud of. I mean the fact that it delivered money as well has continued to be important. And the Society's continued to have the learning, referee publications and all the *Computer Journal* and all of that stuff. [1:00:40] That's important, but it's

not, that's for the academic world. Its value in society, I think, is those post-professional qualifications.

[1:00:57]

Okay. And you were there until 2002?

Yeah. I retired.

You retired.

I left because I wanted to stop working. Well, I was happy to stop, I didn't want to have to, I wanted the freedom to just do other things that interested me without the need for a regular job.

I mean you've been involved in a number of funding bodies, haven't you, in the scientific area?

Yeah. It was PPARC I was at, particularly.

Just explain what that...

Particle Physics and Astronomy Research Council. It's called something else nowadays. I can't remember what it's called, because they- it's about large projects. But it's the, it was the Research Council that funded things like the UK contribution to CERN and the Large Hadron Collider. It also funds the participation in a lot of satellite and astronomy projects, I mean they're part of the Atacama Desert telescope stuff in Chile, which is a big international collaboration. I mean particle physics and astronomy are big science. So the way they worked was that they would have, they would ask all the university groups that were interested to do small-scale research projects and then they would, perhaps after three or four years, on approaches to address significant problems. And then they would have a gathering, a town hall kind of gathering, where they would discuss all these ideas and air them, and then they would have to pick the one that they wanted to put the instrumentation on, because they could only afford one project in, to answer a particular question. So I found

myself working with some very interesting scientists, not that I know a lot about physics, particle physics and astronomy, but I learnt a bit.

[1:03:05]

And you were also a member of Council for Reading University as well, at the same time. Is that right?

Yes. That's a volunteer role.

Reviewing research strategy and academic research.

I kept on, because of my background in, basically the electronics sector, start-up business, new technology type businesses, for universities to stay vibrant they need a research strategy and a viable one that they can... It's what keeps the academics challenged and so on, and it ultimately, the attractiveness of that cohort of academics is what attracts the students. So, you know, unless you're just a teaching university, which Reading is not, it's got research as well. So, while a lot of the people on the Council were financial and perfectly happy to deal with the financial stuff, but what the university's long-term future I think lies in, in how they deal with their research programmes. And there was a lot of need for change, because the government was changing the way it was funding things and they were trying to be research active in too many areas, so they had to have a programme consolidation. It was an interesting time to be working.

Plenty to get your teeth into, despite the fact that you were retired.

Yeah. [laughs] As you see, I did those things.

[1:04:49]

And did your experience in the IT industry contribute to these research councils?

Yeah, I mean, yeah, I'd ask questions about the IT stuff. But a lot of their structure and stuff was being well run. I mean they were doing all the things like putting Wi-Fi in and getting all the student rooms on board and getting a lot of distribution of

materials and tutor groups and stuff electronically. I mean they were doing, they'd already got that in hand. They have all the regular problems that everybody ends up with that, you know, the electricity supply isn't adequate into the campus and stuff. Just in the mad stuff that you have to deal with as well. And they were not blessed with an easy life, because I don't know whether you know, but Reading University, the boundary between Wokingham and Reading borough goes right through the middle of the campus.

Through Whiteknights Park, is it?

Yeah. So the planning permission is a nightmare thing.

[1:06:02]

Okay, well that's more challenges. So, looking back, can we just look back and reflect on your career a little bit? I mean you're obviously a successful woman. I mean, as a woman, have there been any special challenges for you? You know, especially in your later roles in industry? Which is, I mean it's still, probably fair to say, it's still a male-dominated industry.

Yes. It shouldn't have been, right from the beginning, but there we go. I think, effectively I've emigrated twice, and I think the biggest problem that's created is that I had a bunch of networks in Canada and I then had to come here in my forties and build them again in this country, and that's hard. And coming back into the, coming back into this country with its attitudes, it was even harder. And so yes, I do think that that bit of it, and starting at that level, because I was already a chief executive when I came back in here, so it was [sighs], building networks in this country was hard and if I had to do it again I wouldn't emigrate twice in a lifetime. [laughs]

So you came back, even when you came back to the UK, which was, well, that was in the nineties wasn't it? You still found things...

Oh, it was much worse here than it was in North America.

Much worse? Yeah.

Yeah. I went to a dinner organised by – shortly after I arrived back – organised by the Canadian High Commission, at the Institute of Directors, and I, there were 120 people at this dinner, I was the only woman. And the cream of British business was there.

Have you done any work to try and promote women in IT?

A bit. When I was first working, I've never been in favour of positive discrimination, partly because I work on the principle that I just get on with it and do it. I have a daughter who has much more in the way of mentors and stuff in the workplace. And I probably made it hard for myself in my time of just, I saw what needed doing and got on with it and did it, and made my way that way, and I never really thought about the fact that I was a woman. And I think after a little while the people I worked with didn't really think about the fact that I was a woman. I was there, we were there doing what we were doing. I think the moving back here was the hard bit, and they were, I mean I remember going to Japan in the eighties and they had... I visited, I mean I was there for international standards business, but I went and visited Sony and Matsushita research labs as well as the NTT research labs. And particularly at Matsushita, apart from the language difficulties, I had to have an interpreter with me, they wanted to know why they should be answering questions to women. I mean it was in that sort of era. Sony weren't so bad because they'd travelled a lot in America and knew that there were women in senior roles, so they weren't quite that rude.

