Ewan Page

Interviewed by

Mark Jones

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At

Ewan's home near Bath

My name is Mark Jones, I'm an interviewer with Archives of IT. I'm here with Ewan Page, at this home in Bath, on a lovely sunny day in May, and we're going to walk through Ewan's life. Ewan is both an academic and a scientist, researcher, I think I could say, as well as being a Past President of the BCS. And Ewan also has many honours to his name, and I'm sure we're going to have an interesting conversation about your life. Welcome Ewan. Thank you very much.

Thank you.

[00:34]
So, traditionally we start at primary school. Do you have any strong memories of primary school?

No. I started at the Humberstone Junior School in the outskirts of Leicester, and after that I went to the junior part of the Wyggeston Grammar School for Boys, and continued there until I left and went to Cambridge.

Would you say you had a happy childhood?

Oh very, yes. It was of course, a large, important part of it was during the war. Because I was born in 1928, which, in August of 1928, which was just too young to be called up for National Service during the war. So as I say, I went during the war years to Wyggeston Grammar School, and was very fortunate in encountering one of the outstanding mathematics teachers of the time, a Mr J W Hesselgreaves.

I think he has published some books, hasn't he, or at least some articles about maths and school maths. Did you know at the time he was a, semi-academic shall we say?

I don't know. He had a, an MA from Cambridge, in mathematics, and he also had a BSc, which I think must have been an external London BSc, which was rather unusual in those days. He was certainly a member of the Mathematical Association I remember, which of course dealt with, in the main, schoolteachers and, and people like that. Because I know he brought quite a bit of it, of the material that was published, into his, into his lessons.

Mm.

But he was certainly very good, and, really prompted me to try for an open scholarship in mathematics at Cambridge.

So did you find school maths relatively easy?

Yes. It's one of the things that, if you can do it, it's the least work to do well.

[laughs] Yes. So Mr Hesselgreaves, some of the papers I found that he had written were essentially about innovative ways of proving theorems, or different ways of solving problems.

Oh really?

Yes.

Well I hope it's the same man. I can well believe it was the same man, yes.

Yes. Yes.

Because he was good.

Yes. So, you never toyed with the idea of being an arts person; it was, science and maths were your key subjects?

No. Indeed, I wanted to go into the science form, and, of course my school was a classics base. It was a, the headmaster and headmasters before them had all been classicists. And, everybody of course did Latin, and if you can do Latin, you can do, do Greek. And I was aiming to go into the science form, and on the, the day that they were announced at the beginning of the year, I was put in the classical. And I went to see him, and, he said, 'Oh, there's not room at the moment. We'll, we'll look at it next year.' And, I then started Greek in that form. As I say, if you can do Latin, you

can do Greek. And even without any work I did fairly well at it. And so, the following year, I was again put into the classics form. And I went up to see him. And he said, 'No no no. Go, carry on.' And the following morning he called me in, and asked me what was going to happen. And I said, 'Oh my father's coming up to see you, sir, about taking me away and sending me to the Alderman Newton's School.' I was immediately put into the science form, and my, when my father came he said, 'But you do realise, Mr Page, that only the best, all the best people do classics.' And he said, 'Well very probably. I did it myself, and so did three of my brothers.' Just a little aside, that was. Sorry. However. So I ended up in the science form, and…

Very good.

…went then into, well, as I wanted to do, pure and applied maths at high school level and physics, and the people who did chemistry, if you were going on to take the Inter-BSc, get exemption from Inter-BSc in those days. But, the mathematicians did their HSC in one year rather than two, in just those three subjects, and then went up to take the Cambridge scholar.

[05:18]
Was it a natural progression from your school, to go to Cambridge?

Oxford and Cambridge, yes. There were always quite a number of the open awards each year. But of course they did a lot of other, went to a lot of other places as well. I remember my chemistry master was very upset at, he was a Yorkshire man, and he had a student to go on to get the Royal Scholarship in chemistry at Imperial. And he wanted me to try and do that. He was a Yorkshireman, and, he too was very good. I still remember his apothem to this day. [with accent] 'I'm good at calculations on the basis of sound chemical analysis.' [both laugh] However, that, that was the, that was the school.

Very good. Very good.

Mm.

[06:09]
So Christ's College at Cambridge.

Yes.

Was there a particular reason for Christ's?

Yes, Hesselgreaves went there.

Ah, It's funny how these things happen isn't it. Yes.

Well… And, indeed, I'm sure it helped me on my interview, because, I was asked, why had I chosen Christ's. I said, 'Well, my maths master, Mr Hesselgreaves, I think he's a pretty good mathematician, and if you can make me as good as him, I shall be happy.'

Very good, a very good interview answer.

It was. But yes, and there's another occasion later on where I said the right thing in an interview. I'll tell you about that perhaps later on.

Yes. So, did you find university maths an easy transition from school maths, or…?

No. No no. It's, it is a much more challenging thing. And of course, you realise that while you might have been pretty good at school, when you get to Cambridge there are always people who are brighter than you are.

Yes. Yes. So this was Cambridge just after the war, wasn't it, 1946, 1947.

It was. It was the year that 90 per cent of the entry was reserved for returning ex-servicemen. So there were only, in my college there were only I think about ten schoolboys in that, in my year.

That must have been a very different atmosphere.

Oh, these people coming back, having had all sorts of experiences, and were mature, enormously by comparison with us shallow schoolboys.

But, I imagine there were probably still some student-y high japes and, some fun times as well.

Oh yes. And of course one of the things, in those days, I don't know whether it was the same in your day, that, those days you had to wear gowns after six o'clock, out. Well of course, these ex-servicemen coming back hadn't been used to having, having to wear gowns or things like them.

Just pause a second.

[pause in recording]

[08:03]
So university maths was, not a struggle but harder work, was it?

Well yes, it was. The scholars were advised, that is to say instructed, to omit Part I of the, of the Mathematics Tripos and go straight to Part II, and do Part II and III.

Really?

And that was a struggle.

Mm.

But come 1948, I was in the third year, I was taking Part III of the Tripos, and there, there was a vast number of advanced courses to choose from. And I chose all those dealing with mathematical statistics, probability theory, numerical analysis, because they all gave you, a 24-lecture course gave you three questions from the vast array of papers, and the sixteen was two. But there was one other course which was offered

then for the first time, not, not to be examined at all, was called Programming an Automatic Computer.

Ah.

Given by Maurice Wilkes. So you could take this, but it wasn't going to give you any questions in the, in the Part III papers. I seem to recollect that, there were about a couple of dozen of us; only a few were undergraduates, others were research students, and a number of dons, and, perhaps some visitors. One of those who was pointed out to me was Professor van Wijngaarden, who was then the Director of the Mathematical Centre in the Netherlands, and he was a computer pioneer himself. But, presumably that course… I mean at that stage the EDSAC wasn't working, 1949, it was still being built. And I presume that Maurice Wilkes really gave the lectures on which the Wilkes, Wheeler and Gill book was subsequently based.

[10-:25]
Mm. So, I think at that time, I think I've read somewhere else, or maybe someone's told me, the university authorities didn't really think of computing as a proper academic subject.

Oh no. No. And indeed, for many years they never, they wouldn't give Maurice Wilkes a chair, which was, I think, I think quite wrong. And when he took, when he took the chair, he decided on the title, not computer science, but computer technology.

Mm.

I mean, it wouldn't be regarded as, computing wouldn't be regarded as a science then.

Yes. Yes. So, did he strike you as an inspirational sort of figure, or was he a bit of a boffin?

At that stage, really he was just a lecturer, and I didn't know him at all then, although I did come to know him quite, quite well later on.

Mm.

You see at the end of that 1949, I had quite expected to return to do research in mathematical statistics, but, and this where, [laughs] perhaps we'll put it delicately, the director of the Statistical Laboratory had gone on sabbatical leave, and he had left a colleague in charge who, the kindest thing I could say is that, he perhaps didn't know he had to put forward any names for research studentships to the Department of Scientific and Industrial Research, but he didn't put my name forward, or anybody else's.

Oh dear.

