NATIONAL Life stories

IN PARTNERSHIP WITH BRITISH LIBRARY

NATIONAL LIFE STORIES

AN ORAL HISTORY OF BRITISH SCIENCE

Frank Land

Interviewed by Thomas Lean

C1379/17

This interview and transcript is accessible via http://sounds.bl.uk.

Oral History
The British Library
96 Euston Road
London
NW1 2DB
United Kingdom

+44 (0)20 7412 7404
oralhistory@bl.uk

The British Library National Life Stories

Interview Summary Sheet Title Page

Ref no:	C1379/17		
Collection title:	An Oral History of British Science		
Interviewee's surname:	Land	Title:	Professor
Interviewee's forename:	Frank	Sex:	Male
Occupation:	Programmer, information systems theorist	Date and place of birth:	1928, Berlin, Germany
Mother's occupation:		Father's occupation:	Engineering company owner
Dates of recording, Compact flash cards used, tracks: 13 May 2010 (tracks 1-3), 21 June 2010 (tracks 4-5), 22 June 2010 (tracks 6-9), 23 June 2010 (tracks 10-18)			
Location of interview:	British Library (tracks 1-3), Interviewee's home, Ivybridge (tracks 4-18)		
Name of interviewer:	Thomas Lean		
Type of recorder:	Marantz PMD661 on secure digital		
Recording format :	WAV 24 bit 48 kHz		
Total no. of tracks	18	Mono or stereo	Stereo
Total Duration: (HH:MM:SS)	15:06:31		
Additional material:			
Copyright/Clearance:	No restrictions except for the following sections: track 1 [between 35:38 – 35:58, and 40:36 – 41:26], track 4 [between 31:46 – 34:56], track 8 [between 13:04 – 13:15 and 47:20 – 49:19], track 9 [between 18:21 – 18:41, 20:20 – 20:21, 01:02:54 – 01:03:31 and 01:08:31 – 01:09:46] and track 13 [between 18:10 – 19:11] which are closed for 30 years (until March 2041)		
Interviewer's comments:	Equipment problems after track 11, leading to shorter session times.		

[Track 1]

Right, this is interview with Frank Land on the thirteenth of May, 2010, at the British Library. Frank, as I mentioned, we'd sort of like to start this interview in your childhood and then move on from there, so I was wondering, when were you born?

I was born in 1928 in October, in Berlin, Germany. I came from a family which was fairly prosperous, manufacturing. In historical terms quite interesting, because the family had built the first lighting system for Berlin, a company which produced automatic lighting which didn't have to be quenched by somebody going round, gas lighting, that was the family business. My guess is that the family had suffered quite a lot in the Depression, but by the time I was conscious of that sort of thing, I never knew. My father had his own manufacturing business producing accessories for the motor industry, for the motor maintenance industry. And when we grew up, my brother and I – I'm a twin – we were content, lived in quite a nice flat, and then gradually Hitler impinged. First of all, my father's business was confiscated, his business partner actually sold him down the river, stabbed him in the back, and in 1938 of course I remember very vividly Kristallnacht, the destruction of the Jewish community and much of their property. My father had been a great optimist, he thought the Hitler thing would blow over and the Germans would come back to their senses, but by that time he saw they didn't. One of my uncles was one of the earlier people to go to the concentration camp at Dachau and so at that time we tried to get out. But where to? It was very difficult to get visas and permission to go anywhere, so the family was scattered over the world: some in Holland, some in Belgium, some in France, some in China, some in South America, some in Israel – very early settlers in Israel – but we finally got permission to come to England and that had been my parents' preference because my father had been a commercial apprentice in England at the beginning of the century. So – and we had other family members who had emigrated to England much earlier for business reasons really, so we came to England in April 1939, found ourselves in a strange country and once we… well a funny thing is, the funny thing is that there was a kind of image of what England was like, which was totally false. So for example, we all got clothing which we thought was suitable for England. So we as children were given knickerbockers because we thought that they were used in England, of course they weren't. And all sorts of things. These long, trailing overcoats which you see in cartoons of refugees, that wasn't the German style, that was what we thought was the English style. [laughs] So we came across in that way. [04:15] Now, we

had no English at all, but we went to a school, we lived in Kilburn and we went to the local primary school there, Essendine Elementary School I think it was called, we went to the local primary school. At that time we were aged ten and we were lucky in that we had a teacher who was very sympathetic and very good and the way she dealt with my brother and myself and managed to get us to learn English very quickly. And this was very necessary because a few months later, very shortly in September, we were evacuated. You've seen the pictures no doubt of the trains of children with their gasmasks, well that was exactly what it was like. We had no idea where we were going, we arrived at the station and the first thing we saw was a bus, the 142, which we knew came from London and went just to Watford. So we finished up in Watford station, we were bussed then to a little village called Bedmond, which was very close to Kings Langley which is better known, and well, that was quite interesting. I'm not sure whether this story is interested in this particular incident, but here we were, two little German boys, refugees. We all went to the village hall, this bus went to the village hall and the families which had agreed to take evacuees picked and who was left for the end, the two little German boys. A few others as well, but then the local voluntary organisation, the women's voluntary organisation took us round to those houses which had said they might take evacuees and we came to one house and the lady of the house said she had agreed to take some girls but she would certainly not take boys, but she took one look at us pathetic things and said well, they can stay overnight and see what her husband would say. And we stayed there for the duration. They were lovely people. They were I suppose what one would call yeoman class, that is to say they were neither gentry, worked for the gentry, but they weren't at the very bottom either. He, Mr Gentle, was… he was very good, he was a very good carpenter, cabinet maker, but he was also an excellent poacher and we very early learnt the art of poaching: snares, traps, guns. So we learnt the country life and very much loved the country life, that was very enjoyable. That worked very well. [07:54] We went back to London after the Blitz, but went out again when the V1s and V2s came along, and again stayed with them and we're still closely in contact with the remains of their family. I think they transformed our life, but we transformed their life, because they saw a totally different kind of culture which came from us rather than the village culture which they were used to. And the son, who was a little bit younger than we were, there was one only child, the son went on to do extremely well and developed air radio, became a leading light in that thing until he sold out to British Airways many years later. He is having his eightieth birthday in July and we're going to that, so that should be fun, but we see him quite often. [09:12] Well, in the village there were, there was friction in a friendly kind of way, not in a very aggressive

kind of way, but there was friction between the village children and the evacuated children. We would jeer at each other, but not much more. There were a few fights, but not many. We had more fights amongst our own group than with the others. So we adopted to village life quite well. We subsequently, we went – our school was evacuated and so we never went to the village school, our school went to the village hall. [09:55] But it was an elementary school at that time up to the age of fourteen. There was an eleven-plus exam, a scholarship exam, but we, our English wasn't good enough to even bother to take it. So at the age of fourteen the headmaster told my parents that probably the best thing for us to do was to go into the Post Office, because one could have a progressive career there. This was something my mother could not accept. She'd been to university at the University of Vienna, she was an artist, she was a very strong woman and she said we have to go on, get our education, complete our education. And she went round schools in London and [telephone ringing] and got us…

[pause for phone]

Anyway, my mother persuaded the headmaster of Willesden County Grammar School to take us on and we went into a class below our age range, but we soon went up to our proper thing and took the usual examinations and finished sixth form with Higher School Certificate, which entitled us to apply for universities. [11:28] Now, at that point we sat the examination for, the scholarship examination for the London School of Economics, but failed to get in on that basis, but became high enough on the list to be subsequently offered places at the LSE. Now, it was a period, 1947 when ninety per cent of the students were ex-service, many of whom had seen six years of service, or five, six years of service, very mature in every way, and here we were coming in as school kids, very far from mature. So that was quite an interesting experience, the ten per cent at that level. However, we enjoyed university; we studied economics and particularly international trade, graduated with a sufficiently good degree to be offered posts at the LSE as research assistants and worked, joined the economics research division. My own work was working for a historian actually, on shipping conferences. A subject I knew nothing about, but it was quite interesting, how shipping conferences had developed. [13:10] At the research division there was another graduate, graduated the same year, Ailsa Dicken, who was ex-service, she had been in the Canadian army. But she had joined the Canadian army because when she was in Canada she had told them she was eighteen when she was only sixteen, so she was much the same age as I was

anyway. And we found ourselves working together in the statistical machine room doing, pounding the statistical machine room and we got together and married in 1953. Now Ailsa has not been away from the London School of Economics since then; she became Professor of Operational Research until she retired. So she's now Emeritus Professor of Operational Research. My brother and I talked to the careers advisory officer there, a man called Commander Evans, Warren-Evans. At that time our name was Landsberger and he said, with that name you'll never get a job. He was absolutely wrong about that, but we believed him and we went out immediately to solicitors and said how can we change our name? And the answer was, well there are several ways of doing it, you can do it by deed poll which is a complicated process, or you could go to the Food Office and say I want to change my identity card and I want to change my ration book, I want to change my name, and that's the easiest way. And that's what we did, so we changed our name from Landsberger to Land on the basis of that statement of the careers advisory officer. As I say, he was totally wrong. [15:12] We had both been in the research division for about a year and we thought that perhaps we ought to look for employment outside in the commercial world and we applied to many companies. And I was finally offered a job by J. Lyons and Company in their statistics office as a clerk keeping the cost accounts for some of the Lyons businesses. If I remember rightly, it was the provincial bakeries and the laboratories. It was a terribly boring job and one which having come from university seemed to be well below one's ability, capability, but my fellow clerks made sure that the job they had took a week; a week's work – what was called a week's work – took a week when in fact it could have been easily done in two and a half days. So that was the kind of atmosphere. Some of them we could use calculating machines, adding machines and with my sense of arithmetic adding machines were essential, but they wouldn't use them, it was their pride that they could add up a column of figures accurately without using a machine. [16:36] At that time Lyons were developing the LEO computer. I knew nothing about that, but a notice went round that anybody who was interested in this, whatever it was, didn't know, were invited to come on a one week course or were selected if they fulfilled certain criteria, one week course. At that time Lyons thought that they could recruit all the staff they needed for their computer from inside, except for the engineers, all the other staff from inside their own empire. And they ran these courses; one week, very tough, to select people. I found it very hard, it really was quite hard learning about computers, learning how to program in one week. We were given homework and without my wife I don't think I would have got through, but with the two of us working together on these problems we managed it and I was selected then to join the LEO team. This was in late 1952 or early '53.