[laughs]

[1:09:44]

What – well, you touched on this a little bit – but looking at your career as a whole, were any of your managers particularly inspirational and what did you learn from them?

Working in start-ups doesn't work like that, it's the people you work with.

Okay. So what about colleagues and friends? Did they play a big role in supporting you?

Yes. Because we were all part of a team. You have to be a team player in start-up, you can't not be. And there are a lot of colleagues that I look back on, and even in this country when I came back, there are people I'm still in touch with from the times that I came back in '87. But they're fairly small in number.

Why do you say that?

Well, I mean some people have vanished, I don't know how to get in touch with them. I mean I know of one person whom I am told has emigrated to Australia.

Oh, I see.

But given that I've got no information about where they are.

Right. So there were a number of people that as time's gone on you've lost track. Yes, okay. Were there any particular decisions you made, do you think, positive or negative, in your career which made you successful or which contributed to your success?

Not individual decisions, but a willingness to be flexible and look at what's reality. I mean I haven't worked in a big structured organisation at all. How I would get on in one of those, I do not know. It'd probably have been a nightmare. Yeah.

[1:11:53]

And what would you say your proudest achievement was?

I think just being willing to think about direction of travel and trying to do something about it. I've done that in each of the jobs that I've done. I mean where I've come up against a brick wall I've then had to say this is not for me any more, but...

So in terms of achievement...?

Actual delivery of achievements. I think playing a big role in the development of, certainly data communication technology and standards, yeah.

This was things like the document transaction standard?

Yeah. And all the underpinning, protocols that go with it. Up to the Ethernet standards, because we worked on some early versions of Ethernet standards for connecting multiple devices and dealing with collisions and stuff.

I don't want to put you on the spot, but what sort of, are those standards still...

Oh, they've evolved, because technology's...

They've now evolved.

... because technology's evolved. Well, Ethernet's pretty much, once it's settled, I mean we worked on the early versions, but once it's settled. And the ISDN protocols underneath that haven't changed much, once they got firmed up.

I seem to remember the document, was that X.400, the document one you were talking about?

Well, it could have been. Yeah. I don't remember the numbers any more, because I stopped working on it. I mean it was clear that we hadn't got to the end when we were working in the mid-eighties, which is when this was, and that it would move on. And the, I mean people were preoccupied then with lack of bandwidth. Well, bandwidth isn't an issue now and once that became a non-issue, you think about things differently. And we were right at the cusp where we were saying, actually I think we're probably trying to solve the wrong problem, because technology's going to remove this constraint. I mean you look at, when I first started in computing, you harvested every bit of storage you could carefully. Well, once storage got enormous and it was cheap, the investment in terms of optimisation just didn't matter any more and you do other things, you know, the strategies change.

[1:14:45]

Sure. If you had your time again, what would you do differently?

What would I do differently? I probably wouldn't emigrate twice. I mean I had intended to go back to Canada, it just didn't happen. And by the time the family got settled here it then got awkward to move the children again. I think, on the whole I've enjoyed what I've done and a lot of it, if I was that age, I'd do it again. I mean being in start-ups and going to the Stock Exchange when you're in your twenties is fantastic experience, but I wouldn't want to do it now because I'm not, don't have the energy levels for that sort of thing.

So how do you spend your time now?

Well, I'm still on the strategy board for the Business School at the University of Reading. I'm not on the Council any more, but I do deal with the Dean of the Business School. I've got family and things that I do now, I do more childcare than I probably did when I was a parent. [laughs]

Alright. So, I said we'd just at the end, ask you about your views on the future. What do you think the biggest challenges and opportunities for the industry are going to be over the next ten years or so?

Artificial Intelligence and the ethics that go with it, because it's going to pose some very tricky questions. I've had some dealings recently with the Bishop of Oxford who's been appointed to the Ethics Panel for AI, and he was on the House of Lords Select Committee on Artificial Intelligence, and it's been interesting talking to him about how he sees- he doesn't know anything about technology, but he does know about ethics, and that's going to pose us some really interesting challenges.

And I guess the next question was how do you think IT will impact society, which I guess is linked to that.

It's all tied up with that. Because I think that's the next big societal change, is how we use Artificial Intelligence. It's in its early stages now, but people are beginning to talk about it a lot and, you know, I don't think Tim Berners-Lee will have foreseen all the things that have been done with the web with his, I mean his idealised vision of, always interchangeable, but the fact that people – I'm afraid I've got a bit more

cynical as I've got older – that people will find ways to corrupt and use things and I think Artificial Intelligence poses more fundamental risks, perhaps, than some of the other things that we've done.

[1:17:44]

What advice would you give someone entering the IT industry today?

Enjoy it. Enjoy it. I hope they can in the way that I did. I mean I was very lucky to be at the beginning of this where everything was to be done. But I think there are still a lot of areas of computing. I have a nephew who works in IT and – I can't remember what he does now, because he has tried to explain it to me and I didn't pay much attention – but he's having fun doing what he's doing in terms of developing new areas of expertise. But I hope some of them go on to think about the bigger issues, which I found at the end of my career much more interesting, like the question of ethics, like AI.

Okay. Thank you very much Judith. It's been fascinating hearing your life story and about the part you've played in developing the computer industry, both in Canada and here in the UK. On behalf of Archives IT, thank you very much for taking the time to talk to us.

My pleasure.

[ends at 1:18:58]