And so I was then called up and spent two years in the RAF.

Right.

But during that two years of course, Maurice Wilkes and his team completed the building of EDSAC, and got it working.

Mm.

So that by the time I returned in 1951, it was just, I think, just about doing useful work. And, early in 1952, I needed to do quite a lot of calculations for one of the inspection schemes that I had devised, and so I sought to see if I could work on EDSAC. And in order to do that, you had to put forward an explanation of what calculation you wanted to do and why you wanted to do them, and go before a little committee. And this was, again, the first time really which I suppose Maurice Wilkes had become aware of my existence, he was in the chair of this little committee. I think David Wheeler and Stan Gill were there. I'm pretty sure Professor D R Hartree was there. And one or two others. And I told them what I wanted to do, and got permission to do it. So, at that stage, you go away and teach yourself to program. There wasn't a programming manual of course. But I seem to remember there were some mimeograph notes, and you learnt from those. And then you wrote your program. You punched it out on five hole paper tape, twice, and put it through a

comparator, and if the comparator didn't stop it, you had one of those which you wound up, put a rubber band round, with, I suppose, must be some little form filled in saying what had got to be done. And you hung it on one of a row of hooks outside the computer room. And the following day perhaps there would be, it would be returned, almost certainly with, saying that it hadn't worked, and why it hadn't worked, and where it hadn't worked. And so you tried to correct it, punched it out again, did exactly the same thing. And went backwards and forwards until you had got your program right. And then at that stage, it would be run for you.

[15:51]

This of course is a very slow and tedious way of doing computing, but I found that if I changed from the Statistical Laboratory as a research student into the, what was then called the Mathematical Laboratory, you would share a room with some other research students, and, you could eventually get trained to run the computer, run the EDSAC, on your own, after the engineers had gone home, if it still worked. Which it didn't always of course. And you were assigned a night a week which you would share with someone else, and you would run it until the engineers went – until the machine failed. And so, that was really how I got into the Mathematical Laboratory, sharing a room with, and I remember the names of three, I think there were either three or four of us in there, three others, four of us. And one of them was a very nice and very able engineer called Eickhoff , who I think was a structural engineer. So he was doing some of the very first structural calculations on, on a machine. Another was Don Leigh, who was a Canadian, and he was being supervised by D R Hartree. And I remember that he was doing numerical analysis or some, differential equation that had cropped up in his work. Another was Sandy Douglas, who eventually became a professor at Leeds, and President of the British Computer Society. Was a director of the Leeds University first computing centre. And so you were able to run the EDSAC in the evening. And you might be interested to know that, one of the people that I was down to share it with spent most of his time visually comparing two five hole punch paper tapes, because this was quicker and more reliable than the comparative, automatic comparative upstairs. His name, I didn't know him at all well, but his name was J C Kendrew, later Professor Sir John Kendrew, Nobel Prize winner for finding the structure of haemoglobin, which was evidently what he was working on at the time, those nights when we shared that, that machine.

[17:55]
Mm. So Maurice Wilkes's idea was, the computing was a service to the university, wasn't it; it wasn't meant to be a, a research topic and an academic area in its own right?

Precisely. It was to do things useful.

I was talking to someone called Norman Sanders, who was at Cambridge, maybe a little bit after this time, and he said that, you know, in those days computers did computing.

Yes.

They didn't manipulate data and store data. It was about doing calculations. And the job queue[?], as you described it, judged by the worthies, was how best to help people with their calculations that couldn't be done some other way.

That, precisely that. And of course, when you think that, at that stage, well in 1952, there were only 512 words of fast memory, that was in the, you know, the mercury delay lines, and it went up to 1,025, but, nearly always one of the tanks of 32 words was, US.

Hm.

And, that would be then switched to the last, [laughs] the, the last 32 words of the memory. So, you never wanted to write a program which would take 1,024 words, because you couldn't be sure the last 32 would ever be there, or sometimes even the last 64.

[19:19]
Yes. Yes. So, were you getting, starting to get intrigued by computers at this point, as much as solving your statistical problems?

Well, well yes. I mean I, I completed the calculation, the initial calculations that I had wanted to do, and was able to write that up. And then I thought about… [phone ringing] Oh there's the phone again. Then I thought about… [phone ringing louder] Oh. We'll wait until that stops. Sheila will pick it up. I'm sure she will pick it up.

[pause in recording]

When we got… One…

So, you were… You solved your statistical problem.

Yes. And then I thought about… The particular statistical problem I worked on was effectively a random walk between barriers. And so I thought that perhaps I could do some Monte Carlo methods. And, these were some of the first Monte Carlo methods I think which were done in Britain on a computer. But again, that was again quite fun. And so, eventually when I produced my PhD thesis, it was entitled 'Continuous Inspection Schemes and Monte Carlo Methods'. And that proved a bit of an embarrassment to the University of Durham [laughs] when I was eventually appointed to a post up there. Yes. Monte Carlo method seemed as though it was a bit racy for them.

Yes. Yes. So, I think you won the Rayleigh Prize didn't you?

I did.

Was it for that thesis?

No, it was for the continuous inspection schemes, which… The Rayleigh Prize, I think has to be done in the first year, or, eighteen months of one's research studentship. And that's when I submitted that, that for it.

Right. So about this time, were you thinking in terms of an academic career?

[hesitation] Yes I was. I was toying at the time with, a business career. I was invited to effectively take over the Comrie calculation operation, but that wasn't an interest really that, that…

[21:47]
Mm. OK. So just before we leave Cambridge then, did you know David Wheeler?

Oh yes.

Yes. I've heard lots of stories about how he was, not the brains of the whole thing, but Maurice Wilkes was an organiser, a manager, and a bit of a visionary; David was more of an engineer and a doer, and got things done.

David… David Wheeler, I think… I, I mean I, I encountered him but hardly knew him there. I knew him again, rather better later. David Wheeler I think wrote the initial orders for the EDSAC, which were of course set up on electromagnetic switches, which you switched on. And he had condensed these into I think about sixteen words. Incredibly compact. Very cleverly done, using, sometimes using the instructions as constants… It was very clever indeed. And David Wheeler I think was responsible for those. He wasn't terribly good at writing. He didn't enjoy that at all. And the rumour goes round that, his PhD thesis had to be effectively corrected by Stan Gill, who of course was the third of the Wilkes, Wheeler and Gill.

Mm.

Anyway, subsequently. came across David through the British Computer Society, and on my comparatively rare visits back to, back to Cambridge.

Mm. When I was there in 1977 to do my computer science third year, Wilkes and Wheeler were still lecturing.

Were they?

Not regularly.

Not very well. Not very well.

Wilkes's lectures were very interesting. They were about time-sharing computer systems.

Were they? Yes.

And that was enough to get me interested in that as a topic,[inaud] the book and, so on and so forth.

Yes. Yes.

I'm afraid I can't remember what David Wheeler's lectures were on. But…

I don't think David would be a terribly good lecturer somehow. He, he's a rather withdrawn person, and quite taciturn.

Yes.

Stan Gill would be good.

Yes.

I'm pretty sure Stan Gill would be good.

Yes. And to my shame I didn't realise at that time, being a nineteen-, twenty-year-old student, how important they were in the history of computing, otherwise I might have made more of an effort to get to know them a bit, you know, but…

Oh yes. Yes, I mean the remarkable thing of course at that time, well in 1946 to '49, certain mathematics dons were coming back to Cambridge, having been on war work, and it only transpired much later that several of these were on the Bletchley code-breaking operations.

Mm.

I mean David Taunt[sp?] was one of them, Jack Good, I J Good, was another. And there were several of them. And we ultimately found, you know, had been doing this terribly important work during the war.

Mm. You didn't happen to meet Alan Turing at Cambridge did you?

No.

Because I know, talking to someone else, he came back and gave a lecture in, I think 1954, and, it was towards the end of his life, and, the person I spoke to said they found it a bit difficult watching him, because obviously he wasn't well, and…

Mm. I don't, no, I, I've no recollection of that at all.