One of the other people on the course was of course somebody you've already interviewed, Mary Coombs or then, as she was then, Mary Blood, daughter of the company doctor. So that was the jump into, suddenly, into something which was totally new, very difficult and where there was not a single day when you didn't do something which had never been done before and there was an excitement about it, there was a buzz. We would congregate together, it was a very small team, we would congregate together, coffee time, talk about the latest thing we had done and say I found a new wrinkle, a new way of doing things. The great, as a programmer, the great problem was how to utilise this very small store, 2,000 words, and accommodate what you were trying to do. Now one of the exciting things about Lyons is that their level of ambition was extremely high. If you look at the specifications for some of these early jobs, they are as sophisticated as some of the most recent things. I don't know whether you want me to talk a little bit about the history of LEO, whether an interlude on that would be useful or not?

I think it would be useful at some stage in this, yes, but I don't think maybe this is the moment for it now. I think we can go back to it in a little while.

I can come back to it. At the time I didn't know that history, at the time I was simply both finding it very, very hard and at the same time being absolutely thrilled by the job we were doing. I found it hard because I don't think I'm a natural programmer. There's some people who are natural programmers and do it brilliantly. There was a guy who came in more or less at the same time as I did, John Gosden, who became very well known in the computer industry, and he sailed past me just like that. Nevertheless, I gradually got the thing and in the end I think became a very good programmer and over time one got more and more responsibilities. [20:27] One of the features of this very small team is that we put our hands to a vast number of things. The very first thing I had to do on my own was to do an amendment to the booting routine, the initial orders. The computer was already, as against some other computers, already had quite a sophisticated assembly code, developed largely at Cambridge for the EDSAC, but developed by us, by the LEO team to be able to handle commercial things. So it had instructions, for example, for dealing with pounds, shillings and pence, which we then had which of course EDSAC wasn't in the least interested in. They had the mathematical functions we introduced into this assembly code, much more commercial type of things. And also, things which could automatically do checking, so they did automatic check sums on everything which was dealt with, which again the EDSAC people

didn't know about and which we found subsequently when we merged with English Electric, they didn't' seem to know about as well, either. So we had these assembly level instructions. [22:04] We worked under the direction of David Caminer. Now David Caminer was head of the LEO programming and systems division – I say division, it's just a handful of people - and Caminer had joined Lyons in the 1930s, he'd never taken a degree because his parents thought it was a waste of time, he could do much better if he goes straight into the business. He had joined Lyons and he'd done extremely well there and he'd become manager of their systems research office. They had a systems research office as early as 1930, early 1930s, I think one of the few companies which had that sort of thing. And he took over, now he was a remarkable character. He was meticulous, he invented systems engineering, if you like. There were others who were doing similar work, but he did it in a sense from nothing, or from a tabula rasa. He was meticulous, but he was also an extremely strict taskmaster. He insisted that no programme would go on the machine until it had been checked by somebody else. At that time of course machine time was much more valuable than it is now so this problem of space and getting things into the computer and using computers were the critical things. So nothing went on. But he was equally thorough about writing. We had to write, if you wrote instructions, documentation, it had to be in such a way that it could be understood and if it wasn't understandable, if it wasn't clear, if it wasn't in good English, it was sent back again and again until we had it right and so we learnt how to do documentation and how to write in a way which is clear, which I think many of us have retained to this day or built on. If we didn't do things right, he would throw things at us. He really was a stern taskmaster. At the time we resented that, in later years we admired it because we recognised what lay behind it; the importance of getting things right. I've often talked to him in later years in his retirement, in his old age of why so many computer systems fail. If he had been in charge would they have failed, I'm pretty sure that he would have ensured that they didn't. [25:00] The scale of the jobs of course was different, but not the level of ambition and what we did was ambitious. For example, one of the first jobs which I was in charge of was a job which arose out of the times. It was a scheduling system for raw materials and raw materials at that time were in short supply so you couldn't – they were rationed – so for example you couldn't get butter, so they used what was called sweetened fats which were imported from Holland. So everything had a substitute and this job took the production orders from the factory and scheduled the deliveries of the raw materials from the various stores in such a way to optimise the transportation. It placed orders for new things. Now this was in 1953, 1954, very early on. The job collapsed when rationing stopped, it was no longer necessary. Those 'reserve stores'

– it was called the reserve stores – were no longer required. A job I was not concerned with, the teashop order job – you probably know about the teashop order job?

I've heard of the teashop order job but not that much about it.

[26:31]
But the feature was that it was the first job which was quasi-online. What happened is that – I say quasi – first of all the original thing was that each teashop manageress would place an order once a week for every day of the week ahead for the full range of products the teashop stocked, which was several hundred. David Caminer did the analysis himself, he found there was a pattern to the way they ordered. They tended to order on a Monday what they'd ordered the previous Monday with a few exceptions. And so he said alright, we will have a standard order, we'll devise a standard order and the teashop manageress will be phoned at a certain time each day, her revised order, that is the items out of the three or 400, perhaps two or three or perhaps five or ten she would make a change to, she would tell the operator who'd punch it straight on to a punch card then it would go straight into the computer. So that's why I say it's quasi-online, it was in real time, job. The computer then aggregated all the orders from all the teashops, they added in changes the management had wanted, particular things, they were going to try something different, a different product line or something, or changing a product line, and produce the schedule for each of the factories for the factories, it produced a list of the containers which were required and put in assembly instructions for putting the stuff in the outgoing docks in the order in which they were to be loaded on to the lorries which were taking it to the Teashops. So again, quite a sophisticated job and a true case of business process re-engineering, a term which came into use very much later. But it was an example of that. So we were in this atmosphere of constant change of being ambitious as personally I was given more and more responsibilities. LEO was also being used by outside companies on a service basis – outsourcing you'd call it nowadays – and we had to deal with those jobs as well. One of the most interesting ones I did was a very early job for the Stock Exchange; a stockbroking company called Nivison's, the senior partner had the idea that he wanted to produce nice looking schedules for his clients of which stocks to go for and so he wondered whether the analysis and production of these schedules could be done on the LEO, and we did that job and produced each week, very nicely, produced schedules for him to send to his clients. It was a very successful job, that's again a job I worked with, learnt quite a lot about the Stock Exchange in doing so. Gradually got more responsibility, became then

responsible, by that time LEO was expanding, it became LEO Computers, it was going through the generations of computer: LEO II, LEO III, and it opened a number of regional offices: one in Glasgow, one in Sheffield, one in Birmingham, and I became responsible for those offices, so I ran these offices which were partly sales, partly systems. One of the things where we differed from most of the other companies is that we almost insisted that we would do a proper systems study and with our acquired arrogance, we know better than others, we told companies like Imperial Tobacco or Stewarts and Lloyds or Dunlop's how they should run their businesses. [laughs] Sometimes that worked, sometimes it didn't, many companies resented it. [30:58] But of course by that time a change had come, the Americans had come into this country. Originally IBM had been kept out because they had a territory sharing agreement with ICL, or with ICT as it then was. When that, I think in 1956 or thereabouts – I'm not sure of the exact date – when that broke down, IBM came into this country. UNIVAC had already been here, but not terribly successfully, but IBM came and they suddenly walked all over us. But by then the atmosphere had changed, people said I know what I want my computer for, what I want you as the contractor to do was to tell me not how to do it, but what machine you will offer for me to do it. So we no longer had this relationship, we somewhat lost that relationship with clients and sometimes wouldn't want to know. IBM offered the better deal, we'll go to IBM, even if IBM knew less about what they could actually do with their computer. So I know, I remember going to ICI and being told what IBM had suggested for their paints division. It was ludicrously primitive against our sophisticated methods, using a computer basically to replace punch card equipment, but doing the same thing as the punch card equipment. That gradually changed, but for much of the late fifties, the sixties, that was the way computers were sold. It's only later that one got this notion of business process re-engineering that we used the computer to change the way things are run, not to replace the way things are done in a cheaper way, which was the custom over much of that period. [33:06] The next step for me, apart of course from the jobs themselves, which were very interesting, I dealt with quite a few interesting companies – perhaps I will make a digression here. One of the things in dealing with British companies, I often dealt with, talked to their very senior management, is that the senior management were either very good accountants or very good engineers, too often accountants, but often engineers. But very often they had very little idea of the things which happened at the coalface, particularly in terms of business systems. They knew manufacturing systems but they didn't know the business systems. And this differed enormously from, for example, when I visited companies on the Continent in Germany, where the companies were very similar, the people had similar

backgrounds, but somehow or other, they were also totally immersed in the way things were done at the shop floor.

So having that technical knowledge then of what was going on?

They had technical knowledge, but they had the knowledge of business processes, which somehow or other perhaps the elitism of some of the British management prohibited them from knowing. And I think that's one of the features which led to the relative decline of British manufacturing as against some of the other companies. I observed that in too many companies for it to be just an accident. In particular there was one of the most famous machine tool companies and I had a most interesting discussion with the chief executive and he knew everything about their new products, what they could do, their capability, but I knew, because I'd been on the factory, that they had totally incomplete business systems, they had incomplete feedback loops so that what was happening on the shop floor was not conveyed back to the scheduling people, or not accurate. But he was simply unaware of that. The company went out of business later, or it was taken over.
[closed between 35:38 – 35:58]
But that was true. British Callender Cables, many companies. There were some companies which were very good. [36:10] Again, another company – but this was perhaps research which I did much later, university, but the same story – Baring Brothers, the well known bank, I think they're on your list of…

We do have an oral history of Barings, yes.