[25:18]
OK. So, I guess, you mentioned your National Service, in 1950-'51, a lecturer.

Yes. I, because I hadn't got a research grant, I wrote off to them and said, 'Look, call me up quickly, because, then I can do my National Service, and perhaps get back to Cambridge after it.' So I went in as an AC2, at age 21, along with a lot of eighteen-year-olds. And, so the first six months before I went through the selection process, and went then to officers' training camp, and after being commissioned, they really did very well. They sent me to the RAF Technical College at Saffron. it was at Debden near Saffron Walden, which was the division of the RAF Technical College training signals officers, in the main for ground radar operation. Because, most of these people were, were air signals officers, and, you know, had been on many hazardous missions, and… But, there were no aeroplanes very much for them to fly after the war, and so they had got to be trained to command ground radar stations. So they had got know something about wave guides, and, they needed some mathematics. And it was terribly difficult, because some of them had done no more mathematics than, GCSE, School Certificate level. So I had to teach them some

calculus. And that's what I was put there to do. And so, while it was a waste of *my* time, it probably was very good for me, and, I met some very very interesting people.

Mm, I can imagine. Some real characters, bright.

Oh, absolutely, yes. I mean… Oh, there was one man I remember had 4,000 hours of flying experience, an awful lot of it on missions.

Mm.

Oh, they were, some of them quite remarkable.

Mm.

[laughs] The… I had got to get an awful lot of them to do things by rote. And, so for example, I taught them, the sum of two sines is twice the sine of half the sum, the cos of half the difference. And one of the people who kept in touch with me until he died only about a year ago, well into his nineties, and he would always start of by saying, 'Twice the sine of half the sum, and all that crap.' And he'd remembered it over 60 years. Wonderful. Yes. And so it was a… After that, I was then able to go back to…

Back to the PhD. Right.

Back to Cambridge.

[28:29]
So you finished your PhD. Did you have much choice of where you went next, or was it an obvious thing to go to Durham?

No, there was no… There was only one post… There were no computers of course in, out in other universities other than Manchester.

Mm.

And there was only one new lectureship in mathematical statistics, and that was at Durham. And I went up to, to interview, to be interviewed at Durham. I think it was in a February. And it was cold. And they put me up at a hotel down at the bottom, Durham's on hills, by the edge of the weir. And I had to walk along the bank of the weir to the science laboratories for my interview. And it must have been late February, and in Durham the river winds round a, a sort of, a steep peninsular with the cathedral on the top, and I walked through there, and all the daffodils were out. And I thought, you know, this is so different from Cambridge, the formal blacks beautifully manicured, but here, this was really a beautiful setting.

Mm.

And so I thought, well if they, if they will have me, I shall go there, and I did. And I went there for [inaud], and of course I only stayed in Durham a couple of years.

[30:01]
Mm. So, lecturing in statistics.

Yes.

Did you have some research topics as well you were pursuing?

Well at that time, I think… Well, I mean the first thing, when a young lecturer starts, you jolly well have to write your lectures.

Mm.

And so I did a lot of that. And I had, I was given a, a young research student to do a master's degree, and, we did some calculations on, on, as I seem to remember, variations from a normal distribution and how it affected some certain procedures. But it was nothing very profound at that stage. But then… Well during that time, of course, that, computers were just starting to be marketed.

Mm.

And I thought, well it would be good idea if we could get one in, in Durham. And I spoke to my professor about this, and he said, 'Well it would be money, and we haven't got any money.' So I, quite naively, I thought I would write to the Littlewoods Pools people, not realising of course they were based in Liverpool, and they were tied up with Liverpool University and then eventually what became Liverpool Moores University isn't it. But however, I didn't get any money there. But, the University Grants Committee tumbled to the fact that very nearly every university would put in a request for money to buy computers, and they hadn't got enough to give everybody one. And at that stage, Durham University was in two divisions, the Durham Colleges and King's College, Newcastle upon Tyne in Newcastle, and they were part of the federal University of Durham. And they realised that they would stand a better chance of getting the money for a computer if they combined. And so they combined their application, and indeed were given money.

From the University Grants council budget.

From the University Grants Committee.

Yes.

And so, I decided I would apply. Even though I was what, 27, or 26 I suppose, 27, I would apply for it. So I worked out and thought, well, there weren't going to be very many people who had worked on computers at all, and not all those would want to work in a university, and there were perhaps still fewer of them that any decent university would want to have. So, I applied. And, I was asked… there were two candidates, asked to wait behind, and I was one of them. The other one was taken in, and was offered the post. I was merely being required to drive my professor back to, back to Durham. But, the man who was offered it was Sandy Douglas, and he chose Leeds instead of Durham. And so, a bit later on, I had a visit from the registrar of the university, not the Durham Dons, it was the registrar of the university, offering me the post as acting director of this new computing laboratory.

So that was 1956, thereabouts.

That was… Yes, from April the 1st 1956, which was a very significant date it seemed to all concerned.

[33:47]
Yes. So at that time then, this must have been quite a revolutionary idea, putting computers in universities.

Oh yes.

Was it difficult to make the case, or…?

I don't… I think the University Grants Committee had tumbled to the fact that computers had, they had got to go in to universities, and that, it would push on the, well particularly the research in a whole lot of disciplines, particularly the science disciplines, in any universities that were given them.

So that there was known to be, not a backlog, but, some problems that couldn't be solved because there was a lack of computers?

Yes. Well of course, by that time, I mean the atomic bomb had been dropped, and, it had been revealed that there were a lot of calculations being done there. There were a lot of calculations on ballistics done by the, I think the original ENIAC, in the States. So, it was getting round that, yes, if you were going to be an active research university, you would need a computer.

[34:52]
I guess it was giving a sense that having a computer, that opened up fields of research for people that wouldn't otherwise have been possible.

Yes. [pause] We started in, in Newcastle, and the computer was situated in Newcastle, but as a university department, not as a department of King's College, Newcastle upon Tyne, or of the Durham Colleges. Both have the right to use it. But

we were always machine users rather than machine builders or software. And so, when I was appointed, I made the point that it should be an academic department as well as a, as a service department. Partly indeed to be able to get enough people to form a, well a core who could indeed do some research.

Right.

Because otherwise, you would be penny numbers and nobody would be able to support anybody else. It really wasn't, wouldn't be very good at all.

No. So this is a move in a way from the Wilkes model, if I can call it that, of just being a service industry, to being both a service and an academic service.

Yes. Very much so. Very much so.

Mm.

But, I remember the, the interview, that, I was asked… I forget just what the question was, but, what, what did I hope? And I, I said that I hope, I, I had found the Mathematical Laboratory in Cambridge the most exciting place I had ever been, and I would like to make the Newcastle one exactly, a similar one. And of course, the assessor, academic assessor for this senior post, was Maurice Wilkes sitting there. Which, I, I swear that it was quite an ingenuous answer and an absolutely sincere one, but it was obviously the right thing to say. [both laugh]

Splendid.

Yes.

Actually I was going to ask who was on the panel. Because it must have been quite hard to find people, enough people who were knowledgeable enough to be on it.

Oh they didn't know anything about it at all, apart from Maurice Wilkes.

Yes.

They didn't… They had no idea. I mean, there would be, there was a, my own professor of mathematics from, from Durham. I think there was a professor of, of engineering, civil engineering, was on from Newcastle. And there'd be another one or two senior academics, who were intent on appointing a senior academic. They weren't knowledgeable at all. That was to be the responsibility of Maurice Wilkes to say, appoint somebody who might be able to do it. Yes.

[37:41]
Good. All right. So, how did you go about initiating research in computing topics? Because there must have been an infinite number of things to choose from probably.

Well, I mean the… Again, the first thing I had to do was to try and appoint some staff. I was allowed, two lecturers, one research assistant, and a computer operator. The only person who had done any work, had attended a programming course, was one of the, a lecturer in theoretical physics in the university – in the Newcastle bit of the university, who wanted to come over. And he came over. And there was a research student in theoretical physics, who also wanted to come over. And those were the two. The third person was, effective, was Paul Samet, who became a President of the British Computer Society later. But he couldn't join for the first year, because he did not to complete what I suppose was his National Service, I think in the scientific division of the Civil Service. So those were there. And we had a, a computer operator, who was a very successful appointment indeed, Elizabeth Barraclough, who, she had got a First in, an Ordinary, a First class and an Ordinary degree in mathematics from Manchester, but she had been working on a Pegasus machine somewhere else. And she came, and of course, eventually became Director of the Computing Centre and is just about to have a building named after her in Newcastle.

Yes.

Yes. But so, when you say, what, what could we do about research? Well, I mean, the first thing one had to do, we had to get a computing service up, and, in those days

universities couldn't recruit undergraduate students except under a very very limited, limited numbers. So, we couldn't teach in the first degree, so we immediately started a postgraduate diploma, in what we called Numerical Analysis and Automatic Computing. But there wasn't any money for those of course. And so, we started with one student, and, he in fact was quite successful. He was a very withdrawn chap, but he was fascinated by bell-ringing. He was an active… So we programmed the, Pegasus, what was it called, the computer, to, first of all to, to play a, a particular change. And he had his group of bell-ringers round, and they remarked, 'How precisely,' the bell, the, the change ringing, what… And then he wrote one or two other programs to, which, of course were sort of, groupie type mathematics involved, to check changes and to, devise them. And he was… He, he wrote a little paper on it, which was rather nice.

I might look that up. I'm a bell-ringer actually. My wife, my wife and I both ring.

Oh are you?

Yes.

Oh well. And what was his name? His name began with P. I shall remember it in due course. But I mean, that is now 60 years, 70 years.

And curiosity, probably the first…

Yes.

Well it must have been the first ever program about bell-ringing I, I'm sure.

It might have been. Would be a very early one at any rate.

Yes. Yes.

Yes.

[41:50]
Mm. So… Actually, you mentioned Paul Samet a while ago.

Yes.

I found a paper from the Computer Conservation Society which I'd not heard of before. Anyway, Paul Samet is quoted in that as saying that, this is in 1960, he said that, you had a bigger office with a proper carpet than the professor on the floor below. And he said, that reflected the importance of the computing facility, and that people who came to visit the computing facility would be from industry, and they would expect to be met by someone of that sort of status.

[laughs]

Did you think at the time you were, maybe pushing ahead a little bit and being very pioneering, a bit different from the rest of the uni?

Well we were certainly very different. And it… Particularly because we were, initially we were a university department, rather than a divisional one. So that it meant that, the money for the computing laboratory came out of the grant to the university, before it was split into the Durham. And so, I wasn't in competition with all the people in Newcastle with their engineering requirements or in Durham.

Mm.

And… And eventually, I mean, although eventually we were teaching in the main in science departments, which led to me becoming the Dean of Science, but as I was not competing with any of them for the funds in science, I, it was a very pleasant time indeed, and, somehow or another they, they trusted me, and I think that was initially the start where, when Newcastle became a university, on its own, and we were transferred into it, that I then became Pro-Vice-Chancellor and eventually Acting Vice-Chancellor before going down to, to Reading.

[43:48]

So at Durham, did you start forging links with industry?

Oh yes, we had to.

That was part of the income stream was it, for the…?

And it was part of the capital, in order to… I… We, we were given quite a good amount of money from Parsons, the marine engineering people, which guaranteed them a certain amount of time on the machine. And we had a bit of money from Parmatrada, which was a marine research establishment on the Tyne. And eventually I suppose we, we sold a bit of time to, oh what was the, the detergent manufacturers up there.

Unilever?

No, the other one. Another one.

Procter & Gamble?

Procter & Gamble. Yes. P&G.

They're the only two I know so that's handy.

Yes. Yes that's right. Yes.

Yes. So was this purely a commercial arrangement, or was there an interchange of ideas and expertise?

Well, we started… It seemed… When the British Computer Society started, there was the prospect of starting a regional group, and so I thought that we should start a regional group and try and bring in the local authority people who were going to put computers, try and put computers in, to get their rates in and so on; the various technical people along the Tyne, who were shipbuilders and, well designers of marine engines and this sort of thing. And so that was really why we started. We got a group

of people there, and, in the main we had to speak to, speak to ourselves, that… Because there was no, the British Computer Society at that stage had no money to support its, its regional groups at all. And we met in the lecture room of the computing laboratory, which I didn't charge for in the, it never occurred to me, I didn't… because there wasn't any money to charge for it, but, nowadays of course if you want to meet in a university, you have to pay a hiring fee. But, we didn't. So we started very small indeed, and… But it, it grew, and, we had people, anybody who came to the university who looked as though they might have something useful to say, we tried to drag them, because they'd come in on their own money rather than ours.

Mm.

We hadn't got any.

[46:40]
Mm. It's round about this time that, well I was talking to another interviewee, and he was working for Boeing in the States. I think it was probably the late Fifties, perhaps early Sixties. And he said it was still a time when you had to prove to engineers that computers did things properly. And he said, you know, a certain degree of scepticism about the validity of sort of, computer modelling and, and computer work. Did you find that in your dealings with industry at that time?

I don't recollect anything like that. But I do recollect asking Elizabeth Barraclough's father, who was a, an accountant, and he was an auditor for various councils, about the problem of auditing computer-produced accounts. And, he came and gave us a, gave a talk to our students on it.

Mm. Mm.

But it was all speculative at that stage, because there really wasn't very much of it done.

[47:45]

So, BCS, you mentioned them just now, I was going to ask you about that. I mean to look up, what was the date when they started, can you remember?

No, I can't. I know, I still remember my number, which was 961. And it still appears, is part of the, presumably, digitally-checked number that I've got at the moment.

Mm.

No I can't remember that, I'm sorry.

No, it's round about this time, wasn't it, for sure.

Mm.

Yes. So was it easy to get the Northern section of the BCS up and running? Was there a lot of interest?

Not a lot. No, no, we had to… [laughs] We had to go round recruiting, and, saying, 'Well look, don't you think you ought to be?'

Mm.

Yes.

[48:31]
Mm. Moving ahead to the BCS, while we're on the topic now. How much value do you think the BCS has brought to the industry over the years?

Oh, from, from initially, from the initial start, where it was struggling to make any impact at all, I think it's been a, an enormous instrument for good. Because, during the time that, you know, I was active in the society, we were struggling to get numbers to get a coherent core which could indeed support some external activity. It…

Mm.

You see, in the early days I, I seem to remember, a talk, which must have been arranged by the British Computer Society, by Freddie Williams, who was the professor at Manchester, and it was almost entirely dealing with calculation. Because in those days memory was so expensive, so tiny, that an awful lot of your mental effort had to go into squeezing the problem into the very tiny memories. So there was no question of big random access storage. And that is of course a thing which has completely transformed what computers can do and what you can think of doing them for, doing with them.

[50:09]
Mm. Yes. Well the BCS is still hugely active isn't it, and a very significant organisation.

Yes. Mm. Yes it is.

So you were President, weren't you, in, 1984 to 5? Is that right?

Yes, I think so.

Yes. Did you enjoy that year?

[hesitates] Enjoy? It was interesting, let's put it like this. But you see, at that stage I was Vice-Chancellor at Reading, and so I really was rather busy, so I'm sure I did much less than the presidents of the British Computer Society have done subsequently.

Mm.

I went around the country a fair amount, but, I mean it had to be fitted in with the job that I was being paid to do.

[50:56]
OK. So, coming back to Durham then.

Mm.

So 1963, there was this organisational change, wasn't there, between Durham, Newcastle and so on.

Yes.

Was that… I guess, that might be a little difficult politically, or a few ruffled feathers, or, slightly difficult time, is that right?

If so, I, it didn't affect me in any way. I'm sure there was some horse trading between the powers that be in Durham and in, in Newcastle. But you see, by that time, Newcastle was a great deal bigger than the Durham Colleges, and so I fancy that they cracked the whip in various ways. It was a fairly smooth transfer of the computing laboratory, the, what was called the Durham University Computing Laboratory, into the Newcastle University Computing Laboratory.