Yes, I noticed that, that reminded me. We were doing work under the Alvey project much later and Barings were, we were studying Barings and the way they were using case tools. But the most important thing is, the computer set-up, which was vital to the way they operated, nevertheless was in the basement and simply unknown about by the top people. The partners clearly had no knowledge about what was going on there. They couldn't make any informed decision about that. Somehow or other that was not the elites, they weren't the masters of the universe, they were simply technicians. And this notion of technicians rather than engineers is very British.

Do you think? How would you define the difference?

I think it's not the difference in what they do, it's the difference in the way one talks about them. A technician, it's like an aristocrat talking about 'trade', something which is below your level. Accountants wouldn't regard technicians as important people. Engineers somehow or other have got slightly higher status, although in the UK it's well known they have a relatively low status. So where do we go from here? I went, yes, I became what is called chief consultant for LEO Computers. That meant I was just below the board of directors, but not a member of the board of directors, so was totally unaware of the negotiations that were going on behind the scenes, which led to the takeover, or rather the merger of the English Electric computer division with the LEO Computers. [38:45] It was called a merger, it was in effect a takeover. Our managing… our chief executive had been TR Thompson, TR Thompson famous for the Thompson Standingford Report of 1947 and again, a most interesting man I might talk about a little bit later. And he now played second fiddle to our new managing director, Scott from English Electric. Now Scott was a worthy man, but we – I think I mentioned earlier – we regarded English Electric as provincials as against our London sophistication. And in many ways this was true, I mean this is not just a sick joke. They were in a sense much more ponderous, much slower, much more conventional than the LEO people. Perhaps we, the LEO team, had recruited people who were less conventional. We took them from all sources: mathematicians, engineers, historians, classicists. We were looking for a different kind of aptitude than the manipulation of symbols, although that was important too, that was not what we were mainly looking for. So we suddenly found ourselves working with this, officially a merger, in practice a takeover. We then had the battle for who took what jobs.

[closed between 40:38 - 41:26]

Whatever it is, by this time I began to have itchy feet and I was, about 1966, was head hunted by a company called CEIR Consultancy and they offered me what seemed to me a fabulous salary and a good position and I went back to the LEO English Electric people and said this is what has happened, and they matched their offer, so I stayed where I was, nevertheless still having that feeling of itchy feet. At that time my wife was offered a visiting professorship and a sabbatical at the University of Wisconsin and I asked the Lyons people, could I have a sabbatical too, I asked the LEO people. It [the sabbatical] was not very well known at that time, but I asked for a sabbatical and they said no, you can't have a sabbatical. So I felt somewhat aggrieved. As it happened we couldn't go to Wisconsin because my wife's mother was dying at that stage and she had to stay at home. But again, it loosened the ties I had.

[42:58] The NCC, the National Computing Council, was at that time looking to give grants to universities for establishing teaching and research in this new subject of information systems analysis and two universities were given grants: Imperial College and the London School of Economics. Professor of Statistics in the London School of Economics, a man called Gordon Foster, had already started to establish some research and teaching in computer science targeted at social scientists, and he bid for this money and the LSE got the money. It was £30,000, seemed a lot at the time, and LSE, I applied for it and LSE offered me the job. So the money didn't go fully towards what was needed so I was appointed a research fellow in management and – in the statistics department – and computer service manager, so I was the first computer services manager running the computer – we'd got an IBM 1401. Never mind, that was quite good, at the LSE. So in 1967 I left English Electric LEO Marconi to join the LSE. Perhaps I ought to say quickly, at… I hadn't done too badly in that company in the sense I'd been chief consultant. I'd also been made responsible for all the English Electric applications of computers, that is in all their factories. So I got a sort of overview of all of it, which was very interesting, but of course nobody wanted to hear what I had to say, they all had long established, they'd done their own thing and here is this outsider who is suddenly coming to see what they're doing. Some were more co-operative than others. It was interesting, but it was also something of… quite difficult in some cases. Some of the locations were very resentful that anybody should be put, that they had to answer to somebody else for what they were doing. Nevertheless, it was interesting to see how English Electric divisions were deploying computers as against the way we had learnt to do it at LEO, and once again, on the whole they were much less ambitious jobs, they were much less ambitious applications. To us they seemed very primitive. I wonder whether we could make a halt for a moment here?

Seems a good time to…

[end of track 1]

[Track 2]

I was wondering if you could talk a bit more about your father?

Yes.

You mentioned he had a manufacturing business.

Yes. First of all my father had served in the German army in the First World War as a private, but had been invalided out when he was kicked by a horse. In those days one was still kicked by horses. I think on his head. Yes, he built up a manufacturing business manufacturing the lifts which are used by cars to lift them up so that you can get underneath them, and compressors which provided the air pressure system for that. And that was quite a prosperous business, including a branch in England, a sales branch in England. One of the things is when we came to England he tried to build up that business again, but as it didn't have a manufacturing capacity it folded. My father had not had a university education, he'd gone into business when he left high school, and as I mentioned earlier, he'd been a commercial apprentice in England, in London, early in the 1900s, I suppose he was about eighteen at the time, and had grown to love England. He had a particular regard for England, so much so, that when we were named, my brother and I, we were given English names. So my brother is Richard, he's Ralph Richard, and I'm Fred Frank. I don't know why that happened that way, but his preference was always to go back to England. Now, when we did get back to England and when the war started, he was an enemy alien, classified as an enemy alien and was interned in the Isle of Man. Now this had the effect that my mother had to look after herself. Her English was much less good than his, but she was very strong and enterprising. They had no income because the business had folded, so she started manufacturing garments, hats and so on, out of the one material one could get at the time, felt, and sold them to the best stores in London. She went there herself and sold them. So she built up a little business. Subsequently she turned from hats to dolls' dresses, made those, and when my father returned from internment he joined her and they set up a company, or rather they bought a company called, strangely enough, the East Surrey Engineering Company, which made dolls' dresses. [laughs] It was simply a shell company which they bought up. But they made a very successful business out of that, selling to amongst others, stores like Woolworth and so on. And they did that until he retired at the age of, must have been

seventy-ish or something like that, maybe a bit older. He was, I think was a, quite a good businessman, I think he knew what he was doing, but the creative element came from my mother and I think that was also true in his manufacturing business in Germany, the creative side came from his partner, the one who sold him out, the one who stabbed him in the back. But he was best at the business side and running the thing, but the other person produced the innovations, more the creative things.

What was your father's name?

My father's name was Louis, Louis Landsberger. [04:45] And my mother's name was Zoscha Weinberger from Vienna. And again, there's an interesting history, as for many of these Jewish families there are. They originally came from what is now Belorussia, but was then part of the Austro-Hungarian Empire and they lived in a village, now one talks about the Jewish *shtetls* – I don't know if you've heard the word. They were the Jewish communities in the countryside, often very poor. My grandparents on my mother's side lived in the *shtetl* but they were the heads of the thing so they were quite successful and they had servants who were Polish, that area's all mingled up. My mother could still sing a Polish lullaby to us when we were babies. I don't think I can repeat it – nearly, but not quite. And they had moved to Vienna before the First World War and my mother has a brother who became a very prominent lawyer and later he escaped to America by the skin of his teeth, really by the skin of his teeth, and became a professor in law, quite a well known lawyer, but returned to Vienna and died there. My father was I think what one would call a good man. He was socially very conscious and so on. My mother proclaimed she was a communist. I don't think my father would be anything like that, but my mother was a very bourgeois communist. She said she was a communist up to the end of her life but I don't think she behaved like a communist. When I say to the end of her life, she died when she was nearly a hundred so she lived a long time. My mother was, as I say, a strong woman, a creative woman, she was an artist. She was doing jewellery and painting until she was in her nineties. She carried a student's card at the age of ninety-two. She was a student at the art institute in Camden Town and she proudly showed her student's card. But she had one-man exhibitions, she was a member of the Goldsmiths' Company for her jewellery, so she was quite a creative person as well as being strong. I think they made quite a good couple with problems in between at times, but I think they made quite a good couple. They certainly contrived to bring us up, my brother and I, to bring us up in a very close family way and like many families from that era it was a very

extended family. My father had six brothers and a sister and we were quite close to all of them. My mother's parents died during the war in one of the concentration camps, Theresienstadt. How they died, we know nothing about. We know simply that's where they died. Most of the other families survived; two had stayed in Germany and they survived, one as a slave labourer died almost immediately after the war finished, the other one, who had been quite a prominent lawyer and well connected, survived rather more easily, but he's the one who had been in a concentration camp before the war, which gave everybody a huge shock. He was at Dachau because that was one of the earliest where Jews were taken to concentration camps. [09:50] In Germany we went to a Jewish school. I don't remember a great deal about it. We learnt Hebrew but I don't remember a single word of Hebrew, I don't have any of that. Most of my memories are in fact from past the age of ten when we were in England. Very scattered memories of incidents in Germany, such as the first day at school which one remembers. Or some people remember. On the Continent it's made much more of than here. In Germany each child gets a huge bag of *Zuckertüte*… *Zucker*… I don't know the word now. A big cylinder or cone filled with sweets and fruit and things like that, so going first day in school is something very special. Anyway, these are fleeting memories.

What is your earliest memory?

Earliest memory… ah yes, I can say that almost definitely. Standing and watching a parade with Hitler going by on the Kurfürstendamm in Berlin. And as a child about five, four or five I would guess, waving flags and cheering not realising what was happening, of course not realising what was happening. We had a nanny and we were taken there to see that. I suspect that's the earliest memory I have. None of my really early childhood. Otherwise, again fleeting memories of the house we had, typically we thought it was huge. When we went to see it after the war it was still big but much smaller than one… much, much smaller than I expected. Not exactly the stately home I'd envisaged. It was not a house, it was an apartment, but we thought it was a very big apartment. Other major memories is when we left to go to England, the whole journey, and also the selling up of our property. We had the house full of furniture and things and we held a sale and I do remember very vividly that sale and helping to say, well why don't you buy that, that kind of thing. But we were only allowed to take a trivial amount back to England. We were allowed to take some furniture, but we weren't allowed to take any more money than ten Mark or something like that. But if we

didn't have… we had relatives in England so that helped us to get started, they found us a place to live and things like that.