Were they actually different facilities, or just a change of name?

No no, it, it was just merely, we altered the name on the door.

Yes.

And I then became a member of staff of the University of Newcastle upon Tyne.

Had you been able to carry on any of your own research topics through this period?

A little, but it was by no means as, as full-hearted as it had been earlier. I mean it… Things were indeed difficult. In the main, I would be associated with some of the research things that were going on, rather than actually doing it myself. I mean, for example, one of them, we started early printing, applications of the computers to

printing. And, we had a, a project on that, and actually did a little bit of printing which was producing a tape to control one of the automatic, one of the printing presses elsewhere. So that was one of the things. Another one was, the representation of terrain within a computer, which, we got some money from one of the military research establishments to do it. There were things of this nature which… And indeed information retrieval. We negotiated with the, what is it called, the National Library of Medicine in Bethesda, in the States, who were producing tapes of references in medical literature, which then could be searched. And, there were to be, this was of course in the, after we had got the English Electric KDF9, with some magnetic tape drives. And we would have the updated tapes flown in to Newcastle Airport, and brought down to us, and we would run the searches in association with the National Science Library. We had some difficulty sometimes getting the tapes in. There was one particular occasion where it was suspected that it was pornographic, and, we had to, [laughs] prove to them that they weren't. Oh it was very odd. Mm.

Still one of the highest bandwidth forms of traffic isn't it, a lorry-load of tapes.

Yes. I should think so. [laughs]

Yes, that's right.

Yes.

[54:40]
Yes. So, to Newcastle. Did you actually move from Durham to Newcastle, was it, or…?

Oh no, I had moved to, to Newcastle in, about 1957, but… You see, my post started on April the 1st 1956. Well of course, there wasn't a computer there. The computer didn't come until later, in 1957. But by that time I had moved house, and was living in Newcastle.

Mm. Mm. So, about this sort of time you started, perhaps becoming more of a managerial role, more administrative?

I… I would think so really, in, in fairness. I still lectured, and, to, and it always seemed to me to be right that, and by this time they had made me a Professor, that, undergraduates ought to see the professor, even if only comparatively short, for a short amount of time. And so, I gave some lectures in, both in the undergraduate degree which we had started by that time and at the master's level.

Mm. You enjoyed teaching, did you?

Oh very much so, yes. Yes.

Mm. I can imagine it must have been rewarding, being promoted to Professor, but also, disappointing to have to give up some other things that were probably interesting to you?

I had already made that choice I think, must have been… It really must have been when I applied to become Director of the Computing Laboratory. One knew perfectly well that there was going to be a, a role in helping other people do research, rather than doing it yourself.

Mm.

I, I made that decision very early on.

[56:42]
So, you became Pro-Vice-Chancellor at Newcastle, didn't you?

Yes. The… Obviously, the deans were the pool from which the pro-vice-chancellors were selected, and it was a, I think the members of Senate voted on it. And, there were two pro-vice-chancellors in Newcastle at that time, one under what was Statute 11 Paragraph 1, who was the designated deputy to the vice-chancellor, and under 11.2 when I was elected first under 11.2. And then, a year or so later, three years later or however long it was, I became under 11.1. And at that stage, the vice-chancellor was Dr Henry Miller, who really was, rather ill. He had a very, he was very much

overweight, and he had a very serious heart condition. And he died effectively during the time that I was Pro-Vice-Chancellor under 11.1, and so became Acting Vice-Chancellor on his death.

Mm. So, like to get the job? Mm.

Well it… I mean, all I can say is that, he had been very ill for the couple of years before that, and, it was a great deal easier being Vice-Chancellor when you had the authority to do it, rather than having to do it and wondering whether it was with his approval. But I mean I think that again was the, must have been the key to being appointed in Reading.

Right.

I mean, someone who has actually done it for a year, and know what it's, what it's like, is a more attraction than somebody who you are taking completely on spec.

Yes, aspiring to, yes.

Yes.

So I read a quote somewhere that you were the first Vice-Chancellor who was a computer professional.

I think so.

And I thought, well, maybe that's just timing, but actually, it was more, it's more than wasn't it; it's the fact that computing was now a proper academic subject, and recognised as such, and…

[hesitates] I'm not sure how much that, that influenced the appointing committee. I think, much more it was that, you had had someone who knew what it was like to have to select and appoint professors, and what indeed motivated professors, why indeed they were in the post they were. I mean in the main, it seemed to me that they

were all wanting to buy immortality by their contributions to their subject, and provided that you could encourage that and reward it, that is the right way to deal with appointing and encouraging professors.

[59:56]
So this period of mid-Seventies onwards, certainly the mid-Eighties, late Eighties, was a period of huge change in the computer industry wasn't it. Massive growth. An awful lot of innovation. You know, the personal computer started appearing. Did that… How much did that change the nature of what you did and what you managed?

Well you see, up… I, I left Newcastle in 1979. And at that stage, computers weren't really personal because they were too expensive, but, it was the time when the Xerox laboratory in Palo Alto were effectively putting a, what was then as personal a computer could be, on the desk of all their research people. They did away with all their secretaries, so indeed, the researcher would indeed write his own papers, and do all that, and do it all from there. So, that was the, the first contact, but, it hadn't affected computing in the university at all. The thing that we had done was to seek to have a, the first multiple access computer, well it was not merely in, in Britain, but in Europe, when we put in the IBM 360 Model 67, which was the first of the machines which had virtual memory.

Right.

I mean that was quite a, a battle to do that. [pause] We had had the English Electric KDF9, which I suppose was, sort of the equivalent in power to some of the IBM 700 machines, I forget which one it would be. But we wanted then to put terminals around the university insofar as we could. The only systems that were available then was, I think a, an American General Electric company one, and I think that would be the 645 model, and it was, its competitor was the IBM 360 Model 67. And it was, we were trying to get money for this. At that stage of course Durham University now was separate, and they effectively said, 'Well look, we think if we put our money with yours, you are going down this multiple access route, we should be able to get the benefit in Durham.' So, they put their money together with ours. And at that stage, we formed what was called, the acronym NUMAC, Northumbrian Universities

Multiple Access Computer. But we had of course a good deal of difficulty in persuading the powers that be that we could spend our money on an American machine, because, in those days there was still, ICT, or ICL, whichever it was at that stage, trying to build what was a competitor to the IBM 360 range. And they had got a model, Model 470 I think it was, which was supposed to do all this, but they were busy writing the operating system, and it was not going to be ready for use.

Not ready. No. So can you remember what date this computer arrived, or you went through the process of procuring it?

Well, it must have been… I seem to remember that the Model 67 came in 1967. If so, we must have been thinking about this in 1965. That seems about right. Because, I remember taking a sabbatical year about the time that the KDF9 was due to arrive, placed the order and then left the country. And, so we would have the KDF9 from about 1963 round through to '67 or '68, and the, the new machine overlapped that.

Mm.

[1:05:11]
We were very taken by the General Electric 645 I seem to remember. They were keen also to make an entry into the British and European market, and so they made us a very good offer indeed. But of course, the machine hadn't worked by this time. You had to buy off the drawing board basically. And, IBM didn't like this. They, they thought, now we should fight for this order. And they invited me to go over to the States just to see what was going on. I couldn't go at that time, because I was busy in the university, I forget, but I sent one of my colleagues, Jim Eve, if they would go over. But I would only allow him to go over if they would agree to him going to see the GE, General Electric, people as well. And this caused them problems. They hummed and hahed, should they pay for someone to go over and then just, go to their competitor? But they had thought that I had intended that they should *pay* for him to go to their competitor as well. And, no, to their eternal credit, they agreed, although, in the end I said, no, I don't mean that you should pay for this.

Mm.

However, he went over. And he went to the GE people, and was clearly, they were in trouble with the software, and they were, it was expanding enormously and they were going to solve it by putting a lot of, a lot more memory. This was very expensive and we knew that we couldn't afford that at all. And so effectively that visit did push us towards the IBM machine.

Would that be one of the first serious IBM, big IBMs in this country, do you suppose?