[13:20]
You mentioned that your mother had gone to university.

Yes, my mother had studied at Vienna University and she had studied art there and art history. She was a Viennese and my father's family and her family had… there had been a previous marriage across generations so that my father's sister married my mother's uncle, right, so I have relatives who are both proper cousins and proper uncles or aunts. They fulfil both roles. So that's how they got to know each other, because of that prior marriage.

Did your father ever talk about the war? The First World War?

My father talked a little bit about the First World War, about being in the army, not a great deal about battles. He was involved in them but like many soldiers they don't talk about it. One of his brothers, the one who was also in the concentration camp, had actually been awarded an iron cross. He'd been one of the first balloonists in the war acting as an observer and his balloon was shot down and he was again one of the first people to land safely by parachute. That was about 1916, 17, something like that. So that was the family fame in the war, that Uncle Kurt had an Iron Cross and was a balloonist who jumped out of the balloon, observer balloon and survived.

What was family life like in Germany?

I know, unfortunately now, I feel we never interrogated our father about that period after the war and the Great Depression and the inflation. I do remember one thing; my mother still had a receipt for the sale of one of her pieces of art for something like five billion Marks during the inflation, during that hyper-inflation. Yes, that's a relic, quite an interesting relic. But I never really asked, how did they live through this period, and I don't know how my father came from being in the family business, this lighting business for a town – *Gaslaternen und Fern Zundenung*: Gas Lanterns and Distance Lighting - how he got, how he started up his own business. I wish now that I'd asked much more and indeed how he got to know my mother. But no, we never knew that.

[17:13]
What sort of father was he?

As I say, he was a good man. He was a very gentle person. He… I cannot remember him being angry with us at any time and certainly no punishment or chastisement. I think he was a good father, certainly a very loving father. I know we were regularly taken to see the business. Things suddenly spring up. I remember the leather armchairs in his office. [laughs] Odd things like that suddenly come to mind, which if you'd asked me earlier, wouldn't possibly have remembered.

Was it a big business?

It was quite a big business, yes. I don't know how many employees, but I guess, I mean it would be a small to medium size business, perhaps a hundred employees, not huge. But they had a fair share of that particular market, the selling of these lifts. What is the name for them? Car lifts which, you know, you drive on to and the pneumatic thing drives them up and… There must be a name for them.

I don't know it, unfortunately.

I don't know the name either. There must be a name for it. Maybe car lift, I don't know. And the compressors.

What did he like about England?

Mm?

You mentioned he liked England. I was wondering what the attraction was.

He liked England… it's more than that, he had a love for England, he liked the… I suppose he liked the freedom, I suppose to the discipline of Germany, the much more relaxed atmosphere. Germany had this highly disciplined atmosphere and also authoritarian atmosphere and England didn't have that. Perhaps this lack of authoritarianism was the most

important thing. He spoke English quite well. He, as I say, was interned during the war at the Isle of Man. Now, it was a very mixed experience. Some people, particularly Jewish refugees, the British tried to classify people into those who were proper Germans and those who were not, but they didn't do it very well, so quite a few of the refugees were put in amongst some of the worst Nazis and they had a very tough time. And the toughest time of all were those who the most dangerous, or what was thought to be the most dangerous Germans were sent to Canada and amongst them a handful of refugees who had a very hard time indeed. But in the Isle of Man my father was amongst the group of people, congenial group of people. He became the camp cook. He'd never cooked anything before but he became camp… enjoyed cooking from then on and took on cooking duties and I've inherited that and I do all the cooking. So that is so. Perhaps his range was wider than mine, I'm not sure.

[21:08]
Did you see much of your grandparents when you were growing up?

No. Very little. My mother's parents lived in Vienna and we went to visit them occasionally, but not that often, perhaps once every three or four years, and my father's parents died when we were very young. I do remember visits to Grandma and having to kiss her bristly face. That's the only thing one remembers, it's horrible to be like that. But the family originally came from East Prussia and moved to Germany, Berlin proper sometime in the late nineteenth century – long before our time – and we were in that group of assimilated Jews, assimilat*ing* Jews rather than assimilat*ed* and my grandfather actually rode with the Kaiser. And he died because he fell off his horse at one time and never recovered from that fully, so we never knew him. But Grandma, yes, with her bristly moustache. [laughs] The things one remembers one shouldn't remember.

So that was your mother's parents?

That's my father's. My mother's were in Vienna and we didn't see much of them. They were the ones who also died in Theresienstadt, the concentration camp. My father's didn't survive that long. As I say, my grandfather's on my father's side died I think before we were born and my grandmother died fairly late as well. My father was, there were seven children I think

I said. Yes, he had one sister and five brothers. My father was one of the younger ones so the grandparents were quite old. I think he was the third youngest.

Did your mother have any brothers and sisters as well?

My mother had a brother who I mentioned before who became a prominent lawyer and finally finished up a professor of jurisprudence in one of the American universities, but who returned to Vienna for the last years of his life. He never had any children. He married, he had a very happy relationship with the wife but they never had any children, she couldn't have children, or I think she couldn't have children. And in a sense we're only children as well. I've got a feeling that family wasn't very fertile, they didn't produce that many offspring. But a few scattered around the world, but given the number of parents, not that many.

Did you see much of your aunts and uncles when you were growing up?

No, because they were scattered.

Oh, already. Right, okay.

Oh, sorry, when we were growing up, yes. I'm sorry, before they scattered, yes. We did, we did, as I said, we were only children in a sense, just the one pair, in fact there was a daughter who died at birth. I know while that was happening we stayed with one of my uncles. Yes, we saw them quite often and visited them, went to the Tiergarten, I know that. Played with some of our cousins. We were relatively young, most of the cousins were older than we were. I remember that.

What's it like growing up in a large family like that?

Yes, yes. Somehow one isn't conscious of that, one thinks that's what life is like. Not, hey, isn't that a big family. Again, that comes much later, particularly when one sees photographs of them all. But one, I know one uncle went to Holland and had a couple of children and his wife, yes, his wife collected paintings and she knew Mondrian quite well and so she had an actual original Mondrian, which my guess is, is pretty valuable.

[26:30]

Could you describe your home to me in Berlin?

Yes. It was an apartment in an apartment block, on the ground floor, and I know it was large, although when we came to see it later it was much smaller than I expected. But I know it was large because of some of the furniture which when some of the furniture came back, went to England and there was nowhere we could fit it in, it was simply too large. I remember there was a huge chandelier which came, but which had to be sold because there was nowhere we could put it up, unless we had a stately home, which we didn't, very far from. The… our house or our apartment was very near the Funkturm. Well I remember, that brings back another memory. We had, not a garden attached to the house, but a separate piece of land quite close by, couple of streets away, which was a sort of fairly wild garden, to us it seemed large, but in fact it was probably quite a small piece of land. It had a hut on it and on one occasion, I must have been about seven, eight, something like that, we were playing on that, my brother and I, and I jumped down on to a piece of wood with a nail sticking up and it went through my foot. And as I said, the garden was slightly remote from the house, so my brother ran back home to fetch help. There's a tennis court at the end of the garden, there were people playing tennis and I tried to attract their attention, but couldn't attract their attention, so I sat there with a piece of… nailed to a board and my mother came in terrible shock and carried me to the doctor – I must have been quite heavy – with my board, nailed to my board. The doctor sort of got rid of it. It went through the soft part of my foot, between the toes, so there was no great damage and I think the most painful thing was the tetanus injection I had to have. So that's another little memory.

[29:14]

How did you get on with your brother?

We got on, we got on extremely well which didn't mean to say we didn't fight, but by and large we shared and shared everything and have done so all our life. We went through life very close together, which is in some ways perhaps a handicap because it isolates one in a way from other people, but it also is a huge advantage, huge advantage in some ways. For example, at university, we took the same subject and we arranged that he would read one book, I would read another book, and we'd share that. We, as I say, took the same degree. We got more or less the same mark when we took our higher schools examinations. At, for

our degree, we got an average mark which was identical, though if you look more closely the distribution is very different. Nevertheless, the average was the same, or there's one percentage difference, one percentage point. It happened I got into Lyons, we both went into the research division, it happened I got the first job in Lyons, we both applied and I happened to get that Lyons job and he followed me a few months later and went into a different division of Lyons, but he followed me. So we kept together. And we had more or less identical careers until I went to the university. At that point our careers departed, but not our closeness together. We married very different wives. I think that's common amongst twins. You'd expect them to marry similar partners, similar spouses where there's a female twin, but it isn't so. Twins apparently don't do that. St Thomas's Hospital is doing a major twin study and we are a part of that twin study. I mean they've got thousands of twins. It's probably the biggest twin study, certainly in this country, it might be worldwide, and we participate in various ways in that, but nothing… we've had physical examinations, but mainly filling out various forms. Filling out forms on surveys and things. And then annually they have a party for all the twins, which I've never been to because it's never been convenient, but I would like to go to, quite an interesting thing.

Are there any other sort of features of growing up as a twin that strike you?