Well it was the first multiple access machine in Europe, never mind about in this country.

Mm.

And, they had a, a system which I think was, what was it called? It was, TSS, that's right, Time Sharing System. But that too was running into trouble. And, with the amount of memory we had, we could only run about four terminals, one in Durham, and three up here. So, that really wasn't viable. And that was when we heard about our friends at Ann Abor in Michigan producing a system, a Michigan terminal system, which could support a lot more terminals with the same hardware. And, that was how we came to run MTS for quite a number of years.

I might have got this wrong, but I think, when I was at Cambridge in 1977, the computer lab there ran an IBM, and, they had their own multi-user layer, again, I think because they weren't content with the IBM offering at the time.

Yes. Yes.

And this is ten years after what you're describing isn't it really. It was a, really a problem.

Yes. Yes. I don't think, I don't think TSS ever became a, a live operating system.

[1:08:45]

No. No. So the IBM was a success, was it?

Oh very much so. I was of course absolutely nervous about this, and, I spoke to the, then the head of IBM, who was Eddie Nixon, also a Cambridge man incidentally, and I said, 'Look, if this were to fail, it would be a dreadful blow for IBM.' It would probably be the end of my career as well, but I didn't mention that.

Mm.

And he very much rose to the occasion. And when the machine came in, we had two first-rate engineers in, and they stayed with us for a long time. Eddie Nixon had arranged that almost anybody in their research, in IBM's research in the States, who came over to Britain would come to Newcastle. We would get them to give a talk, or a seminar, talk to our software people. And very much put us on the map with, anybody who came over from the States, at IBM's expense, would come via Newcastle.

Mm.

And that did well. I mean it also tied in with the IBM seminars which started. I was invited, after we had placed an order I was invited to go to one of their seminars in, in Holland, which was held in the Singer sewing machine residence which IBM had taken over. And at the end they asked, in those days, which was quite forward, for criticism and comments on the, on the talking.

Mm.

And I made two significant comments I think for them. One was that, you get a number of people to give a one-hour or an hour-and-a-half presentation. And in a one-hour presentation there's quarter of an hour of introduction, quarter of an hour of summary, and only half an hour of content. If you've got a third of the people, third of the number of the people doing three three-hour, we'd only have a quarter of an hour introduction at the beginning, and a quarter of an hour… And it would be much more use. So that was the first one.

[1:11:19]
And the second one was, that, you could hold these seminars in other places, for example, Cape Town, Rio de Janeiro, or Newcastle upon Tyne, because I had never been to Cape Town and Rio de Janeiro. However, they soon came back and suggested, do them in Newcastle. And I said, well, yes. We shall need quite a bit of money to do this. We shall want to bring over prominent academics from America to talk about the courses that they are giving, and with the idea of giving three hours concentrated to prominent academics in Britain and in Europe, so that they could then go and expand those courses the following the year, say from the three hours there to a dozen, and the following year to 24. And this would be the basis of doing them. And they grasped it. [pause] They asked to be allowed to suggest the names of academics from Europe, and we would either agree or not. We would select the topics. There would be no selling input, but if IBM wished to have as many people as they wanted attending to talk to the, those attending, that would be quite all right. And they went on for many years, and were really very successful.

Mm.

We always selected topics which we felt, our courses… We didn't know how to give them. And that indeed… I mean, initially we started with operating systems, because we knew nothing about operating systems.

Mm.

And we got somebody over, and, there were some very good people came over from the States to, to lecture.
[1:13:30]
And all this, the, the ambiance that grew up around this support from IBM was very valuable to us in Newcastle.

I think we forget now how dominant a player IBM was around about this time.

Oh very much so. And then, they also invited me to arrange some talks in the rest of Europe, for, and they were working on the principle that if the computer market expanded they would get half of it.

Mm.

And that was what happened. And they were very good indeed about that.

One of our other interviewees told me a story about the differences between ICL and IBM as organisations, and he said, I forget where it was he worked now, he said, they bought an ICL computer. ICL were there for months and months and months not getting it working. They bought an IBM computer instead, and the engineers got it working in three days. And he said that kind of summed up…

Yes.

…the difference in experience, pedigree, just maths really, you know, it was engineered to that degree of quality.

Mm. Well certainly the two engineers that, that we had for the Model 67, they were very good indeed. They were really very bright people.

[1:14:54]
Mm. Mm. OK, back to Newcastle then. Pro-Vice-Chancellor, and you went to Vice-Chancellor, Acting Vice-Chancellor. I realise you also published a couple of publications with Leslie Wilson round about this time.

Oh yes. Three in fact. Yes.

Yes, the third one was a bit later wasn't it?

And do you know, I've had a royalties cheque from the Cambridge University Press of, I think thirteen pounds and forty pence, and that is what, 40 years after they were published or something like that. [MJ laughs] Yes.

So how did you choose these topics? Because they're all about manipulation of… Or, Information, Representation and Manipulation in a Computer is one.

Well, I mean that effectively was the first year, the first year course in Newcastle upon Tyne for the undergraduate degree. Leslie Wilson was a senior lecturer, a colleague of mine in Newcastle, and, we felt that, if we tackle this together we might get it out in a reasonable length of time.

Mhm.

And this again, there's a part of the, of a proposal I had made to the Cambridge University Press, because I mean, all these presses came round asking you to write something up, and effectively to write your lecture notes up.

Yes.

And I said, well look, what we need is something which can be produced comparatively cheaply so that the students will be able to buy it. It's no use putting it in hardback and expecting them to buy it. Hardback will go to the libraries, but the students need it in a paper cover. And I still have them in my bookcase somewhere there. So initially we did it, the first one, *Information, Representation and Manipulation in a Computer*, really starting out with the premise that, the way you represented information determined what procedures could be done easily and quickly, and what could not be. And pointing to the analogy of a telephone directory: it's done by name, and you get the number from the name. Given the number, it was a much more difficult process of finding out who, whose it was. And, really that was the genesis of, of that book. I mean, and we did it, in the first one, with all the programming examples in ALGOL. And, later on we changed it to Pascal when that became a bit more used.

Mhm.

[1:17:52]

But another book we wrote was on, *An Introduction to Computational Combinatorics*, which, you know, things like sorting and searching and, that sort of problem.

Mm. And again, we take all that for granted now don't we, but actually at the time, I remember learning how to write sort programs and that sort of thing.

Yes.

Now, it just happens, doesn't it, in Excel, you know.

Well that… Well that's right. But when you've got an awful lot of memory, you don't need to sort an awful lot. You can put an address on it.

Mm. Mm. Things change.

It makes, well it makes a world of difference.

Yes.

That's why it's a bit remarkable that even three copies were sold last year. [laughs] Yes.

[1:18:36]
So 1978, '79, or '79, you moved to Reading. Was that a career change, or were you poached, or how did that come about?

Well, in those days, vice-chancellorships were not advertised with applications being sought. There would be a discreet announcement in, say, the *Times Higher Educational Supplement*, that, 'The University of X is seeking a, a successor to, so-and-so, as Vice-Chancellor, and would be pleased to hear from anyone who can assist them in their search.' Which the Student Union president at Newcastle rather wittily described to me, 'You don't apply yourselves; you get a friend to apply for you.' However… [pause] Anybody who… It was always thought that anybody who wanted to be a vice-chancellor, shouldn't be one. [both laugh] It's not quite that, but,

it still is nearly the case I think. And when we were looking for a successor to Henry Miller in Newcastle, we drew up a list of, and asked the universities to suggest names, and we got a list of about 130-odd people, and we classified these as, sort of, A, A*, B, so on. And we had about three in the A* category. And we wrote and asked them all to come and see us, and none of them would. [laughs] And then we went to the As, and there were about four or five of those, and I think only one of those would come. And when he came, we thought, how on earth have we ever put this man as A? And then there was an A-, one or two A minuses, and, out of the A minuses ones, we… But… So, effectively, as an acting vice-chancellor, my name was known, and was in the, I suppose the counterpart of the *papabile*, popes. [laughs] And I was invited to go down and see them at, at Reading.

[1:21:10]
Mm. So what does a vice-chancellor do?

I was asked this when I went down to Reading. And I think I can point out this. Even in the days when I was a vice-chancellor, the turnover of the University of Reading was more than £100 million a year. So, although he's not the chief executive, he is effectively responsible for a multiple-task job. On the one hand you've got a business operation to run, and it's much more of a business now with the fees forming a very large part of the income. But at that stage, we were the biggest hotelier in the area, with all the halls of residence, with an enormous catering operation of 20,000 meals a day or something. We were the biggest pharma in the, in the area, in Reading. And you would have one or two other business operations as well. But really, you were there to do advanced teaching and research.

Mm.

So this is another of the aspects that the vice-chancellor is technically responsible for to the management of the university. So, what does he do? I should think, a lot of his time is spent in committees, most of which he is chairing. I mean it is always thought that, if you have anything, problem with any university, what you do, well the first thing is, you set up a committee, because, in those days, and it's probably a little bit less now, but it'll still be substantially the case, where it is a self-organising operation,

to be done in the main by consensus insofar as it is possible. So, first of all, he's got to chair, and, I hope, would remember that you've got a lot of people there, they weren't, wouldn't be highly paid, but on the other hand they would be adequately paid, and every minute that they spend is costing a fair amount of money, they're not doing what they have been appointed to do.

Mm.

And that's the important part. You've appointed them in order to inspire the young and to add to knowledge. And any time you are spending in committee is taking them away from this. And I think you have to be very, very conscious of that.

Mm.

So, first of all, he ought to be an efficient chairman, and, I should be kidding myself if I didn't think that as chairman I was having more of an effect than other members. In other words, the way you chaired the committee would be perhaps a dominant feature in the conclusions that they came to. So, yes, it's democratic, but on the other hand, remember who's speaking, this sort of thing.

Mm. So ultimately, you are the boss, aren't you? Should the committee be unable to reach a consensus, conclusion…

That's it.

…the vice-chancellor has to…

Well…

Ultimately.

Yes.

Mm.

And the question of how one does that is a matter of the personality of the vice-chancellor I think.

Yes. So does a vice-chancellor report to anybody?

Well, the owner and, owner of all the assets, and the employer, is the council of the university. And the council of the university is chaired by an independent person, usually an eminent person. In our case, I mean we had the, there was a prominent businessman, there was a, we've had one or two retired permanent secretaries of the Civil Service. That sort of person.

Mm.

Yes. And so... And indeed… [pause] The council of the university I found is, it's roughly 50 per cent lay and 50 per cent academic, I found them really, very wise. As long as it wasn't too big, you could get things done, and, it was a great help.

[1:26:15]
Mm. So I guess by this point your days of statistics and computing are…

Almost, almost gone.

…gone into the background.

I mean, I did take a number of decisions in respect of computing which were Luddite rather than anything else. I was frightened to death that the University of Reading would be the first university to have its finances hacked, and whose vice-chancellor had been a President of the British Computer Society. And so, I always insisted that the computers on which the finance was done was totally separate from the main computers of the university, and indeed, in my, in my time, there wasn't any connection, you know, any electronic connection at all.

It's probably a far-seeing decision in the light of the sort of stuff that goes on these days?

Well precisely.

Mm.

I, I still… I am a member of a statistical dining club, and, when you become 90 they invite you as their guest, and you can speak to them about things and suggest a topic for them to discuss afterwards. And the topic I chose to discuss was, what bits of computing should a statistician know, and what bits of statistics should a computer scientist know?

Mm.

We didn't reach any conclusion, because, by that time we had had lunch and we were getting ready to go, but, those were the, it's that sort of topic that I think is important.

[1:28:06]
Yes. So, you must have enjoyed your time. You were there fourteen years I think weren't you, fifteen years, something like that.

Oh yes.

A rewarding job?

I think it's one of the best jobs in the world. You are surrounded by extremely bright people, some of them perhaps not quite as bright as you hope they are, or not quite as bright as they think they are, but you are surrounded by very able people indeed, who every now and again will decide that there is something that they wish to achieve, administratively, and they put all their, their abilities into doing that. And when they do that, they are formidable adversaries. But it's so exciting and so interesting. And of course, visitors to the university are of a similar calibre. And if you are very lucky,

and, or… and unless you are very unlucky I think, you will encounter students who are brighter than you are.

Mm. Yes. Is there any particular thing stand out from your time at Reading as things you're proud of?

Well I think, the thing I'm most proud of is to have managed the contraction of the university following the Thatcher cuts, in a way that maintained harmony and the activity of the university. Yes, I think that, that is the thing I'm proudest of. And there are a whole lot of other successes which I, which I'm very pleased about. The number of FRSs and fellows of the British Academy increased considerably while I was there. I was delighted to have saved the Department of Archaeology, which now has three FBAs among its staff. The, the man who's excavated… Oh, you know… Not Avebury[?], the other place. I can't remember it. In a minute it'll come. And… Yes, and one or two things like that I'm, I'm very pleased to have had a part of.

[1:30:38]
So along the way through this career you've picked up some honours and awards. Chevalier, l'Ordre des Palmes Académiques.

Yes, that was mainly I think for not interfering too much with my French department. We had a…

Well that's honest. [laughs]

Not really, I don't think. I mean it… They, they got an arrangement with Poitiers to exchange students so that students could go over there and spend a year in the University of Poitiers, and Poitiers students came to us. And, I thought this was very good, and I didn't place any obstacles in their way, and eventually, I was offered the, this Chevalier, and very pleased, and I, I wear it. And there it is.

Oh it's a… Oh. And, also an award from a Japanese college.

Ah. Well again, these are all… [laughs] We were, we were on two campuses in Reading at that time, the old campus and the new one in Whiteknights Park. And we were being urged by the University Grants Committee to concentrate on the Whiteknights campus, and, presumably spend less money. And of course, the old site was quite picturesque, but, small, and near the centre of Reading, and in old buildings. And we were approached by a very very wealthy Japanese who was wanting to start a higher education college; he would hope it would be a university eventually. And he came, and wanted to start this in Reading in our buildings and, down at the, most of them, in London Road, at the old site, called the Gyosei International College. This was at a time when of course the Japanese economy was flourishing, when it was the aim of quite wealthy Japanese to send their offspring over to England to learn English and be taken in English, be taught in English. And so they started in, in Reading. And, we agreed that we would take a few of their best students into our university and bring them through to Reading degrees. This never really flourished, because the students who came really weren't able enough, certainly not able enough to do advanced study in a language which was very foreign to them. But, they indeed made me a, a Distinguished Fellow I think it was called, with a, with robes that were very similar to our pro-vice-chancellor robes.

[laughs] That's nice to have.

Which eventually I gave, I gave mine back to the university, and they modified it back to being a pro-vice-chancellor's robes. Yes.

I think you're also Honorary Fellow of the American Statistical Society.

Yes, I'm very proud of that. There are not very many of them in, in Britain. It, it was mainly for the continuous inspection schemes that I developed from Cambridge days, and for applying computers in statistical problems.

Mm. Very good.

But…

And you also have an award from Northumbria University, Honorary Fellow.

Yes. I mean that was the, Newcastle Polytechnic, where I was on the council for quite a long time, and, then eventually of course, it's become Northumbria University now. It was nice of them.

I see you're a Companion of the British Institute of Management as well.

Yes, that came as a rather, a bit of a surprise, that did.

I wasn't aware we had a British Institute of Management actually, but…

Well I don't think it's called that any longer. I think it's something else. But, the Companion is an honorary, honorary level. I think I was put forward by one of the members of council of the university, and, obviously… and thought that I wasn't managing the university too badly.

[1:35:46]
So you retired in 1993.

I did.

25 or 26 years ago now.

Yes, I did.

Yes. And how are you keeping busy these days?

Oh these days, the diary is, has a different default option. I mean the default option is that, you do nothing. Whereas, in the days when the university, if I wanted to do something privately, I had to book it long in advance. Now it's the other way round, and, as you can see with the flexibility with which we were able to arrange this interview here.