I think the main thing is, people say twins read each other's thoughts. No they don't. But their thinking is sufficiently close for them to follow the same lines of reasoning very easily and therefore to be able to jump in and say this is the way your thoughts must be running, because their logic is the same, their knowledge is basically the same, what they have stored in their minds is very similar, so one would expect a kind of similarity there. But that doesn't mean to say there's any telepathic element whatsoever, I certainly know of none whatsoever. The nicest story about that sort of thing is, much more recent, my brother was going home on the train and the train was delayed so he phoned home to say that his train was going to be delayed and his wife didn't answer so it went on the answer phone. Later that evening he picked up the answer phone to see what messages there were and got this message about the train being delayed. He phoned me and said I didn't know you were on the train as well. He clearly thought that I was him. Our voices are more identical than anything else. People find it very, very difficult to tell us apart from our voices, we look… nowadays we look somewhat different. Somewhat, still fairly similar. Other twinships… it's simply the kind of comradeship one has, the way we keep together. When I first… my wife had been at the LSE

at the same time as we were, she took a slightly different special subject; she took economics whereas we took trade and transport, but she said – we had never met – but she said she'd always known about the twins, because the twins were always walking together through the school so we were noticeable for the twins. And again, there's a book about LSE at that time and it mentions 'the twins'. There were other twins at the school but we were probably closer together than most, obviously there were other twins. One in eighty births are twin births, something like that. So there was a remarkable closeness between us. My brother is slightly older, twenty minutes older. And the other thing is I was unexpected. At that time there was no acoustic, sonic thing. It wasn't known that my mother was carrying twins and so my brother was born and they said, there's a head, that is not the end of it, there's another one. So they hadn't prepared for it, so there was only one cot, had to make do with I think a table drawer, went into… Anyway. That's what you bring out, you bring out gradual things, things come out.

I think memory, you know, it's not a set of facts in your mind, it is a process.

It's associations which form linkages. Yes.

[36:15]
Actually brought up another question in my mind there. We were talking about the incident with the nail through the foot, I was wondering what did you do for fun as a child?

We played a lot in that garden, I know that. And we enjoyed playing football and so on. I can't remember very much else. That garden's very vivid and probably dominated, when we weren't at school we tended to play there and we tended to… no, we had other friends there and it was a good playground for us. Other memories are certainly going to, we were close to a public garden, the Potsdamer Platz, and suddenly we found that the seats were labelled 'Jews Only', just one or two seats for Jews only, the rest were for everybody else. Suddenly you had the segregation. Again, another stupid little thing is every Jew had to have, if he was a male, he had to have the name actually added to your name, Isaac [the interviewee meant to say 'Israel'], and every woman, Ruth. Did you know that? Just a kind of total inanity and stupidity. So we had to have our Jewish names added to our other names. So I became Fred Frank Isaac Landsberger.

Did religion play a major part in your childhood?

Sorry?

[38:11]
Did religion play a big part in your childhood?

No, no. My family were not a religious family at all. I think agnostic would be best to describe them rather than atheist, but a Jewish consciousness, a feeling… Although in earlier years we had become, the family had become more assimilated, the rise of Hitler made us much more, made the family much more conscious of being Jewish and my mother was not only a communist but she was also Zionist. When I say she was, she proclaimed herself to be rather than being active in any way in that sense.

So did you attend a synagogue or anything?

We attended synagogue occasionally, but very rarely. We were not, for example, bar mitzvahed, which is the… My parents really didn't believe in… have any… believe in any religion and we rather had it knocked – for some people religion comes in their youth, they suddenly take to it – in our case I think it was knocked out during our evacuation. We… the school had attached to, coming occasionally, a rabbi for the Jewish children in the school and he insisted more or less that we go to, every Saturday, to take Jewish lessons, to go to shul. At the same time the family we lived with had a somewhat Christian view of things; they wanted us to go to Sunday school. So we had our weekends spoilt by both Saturday and Sundays. It didn't last long. Enough to knock religion on the head. My guess is they actually sent us to Sunday school to keep the children out of the house. Yes, there were quite a lot of little things. [40:40] Our foster father, Mr Gentle, had built the house himself and in fact he was still finishing building it. And it had posh rooms and it had living rooms and the posh rooms were only for visitors, we weren't allowed to go there, except when there were visitors. So I remember distinctly the posh rooms and the other rooms.

Had that not been the case in Germany?

No. No. Certainly not to my recollection, I don't think it had been. I think there was almost something very British about that. Particularly that class.

Were you aware of growing up in any particular social class when you were in Germany?

No, not really. Not really. We were clearly prosperous middle class, but weren't conscious, very conscious that there was anything else. We must have known because we had a nanny and we had… and so on, and at school we must have met children who were from a different background, but I can't recollect any consciousness of that. Only began to be conscious of that sort of thing much, much later when we came to England and became much more socially conscious and have always been on the Left. Of course my mother's communism, but we've always been on the Left, well to the Left of the new Labour party.

[42:37]
Can we talk about your mother's politics for a bit, she sounds like an interesting set of Zionism and communism together.

Yes, yes. I'm not sure to what extent my mother really rationalised these things, I think they were emotional attachments more than intellectual attachments. Her kind of intellectuality was perhaps a little bit different; she was much more into art and history of art than perhaps the political side where it was much more an emotional attachment to progressive ideas. Perhaps I'm misjudging her, but that's the feeling I have now. My father was much more conservative with a small 'c'. He might even have voted Conservative, but he was certainly much more conservative and not so emotionally attached to any particular creed. I think he was much more, he was much more inclined to step back rather than go forward with the flag flying.

Did they read newspapers at all?

Yes, *The Daily Telegraph*. My father was a great *Daily Telegraph* man and yes, until we started taking papers ourselves *The Daily Telegraph* was the paper. And at one level it was an extremely good paper. During the war years it provided the very best maps of the battles, where the battles were going, the accounts of the war, as far as I know because I didn't read many others, but I think that was so. Certainly my father claimed it was, but he also took very

much their kind of politics. I think my mother never really glanced at it or only glanced at it. She was not in that sense a reader of newspapers. They were in that way quite different people.

[45:09]
How did your parents expect you to behave when you were growing up?

I can't… there was nothing, as far as I know there was no explicit thing, no catechism, this is how you should behave. Rather, I think they saw themselves as role models; tolerant, patient – my father more patient than my mother, which goes with what I've been saying earlier – rather than explicitly saying you should be so. One was expected… there was an expectation that one is tolerant, one is honest, one is reflective rather than – my father in particular more – reflective than jumping at things. My mother much more, in terms of our, not so much behaviour, but what we were doing, that we get a proper education. If my father had been in charge at that point, in a sense, he would have liked us to have a better education but if we'd gone as apprentices somewhere, he would have been perfectly happy with that. My mother said no, that's not good enough, you've got to have a proper education, you've got to get to university. My father who had not been to university didn't see the value in the same way, although he was delighted when we did.

Had education been a big thing in your life when you growing up to that point?

Well education became a big thing when we joined the… when we went to the grammar school. Up to that point we'd had a relatively slow intellectual development, partly because of language difficulties. And then towards the end of our period at the elementary school, we suddenly blossomed and we became interested in a wide range of things and in particular we became interested in anthropology and palaeontology and read books which were well above our age range. And this was very much noted by the headmaster at the school who thought that we were really reasonably bright and that's why he suggested that we go to the Post Office. But as I say, my mother wouldn't have that, so we went to the grammar school and on from that. At that point we became very conscious of education, of what education involved and the enjoyment of education, enjoyment… and that was rather really mixed because there were some very good teachers, some first rate teachers who brought us along and whom we went along with in a very positive way. And there were other teachers who were not so good

and I regret now very much in particular that we never took to the physics teacher and as a result we never quite, we didn't become scientists, which we might have done. The school itself had a very strong science wing. At that time the thing to go for was science and medicine and all the brightest kids seemed to go in that direction. We were sort of quasi with economics and geography and so on, though my favourite subject was history. I also liked English literature. No idea what kind of career. We left school without knowing what we wanted to do. A vague idea that we wanted to go into the business world and took economics and so on, possibly the Civil Service, we thought about, seriously about going into Civil Service. [49:56] And then we started, we graduated quite well, the idea of an academic career started and we did both start on PhDs, but never completed them. So, in those days it wasn't essential. Now of course if you want an academic career you have to have a PhD. So for a short period I knew more about sterling balances than probably anybody else in the world, or at least Egyptian sterling balances.

Egyptian sterling balances?

Egyptian sterling balances. But not in – I recognise that now – not in a coherent way, which is why I didn't continue. That I knew about them in a factual way, but not as part, an understanding of the theoretical implications and all that. We thought we knew more economics than we really knew. A kind of immaturity. The arrogance came later.

How did starting school in Britain compare to school in Germany?

Well, it was hugely different. In Germany we went to quite a small Jewish school. In England we went to an elementary school which we lived very close to the Kilburn slums, so a large proportion of the students came from, of the kids there, came from the Kilburn slums, which included a lot of people of Irish descent. However, I mentioned earlier that the teacher of our class took a very intelligent view on how we would be integrated into the society and learn English and it worked very well. So we were quite happy there, though there was a clear distinction between, I suppose, the middle class children and the children from the slums. We weren't terribly conscious of that, we were simply aware that there were some kids who we fought with and some we played with. And again, when we were evacuated we weren't conscious of it, but there were some children who were very unhappy in their evacuation and some like us who revelled in it, really revelled in it, because we enjoyed it

thoroughly. We enjoyed being with our foster parents, they were very good to us. We were within cycling distance of London so we could go home and visit our mother quite easily, it was just twenty miles or so. And we'd go up, we did that very often. We lived on our bicycles in those days. There's not the care abut health and safety there is now, and security. So it was very easy. And in the later years we went on very long tours by bicycle; we visited, we went to Land's End from London, to the Lake District, to the Welsh hills. And there was a small group of us who went together, there were four of us really, one of whom we've lost touch with completely and the other one is still a close friend, although he lives in the States now, but comes here quite often. His wife was at one time my girlfriend. She went to the same school.

Do you want to take a short break at this point?

Yes, I'm happy.

[end of track 2]

[Track 3]

I was wondering if you could give me some flavour of the neighbourhood that you'd grown up in?

In?

In Germany.

In Germany it was a suburb of Charlottenburg. It was a suburb of Berlin called Charlottenburg, which is a reasonably upmarket suburb, so middle class-ish, anyway. Not exclusively so. Nearby was the very modern Funkturm. The Funkturm was like the Post Office Tower here; huge skyscraper. I think it really was very tall and in a sense it dominated the area from a visual point of view, it was very tall and it was perhaps half a mile from where we lived. The neighbourhood was solidly apartment blocks; five storeys, four, five storeys, with the occasional bit of ground like the garden which we had. I wish I could go back to it and see how large it was, but it seemed then to be quite a large piece of ground and it had the tennis court, public tennis courts. No, there was a private club, tennis club at one end of it.