Mm.

No, I now, I don't… I, I… You can't pretend in a subject advancing as quickly as computing science that you are current. You can't keep current. I couldn't keep current really for very long after I became a vice-chancellor.

Mm.

Now, I, now I play golf twice or three times a week. I do a lot of reading. And, I go of course to the past presidential lunches of the British Computer Society. I still go occasionally to the lunches of my Statistical Dining Club, and things like that.

Mm. Mm.

For many years there was a Bath Science Club, but sadly, it, it has now finished.

It's interesting about keeping up to date isn't it. Because I was talking to someone a few weeks ago who's director of a research organisation, and he said one of the things that prompted his retirement was that he found through his career there, every so often he would have to do a kind of refresh. Soon realised that lots of things happened he wasn't quite up to speed with, so he spent some time getting back into sync with it all.

Yes.

And he got to the stage where he thought, he wasn't sure he really wanted to do all that again. And that's what prompted him to take retirement.

Yes.

It wasn't that he thought he was doing his job badly; he just realised that he was being left behind a bit, because of not having enough time to actually get into the subject.

[1:37:48]
Yes. Yes, one of the people that I knew at Cambridge was Peter Swinnerton-Dyer.

Oh, I knew Peter, yes.

Who was I think the cleverest person I have ever met. And he of course is someone who has a, one of the great big conjectures named after him, the Birch Swinnerton-Dyer conjecture. And Peter was apparently reported as saying just shortly before he died, 'I think it will be proved. I don't think it will be proved in my lifetime, which I'm rather pleased about, because I should have to try and understand it, and I think I'm too old for that.'

Oh. [laughs]

Peter Swinnerton-Dyer was, at one stage had a, a post in the Mathematical Laboratory at Cambridge. That was before he, I knew, he was subsequently appointed a lecturer and a professor and whatever, and master of a college, and vice-chancellor at, took his turn as Vice-Chancellor at Cambridge. But, he was a very significant individual.

Peter was actually Master of Catz, which is where I went.

Yes. Oh was he? Yes.

And he still did a little bit of supervision.

Yes.

And in fact he was one of the influences on me giving up maths in my second year, because he was my tutor for some pure maths topics.

Oh was he? Yes.

And I really struggled with this. And I remember one supervision very clearly. I had handed in what I thought was my best shot, and it was clearly rubbish. So he

explained to me how it should be done. I said, 'I'm sorry, I still don't understand.' So he explained again, a different way, how it should be done. And I said… And he looked at me and he said, 'I just don't think I can explain it any more simply.'

No.

And I'm afraid, [laughs] that's when I thought, perhaps it's time to do something else, you know?

Rather a similar comment to my supervisor in Cambridge as an undergraduate. He had apparently told one student, 'No. Go away and do something else, like, like economics.' [both laugh] Yes, very dismissive.

Yes. But, it was meant kindly. He was a, a very nice man actually and very friendly and affable and…

Oh yes.

Yes.

But he, when he became Secretary to the University Grants Committee, and he was, it was then rearranged as, to be called something else, and they brought in the Lord Chilver as Chairman, and Peter then, effectively, instead of being number one, was, was number two. And one of his colleague, one of his colleagues commented to me, 'Well, there are people with brains like Rolls Royces, and Peter Swinnerton-Dyer was one of those. The man who came in was, had a machine of a rather inferior vehicle.'

Oh dear.

Yes. [laughs] He's dead as well now, so we're, we're probably…

Yes.

I think we can probably say that, that all right. But…

[1:41:06]
So, I think we're coming to the end here, and it's been really interesting, and thank you for all your time and, and thought. Just to…

Well, I wondered if you wanted me to mention one or two other people whose…

Mm, please do.

…whose names I… I've mentioned Wilkes, Wheeler and Gill. A fellow there who was I think a senior lecturer in the laboratory was J C P Miller. And he was effectively a rather classical numerical analyst, who, he was just young enough to convert to automatic computing. He was a very bright, an unusual fellow, was, was J C P Miller. I've mentioned D R Hartree. He I think had, at one stage went over to the States to explain to them some numerical analysis method which would be useful in doing the nuclear calculations that they wanted.

Mm.

[1:42:24]
[pause] I do remember a talk given by Freddie Williams, I mentioned him earlier, and his flourish at the end was about memory and instructions. He says, 'We write these instructions to do certain things. And then to think that this,' and pulled out a thing like this, 'has in it the information and instructions to produce an unlimited supply of these.' And he pulled a red rose out of his pocket. So he's got a pip, a seed there, and a red rose. That was Freddie Williams. [pause]
[1:43:08]
Oh. I think I ought to mention, at Newcastle, we were the first to give Maurice Wilkes an honorary degree. And, we also gave an honorary degree to Tommy Flowers.

Wow.

And that was when all the, the work on Colossus was still secret, and couldn't be, couldn't be talked about. But my professorial colleague at Newcastle, Brian. Oh the names go. They shouldn't. [pause] I must remember his name, that's dreadful. Oh Brian. [pause] We shall put it in in the, in the transcript, if you don't mind.

Yes.

But he had done a fair amount of research on the history of computing, and… So we were able to give Tommy Flowers an honorary degree. And it's… He didn't get any, very much honours at all, and even now it isn't mentioned very often when his contributions are mentioned.

Mm.

Well I haven't thought of anything else that I ought to have told you that I haven't.

[1:44:36]
All right. Well I was just going to ask a slightly different topic, about the future.

Yes.

And, students starting, well hopefully, on an IT career today. I think I've had a wonderful career in IT. You've had a, an obviously splendid career in IT and of university management and so on.

Mm.

Do you think there's as much scope for IT students today as there was 20, 30, 40 years ago? Is it still going to be a rewarding career for them?

My guess is, yes it will be, but, who was it said that, forecasting is particularly difficult, especially about the future. For example, Professor D R Hartee was very, in those early days he thought that probably three or four EDSACs would be enough to do all the computing that was necessary in Britain, and, see how wrong you can get.

Mm.

I think we ought to make a distinction between the use of computers that everybody is going to have to be competent at, or devices which have computing in them. I think as, as far as careers in actual information technology itself is concerned, I think that there will still be a flourishing career available to do things that we haven't really embarked upon yet. And we already, robots and automata have developed in an awful lot of ways. But there's going to be immense underdevelopments in those that will be, will require people to be innovative and efficient in. So I think that there will be. [1:46:32]
I am pretty concerned about computer security, and the blending in of communications with computers which… You know, in the early days there wasn't any at all; it was merely forecast. And now of course it's, total. And it's presenting problems. And I think those sorts of problems are going to engage very able people for a long while.

Mm.

Shortly after I went to Reading I was invited to speak at the dinner that the bankers give to their favoured clients in the Thames Valley. And, I, in my after-dinner speech I congratulated the bankers on being one of the areas in which they produced an awful lot of posts for new graduates. And of course they preened themselves at this. They're now in… So of course, the other major employer will be organised crime. And while their guests roared with laughter, the bankers… When it had all subsided, I said, 'I look forward to seeing which of you recruits the brighter graduates.' And that was enjoyed by the guests as well. And I have never been invited back to speak at another dinner, bankers' dinner.

[laughs] I'm sure there's an element of truth in that isn't there. And we're seeing that, aren't we.

I'm afraid so.

Some of the hacking and cybercrime that's going on.

Right. Yes.

Yes. I do wonder whether we're going to see something like quantum computing. I fear it might be like fusion power and always ten years away.

Well…

But something like that would make a huge difference to all of this wouldn't it.

It would make a huge difference to security, it really would.

Mm.

But… I mean in the, in the early days of computing, there was what was called the Hartree Constant, and that was two years, and that was the time between placing your order and the computer arriving. And it seems still to stick at two years even after a year had elapsed. [MJ laughs] But those were the days, as I say, when I, I took a, a sabbatical leave in the, in the States, having placed the order for the KDF9, I knew I could go away for very yearly a year and it wouldn't have arrived.

Mm.

So it was all right.

Thank you ever so much.

[End of Interview]