You sounded like you had quite a vivid memory earlier of this space of ground. I was just wondering if you could describe it to me.

Yes, it was very important to us. It was fairly… ah yes, I can tell you some things. It was a fairly flat piece of ground and we had built into it, I think done it ourselves or with our parents, I'm not sure, a little running track and jumping, a pit for jumping – long jump and standing jump. We were – bringing back memories, yes – we were quite interested in athletics, sports, and we were both at a very young age quite good long distance runners so I know that at the age of ten we were quite capable of running 3,000 metres at a reasonable pace. [02:44] And you were talking about holidays – we won a scooter race at the place we went to on holiday, we were very proud of that, winning the scooter race aged about seven or eight I would guess. Other memories that brings back – our parents, to our great disgust, two or three times farmed us out during the holiday period while they went off somewhere gallivanting, farmed us out to some kind of camp. We were disgusted, we were slightly disgusted being put off that way, but actually enjoyed the experience, some of these

experiences very much. We went to one particular place, curious little memories, it was a sewerage farm, but - and there were lots of other children there and one played quite a lot, did a quite a lot of athletics and so on - but the things I most remember is that once a week a van would call at it and from the back of it you could buy some delicacies, mainly fish things. A less happy memory; we went on holiday once or twice to Vienna, but also once or twice to Czechoslovakia and we went to a place called Trenčín Teplice [ph] – there must be another name for it now I guess. Anyway… and again my parents, our parents went, stayed in a hotel and we were sent to a camp. Now this was a very unhappy experience; that camp was horrible. It seemed to be a forced labour camp, we were taken – I'm exaggerating – we were taken out each morning into the woods to pick mushrooms or various fungi, maybe blueberries as well, I don't know. But we hated the place, we hated the place, we hated the [incomp – 05:19]. And again, the sort of thing one remembers, there was a dragon of a woman who was in charge of us and each morning before we were allowed to have breakfast or something she said, 'Have you done your shit yet?' '*Hast du schon gekacht* [ph]*?'* is the German word for it. 'Have you done your shit yet?' That's another one. Anyway, we hated it and I don't know how we managed to get in touch with our parents and they took us away from it and we joined them in their rather nicer place. [laughs] But another holiday thing is going in Czechoslovakia, this must have been in the winter, going in a snow sleigh up in the mountains and the lovely experience of that. I think it's a memory, probably a false memory, of arriving somewhere and getting warm drinks and cakes and things like that. Probably true, maybe true. But the main thing is the joy of really going on the sleigh pulled by horses in the snow, aged again, seven or eight. Six, seven, eight, sometime in that period.

[06:53]
Did you have any hobbies or toys as a child? Or to put it another way, what were your hobbies or toys as a child?

I don't remember in Germany what our hobbies were. I'm sure we had some, but I don't remember those. Once we came to England we were very… we really were taken by the country life, particularly the poaching. And really I suppose if we had a hobby it was poaching. [laughs] We had quite a good airgun and shot with that and one of the jobs we had, there was a cherry orchard next door and we were hired to guard the cherry trees and shoot any of the birds which came on to the trees – any of the birds. And we certainly during the war shot blackbirds and actually ate blackbirds, had blackbirds, four-and-twenty

blackbirds baked in a pie, yes we had that. Not bad. But otherwise, rabbits, pigeons and so on. Sounds terrible now. But in fact I've kept my love of shooting ever since, so yes, I still have a couple of guns and still do the occasional bit of wild shooting, always wild shooting. We never learnt the formal rules of shooting. This is definitely poacher stuff. Other hobbies… a lot of, as we grew slightly older, a lot of reading. We did a great deal of reading and quite a diverse literature and often not children's books. And became, as I said earlier, particularly interested in archaeology and palaeontology and knew all about Wegener's theory of continental drift and now tectonic plate, and so on. But we knew about that much earlier and we could identify fossils and things like that, we were really quite good. And in school quizzes when they asked about things we could always give, something, we could give some of these ancient names which we knew and were very proud of.

[09:44]

Did you have any interest in science or technology when you were growing up?

Not… yes, we always thought ourselves that's what we would want to do, but we turned out either to have bad teachers or not to be very good at it. My guess is it's a mixture of the two of them. We never became mathematicians for example. I'm frightfully bad at mathematics and I'm almost certain I can blame teaching, bad teaching for that. Having said that, there is a gap in our education. That period when we couldn't speak English yet, so certain basic education we missed out completely. I was never taught, we were never taught, we were expected to know grammar, the rules of grammar. But I don't worry about that, I can write English, but I can't do mathematics, I'm not a mathematician, but I always feel I should be a mathematician and particularly as my wife is a mathematician, is a very good mathematician. And I hope I've got one grandchild who's sitting his examinations now and I hope will get a first in maths. He's doing his exams this week. Hope. I think he's bright enough to do it but whether he will or not I don't know.

[11:13]

We've talked a little bit about how the changing political situation in Germany had sort of affected your life in different places. I was just wondering how aware were you of it as a child?

How well…?

How aware were you of what was…

We were not aware of it at all when we cheered. We became aware of it more remotely, still slightly remotely when my father lost his business, obviously then. But the thing which brought it home completely was Kristallnacht in 1938 when windows and everything was smashed and so on, around us. We became aware of it then when the rules started being enforced, Jews only, these extra names and all this business. When actually going to school Hitler Youth would jeer at us, then one became very, very conscious of it. And I think everybody was ready to say, we've got to get out of here. We didn't know the difficulty about that. The sheer difficulty of getting visas to go abroad. Most countries had very strict quotas and very strict regulations about who could come and I think we managed to get to England because some relatives were already there. We became… I know that when we had to sell up again – by that time we were also much older and much more conscious. I don't remember a sudden day when one suddenly realised this is not right, it came on gradually. But then Kristallnacht it became absolutely crystal clear, you could say, Kristallnacht. That went on around us and was frightening. Up to that point I don't think the question of us children being frightened hadn't happened. I think my father gradually lost his optimism and realised this couldn't, this was going to end very badly.

Were you caught up in Kristallnacht?

We weren't directly caught up, we were at home. We woke up in the morning to it, we were at home and our home wasn't touched, but we went out in the streets and it was immediately obvious; the Jewish shops had all their windows smashed and there was the talk about it. From being very insulated, as one grows older one gets less and less insulated, one sees more and more of the environment and the world around you and it is no longer quite so clear where one's position is. So it happened. Going to England was in a sense an adventure. Train journey, then by ship - we hadn't been on a ship before – from the Hook of Holland to

Harwich and there we were met by some cousins who drove… no, we went by train to London, to Victoria station and they met us there, and taken to the place they had already got for us. A place which was, when my father was interned, it got a direct hit from a landmine and my mother suddenly found herself homeless again. We were evacuated at the time and didn't know the full horror of what she went through. But that was a horror. [15:39] Having said that, we were sufficiently close to London that our village was bombed, or rather what we think happened is it was a German plane ditching its bombs because it was damaged or something like that. So a neighbouring house was destroyed; ceilings came down and so on. We were cowering under the stairs. At school, at grammar school there were four classes in the year group: A and Alpha, B and Beta. And A was where the bright children – it was a mixed school - Alpha much the same, B and Beta, the yobs. And there was a strict, very sharp divide between those groups. Now when we went to the school we went into the B stream, but we only stayed there one term before we were lifted up to the A stream and in a sense we started off at the bottom of the class and gradually got to be a little bit better, but didn't really begin to expand until the sixth form and that was under the influence of one particular teacher, a Miss Stevenson. No, I'm exaggerating, we'd already done better and we'd done quite well in the, what is now GCSE. We'd done quite well in the GCSEs, a few distinctions. Yeah. Mainly in subjects like English literature and history rather than mathematics or science. We passed those, scraped through those.

It's interesting you later go on to work in a science.

Yes, yes, yes. And I always claim that I have an understanding of science even if I haven't got the ability to manipulate the symbols, I can't do that. At university, very very influenced by Popper. Do you know Popper?

Karl Popper?

Karl Popper, yes.

Required reading.

Yes, yes. He was my wife's first tutor.

Oh, you mean literally influenced by Popper?

Oh yes, yes, yes, yes. Yes, yes, I sat at his feet. Yes, yes. Studied scientific method under him. And he is most influential and I'm still most likely to go back to Popper when I talk about that subject.

[18:40]
What do you remember of Popper?

Oh, the total difference between his public face and his private face. His public face was the open society: we're open, we talk to each other. The private one is totally closed. If you took his line, anything goes, you got your full marks. If you took any line which was slightly different, you're out. He… I've talked about us being arrogant, he had an arrogance, a conviction that he was right. Did you read – what's the name of his great philosophical enemy? Begins with 'W'. Also back from Vienna, was at Oxford, or was at Cambridge.

I should know this.

Yes, you will know it the moment I say it. There's a well known, well there's a book, the other man's name, *Poker*, it's called and this describes an incident in Oxford when there was a seminar at which there was Popper and this guy whose name escapes me at the moment and at one…

No, it's not Wichtenstein… I've forgotten his name.

Wittgenstein.

Wittgenstein, thank you. Yes. Tip of my tongue there.

Yes, yes, yes. On the tip of mine, I said 'W'. Wittgenstein. *Wittgenstein's Poker*. If you haven't read the book, get hold of it – *Wittgenstein's Poker* - if you're interested in that kind of discourse. It's about this occasion when there was a seminar in Oxford, I think it was, at which there was Wittgenstein and Popper and Wittgenstein is reputed to have taken up poker to attack Popper and the interesting thing is, the book is interesting about, because it's not

about the incident so much about the differences in their philosophy and their ideas and this is the story from Wittgenstein's point of view. We've heard it from Popper, directly. Popper's verdict of the story.

What was Popper's take on it?

Well, first of all that was all Wittgenstein's fault, that he was being perfectly rational and reasonable and so forth. But Popper in a way despised everybody who didn't think his way and he despised the logical positivists and so on. And he despised in particular the Oxford school of philosophy; a man called Hare I think was the great Oxford philosopher at the time. I don't think he's remembered now, I think Popper was probably right. But Popper thought he could do everything. He thought he would solve the problems of evolution and so on and so on, there was no limit to what he thought he could find the answer to.… But he couldn't, but nevertheless he was a great teacher and it was great to be there with him because he was stimulating even if he was intolerant. So that's one person one remembers vividly. [22:24] Another one's Harold Laski. Harold Laski, brilliant teacher, the opposite of Popper, totally tolerant. He, despite everything one says about Laski, Laski would give credit to anybody who could argue, whether it was on his side or the other side. As long as it was somebody who was capable of marshalling his arguments and some of his best known PhD students came from a very different philosophical stance. So he was one of the great guys at LSE. So there were several. When we went to LSE, we thought of doing anthropology. I told you earlier that we were interested and we thought of doing anthropology and LSE's famous for social anthropology. But after the end of the first year when you had to make your choice, each head of department gave a lecture to put out their wares, put out their stall of what they could do. The very famous anthropologist gave an absolutely abysmal account of anthropology and so we went to economics instead. Fame doesn't necessarily go with charisma.

Who was it?

I've forgotten his name. One of the things, memory. It comes back spasmodically in a curious way. Again, I think I know his initial was 'P'. Do you know…

I've read bits of anthropology along… or I've talked to people about anthropology more than I have read.

Yes, yes.

[24:28]
So why did you end up in the LSE, why there and not another university?

Partly because of this teacher of ours. She didn't do economics, but she taught economics for the first time when we were in the sixth form and she was learning it at the same time as we were, so it was quite an… And she said she admired LSE and she thought LSE was a good place to go to. So we applied to LSE and thereby hangs another little story, but if it's of interest I don't know. My father, our father was naturalised British after the war and as minors we were automatically also naturalised. When we left school we applied for deferment to go to university. We had applied to LSE but at that time hadn't got in there, so we applied to Exeter and we were accepted at Exeter, and then got the dreadful news that we didn't get deferment because, well, they simply didn't give us deferment. And then found out that there was a small window when we weren't British, we were still enemy aliens, a small window of time when the call-up was officially promulgated and therefore we weren't eligible, we couldn't be. So our, although we didn't get deferment, we in fact were not eligible to join the armed forces. So, through that small window of opportunity we went back to say well, to the LSE, look, we are available and we had done reasonably well in the scholarship examination, we had an interview and they decided to take us. So that's how we got to LSE. We didn't try anywhere else, it wasn't like the UCCA system where you have to think of four or five universities, we simply took that. And interestingly enough, my wife, she did exactly the same, she simply applied to LSE and she applied because she wanted to study where Laski was. She'd heard of Laski and thought that was a good thing. In fact, we were probably taught, I was probably taught by more Nobel Prize winners in economics – Hayek, Arthur Lewis, Coase, Meade – that's four, but I think there may have been more. Oh, Hicks I think, although Hicks not properly. Hicks only as a visitor, lecture.

I'm afraid I'm now going to have to ask you what do you remember of each of them in turn?

Sorry?

[27:40]
What do you remember of each of them?

[mic adjustment]

Well the first one was Hayek, but he left LSE very soon after we got there and so I saw very little of him. One knew him by reputation rather than anything else so I can hardly say to have been taught, but I attended perhaps one or two lectures of his. The ones one remembers most are the ones who were more fully at the LSE and of those, Coase – do you know Coase?

No.

He is the man who developed the notion of transaction costs, which was later taken on by a Harvard man called Williamson, and became a discipline in its own right, transaction costs theory, but it was developed by Coase. He was utterly boring. Single level, pitched his voice at a single level. He was a bloody good economist, but he wasn't a good lecturer. The one I knew best by far was James Meade because he took us on as graduate students and he was our, started our PhD work under him. Meade was a Keynesian, specialist in international trade, one of the best interpreters of Keynes's work and doing his own Keynesian type of work in international trade. And the nicest, most modest chap you could possibly imagine. Many years later he gave a lecture at Queen Mary College and I went there to say hello to him, do you remember LSE, da-da-da-da-da, and he was so charming and thanked me for coming to his lecture, not the other way round. He was really a lovely guy. Arthur Lewis I can't really remember. Do you know who he is?

I know the name. There's a building named after him in Manchester which is probably why I know it, rather than for the economics.

But because he is mainly at Manchester we didn't see much of him at LSE, but he spent a term or two at LSE, but the thing about it, he's a West Indian black, he was one of the few things… Again, a really good guy and a good lecturer, but I don't remember much of him at all. The one I remember most of all is of course Meade and Coase in a negative sense. I

wouldn't have guessed from that that he was going to be Nobel Prize winner for his transaction cost theory, which I could, but I won't explain.

[30:50]
Who do you think out of your lecturers at university was most influential on you?

Popper. Popper and Meade. Yes. Laski to a certain extent, yes, Laski. Given that I've always had a historical bent, there was also a guy who taught international history who had been a famous diplomat [Webster] – I've forgotten his name at the moment. He was first rate, he was excellent. On the whole I remember that LSE was a good experience, but there were some people who bored one to tears. The professor of labour economics, notorious for his terrible lectures. And he made the mistake of handing out lecture notes, of getting lecture notes printed so there was no attendance registered or compulsion to attend, so very few people came.

What was the workload like?

Mm?

How heavy was the workload?

As heavy as you wanted to make it, really. You could skate away. If you were not interested you could scrape by with very little and still probably get a pass degree. Pass degrees seemed to be in that sense very easy. If you wanted to, if you were interested, you did the work, you worked hard. We had the fortune of working together, my brother and I, and that really made it that much easier. But we had our Benzedrine moments, stay awake. Benzedrine was the drug for that at the time. I don't think it is any more now.

I think it's ProPlus these days.

Yes, yes, yes. That's it.

Benzedrine?

Benzedrine yes, was the one.

Was it easily available then?

Yes, I think it was reasonably easily available. I don't think the drug laws were quite as strict as they are now. We played a fairly active part in the students' union as well and my brother and I ran the table tennis club, we were quite good at table tennis. And at LSE we had an English international who was very good indeed, so we never went above the second team because the top people were so good, but we ran the table tennis club. Table tennis was one of the sins at the LSE. There was a staff table as well. Later on when I got on the staff there was a staff table and it was actually a good way of mixing disciplines because people from all different disciplines came together rather than staying in their silo and played table tennis, sometimes all afternoon long.

[34:05]
What other social activities were there at the LSE that you were involved in?

Yes, lots. In those days there were still rags – that's gone completely now from LSE and the London University, but at that time each year there were the rags when colleges would set out against each other with flour bombs and all that sort of thing. Yes, one got involved in that sort of activity [coughs] and LSE had a mascot, the Beaver, and other colleges would try to steal it, da-da-da-da-da. University College of course had its mascot who was a…

Bentham.

Bentham, and again one tried to get each other and Bentham and he was stolen. At one time the Beaver was put on to the Circle Line and went round and round and round, nobody knew where he was. But there was a lot of just throwing around of flour and things. But that died out. Other social events were – LSE was quite a social place and there were quite a few things: balls and dances and so on. We had things like Commemoration Balls still in those days. I don't think they go on nowadays. I remember one in particular at the Queen Elizabeth Hall on the South Bank. But in particular, LSE put on reviews each year and at that time it had a brilliant set of people. Ron Moody – does the name ring a bell?

Yeah, it rings a bell.

Ron Moody played Fagin in…

Oliver Twist*, yes.*

Oliver Twist, yes. He was at LSE and he wrote a book about LSE, this is the book in which we are mentioned. Ron Moody. Ah, name's escaped me. I had it a moment ago. The guy who became a *Times* columnist - Levin, Bernard Levin. Bernard Levin was at the same time. There was a whole gang of them who really were very good indeed in this and who did this annual review which was very good. We didn't play any part in that, except as onlookers. But yes, yes, LSE had a great deal of social activity. We joined in some of it, though living at home we probably had less of it than some others, tended much more to go home, home at night.

[37:07]
I think we should probably wrap up in a minute, but before we do I had one last question. You mentioned that Laski and Popper were two of the people who influenced you most at the LSE, I was wondering how did they influence you?

Popper in really getting into the… getting an understanding of what the scientific method is and is not. It's not what scientists always claim it is at all, much more what it is. And he made one think. There's no question about it, Popper made one think. From his point of view, think his way, but you could also think the other way, you didn't need to. To me, I value him enormously. Laski for an understanding of politics and also his tolerance; the fact that he was not, although he was very much on one side, it was… deeply believed in it, was very rational, his tolerance for argument. Some people had no tolerance for argument, Popper is one, but the economists in particular had their very rigid views and look at the mess it got us into. I've always been… although I class myself as an economist, I've always been suspicious of what economists call rigour because it's a rigour which is not rooted in the real world. Like the notion that markets clear themselves. Anyway, that's … one could go on at length about that too.

Seems a good place to stop for today I think.

[end of track 3]

[Track 4]

This is interview with Frank Land, twenty-first of June 2010 in Devon.

Frank, I was wondering if we could talk about your earliest memory?

It seems to be, I must have been about five or six years old. It was after Hitler came to power and I remember quite vividly watching a parade where Hitler and his people, I think drove along, or followed by military with huge cheering from the population, a lot of flags being waved, quite an air of excitement and one was sort of swept up in it, although I had no idea what it was about. I think we were with our nanny rather than with our parents, but that I can't be absolutely sure of. But it is memorable simply because of the excitement it engendered and poor innocent us had no idea what lay behind it, of course. You learnt about that much, much later.

Do you remember what you were wearing?

No idea at all, but it would have been short trousers, obviously. No idea at all, no. I can't visualise that side at all. The only thing I can visualise about us at that sort of age is some photographs in, I think, the Tiergarten in Berlin and we were being, both of us were being obstinate and refusing to leave and there's a picture of us being chased by my father, by our father. I think that picture's still around somewhere. But it's difficult to know sometimes which memories come from recapitulations of these things like pictures and which come from the memory of the incident itself. So how we looked is not a memory from seeing my brother and myself, but seeing a picture much later.

[02:31]
You mentioned your nanny a moment ago, what was her name?

Mentioned what?

Your nanny.

I should know, but I don't, because we, the family became quite friendly with her [her name was Annie] She subsequently opened a kindergarten and I know we went to the kindergarten and she subsequently, I know she married and was also a refugee in this country and her husband was big in the sugar business. He was a sugar trader. That sort of random kind of memory. But we certainly met up with her again in London but I've no idea what happened subsequently. I think she died and he was left a widower. Oddly enough you can check some of these things with my brother who might remember things that I don't. So that we have a good check. It's interesting, on some things he remembers more and other things I remember more.

It's interesting in the interview as well, you often talk about 'we' rather than yourself, it's…

Yes. It is very much so. Not teams as we discussed earlier, but twins. Twins who did things totally together.

So you had a very close relationship with your brother the whole way through then, from childhood?

I had a very close relationship all the way through up to… we were both in the research division at the London School of Economics, and so on. And we both worked for Lyons. But subsequently when I went to university and he stayed on in the business world, our paths diverted, but not our togetherness in other ways. As you could hear from that telephone call.

Yes, you sound almost identical.

I could tell exactly what he was interested in and what I was interested in.

Would you say he was your best friend as a child or…

Yes, no question about it. There's a kind of inseparableness about us, as there is about some twins, but not all twins. More in identical twins than fraternal twins but… We now have twin granddaughters and we're seeing a repetition of that in them. They're just seven years old.

[05:29]
Did you have any other good friends as a child?

Yes, we had good friends. I wouldn't know whether they were intimate friends like… certainly not with the same close relationship as I had with my brother, or have with my brother. Much later at school we certainly had very good friends indeed with whom by and large we're still very friendly with now, see each other very often. But that came much later. In elementary school I remember good friends but not intimate friends. Not the kind of friends one did everything together with. Later on in high school we did have that kind of relationship.

What part did your nanny play in bringing you both up?

I think quite a lot, it's difficult to know. I can't distinguish between the period when she was our nanny and when we went to her kindergarten, so there was a shift in the way things worked out, but we saw her presumably very much less in the kindergarten. But she was in a sense always regarded as a family friend. Interestingly enough, we've kept up the same kind of relationship with a nanny we had for our children here. We were both working so we had a nanny, a girl called Ann [ph], who still comes and visits us regularly, still does babysitting for the grandchildren and so forth and so on. We've had a relationship with her all that time.

Did you have any other close family friends or friends of your family who were important in your life?

There must have been some. I can't recollect them now, not in Germany. There was my father's business partner, a man called Scamoni, and certainly he was regarded very much as a family friend, but he's the one who in the end stabbed my father in the back. When the Germans took over the business they allowed him to take it over and he didn't provide any compensation whatsoever. So he did the dirty on us, or at least that's what we believe. As I say, we were children, we don't necessarily know the full story. My father was probably reticent about telling everything about it, so we know what we've gleaned, which isn't everything necessarily. But certainly as far as the family is concerned, this family friend, Mr Scamoni did the dirty on us.

When did you discover that?

This was about 1938, this happened. We didn't probably know very much about it at the time, we were ten years old then. Old enough to know, perhaps. Yeah. I would guess it was '38, it might have been '37, but thereabouts.

So what happened – did he just take over the other side of the business or…?

He… my father was in effect expropriated and the business was handed over to Mr Scamoni who presumably ran it himself then, I don't know any more about that. I don't know what happened to the business. I know my father tried to keep it going from England but – he had a branch in England but it was only a sales branch and he could never get into the manufacturing side again. And with a sales branch without anything to sell doesn't get you very far.

[10:13]
You mentioned as well while growing up in thirties Germany that your uncle was sent to Dachau.

Yes, Dachau concentration camp.

And this is before the Second World War started.

Yes, this was in 1936 I think, he was one of the early ones to be caught. Now he was a lawyer with… quite well connected in the political world. He was also married to a gentile and he was picked up – we don't know why he was picked up – and he went to a concentration camp, he was sent to Dachau. I don't know how long he was there. It might have been a few months, it certainly wasn't… it wasn't years, and he, I don't think he talked much about it but it was a shock to the family and I think he used his connections to get out. He also stayed on in Germany, as I say he had a gentile wife, he had two adopted children and I know that – a boy and a girl – and the boy went into the German army, was a German army officer. I've no idea what happened to him during the war, I've got a feeling he got killed, but we don't know. I know that my uncle, that uncle survived much better than the other one, my other uncle was virtually [incomp -11:59] what they imposed on him, but this one, perhaps I don't know

whether with his connections, he got an Iron Cross in the First World War. I told you about his ballooning exploits, he got an Iron Cross for that. So he had some kind of record with the military which would help him. He was an officer, my father was a private.

Did you know all this as a child or is this stuff you've learnt later?

Knew some of it as a child and extracted more, got probably more of the story in later life. I can't recollect exactly when things, when one begun to know things. My guess is that we knew quite a lot by the time we were nine or ten, just before we left to come to England. We… my mother had another baby, a sister of ours who died at birth or was stillborn, was dead at birth, but over the period when she was confined we stayed with this uncle and his family. So we knew them pretty well. Of all the members of the family, at that time we probably knew them best. That's Kurt and his wife. Other members of the family, we probably knew Robert and his children quite well; two children, Peter and Miriam, who came to London, came to England on Kindertransport whilst the parents stayed at home.

Sorry, who's Robert?

Sorry?

Who's Robert?

Robert is another brother. He's the brother who died shortly after the war. The two brothers who stayed in Germany both married to gentile wives were Robert and Kurt. Kurt survived quite well, Robert was in labour camps, forced labour and died very shortly after the war.

Are these your mother's brothers?

And just to finish that story, I don't know whether I told it before, Robert's wife committed suicide. And the daughter who came to England, whom we knew very well, who typed our PhD application, she had a love affair with a BBC man and when that went sour, she committed suicide. So mother and daughter both committed suicide and father died in tragic circumstances, so that side of the family has had a very, very hard time.

[15:11]
Was this on your mother's side?

No, my father's side.

Your father's side, right.

My mother had one brother only, one sibling who had a series of escapes before he got to America with his wife as a domestic couple. They were allowed in as domestic servants, which happened to quite a few people. And he was with a family for some time working as domestic servants before he found a way back in the end to university, became quite a well known professor and jurist, jurisprudence.

[16:01]
When did your family decide to leave Germany?

In 19… I think they started applying in 1938. But we didn't go until April '39. In fact it must have been '38 because it would have taken that long to get the permits and so on. And like many such families, one applied all over the place. Nearly every country was very restricted on who they would take and under what circumstances they would take them. So for example the Americans would only take my uncle if he had definite employment, hence the domestic couple situation. The family must have had very high level domestic servants. [laughs]

Do you remember when you learnt that you were going to England?

Remember particularly selling up our flat. We were only allowed to take a very limited amount of stuff, very little money and some furnishings and we had quite a large apartment and a very vivid memory is playing a part in selling it up, we had a house sale. Everything was arranged on tables and so on and we played our part in trying to sell things to people. I don't know how much money was raised, but couldn't take it with us anyway. But that was a very clear memory. The journey to England, bits of it are strong recollections. Going by steamer from The Hague to Harwich [actually Hook of Holland, not the Hague]. The train went to Holland, we crossed over from The Hague to Harwich [actually Hook of Holland, not the Hague] and at Harwich we got a train to Victoria, but we were met at Harwich by the sons

of an aunt, the aunt who lived in London, had lived in London for many years and who was married to my mother's uncle, that's where the families cross over. So these sons, Heinz and Herbert, were both proper cousins and proper uncles – a double relationship. Through their father, uncles and through their mother, cousins.

Right. I think you mentioned this last time, but from the other point of it, yes. What did you take with you – personally?

I remember our English clothing, which I mentioned last time, our what we thought was English clothing. I remember the trouble one took to try to get, for example, get our brown shoes made black, dyed, because one thought in England one only wore black shoes. Our knickerbockers which kids jeered at in Kilburn. Yes. But otherwise I don't remember. I know that what furniture we had came in a container and we had a flat, we had part of a house, that's right, part of a house in Kilburn, Carlton Vale.

[20:10]
Could you describe the house to me?

It was, would guess an Edwardian house. Might have been Victorian, but I think it was probably a bit later. Quite a tall house, but quite narrow and I think we had one floor of it. One of the typical houses along Kilburn, Maida Vale, in that area. What I recollect might have been seen recently. It was, I don't think it was run down but it was certainly not in a marvellous condition, it was not smart in any way. And I know we settled there. The first thing was to try to get to learn more English. I'm not sure how we did this. It's one of these things my brother might remember, whether we had a tutor, I've got a feeling we had a tutor of some kind. But we didn't make that much progress until we went to school and where we were dealt with very intelligently by the class teacher in terms of making sure that we were sat at a table with the boy in the class who was by far the most intelligent. I still remember him, John Wilson. Unfortunately he's got such a common name so it's difficult to contact him. But we remain, John Wilson – you asked earlier about friendships – John Wilson was certainly a friend in that period and when we were evacuated he was still a friend. And he was the brightest boy in the class, he sat the eleven-plus but his parents couldn't afford to send him to school, so he left school at the age of fourteen. What happened then I don't know. We've tried various ways to contact him. I wonder if he's on Facebook? Probably.

Always a possibility, yes.

If he's still alive of course, he'd be in his eighties.

[22:51]
How did you feel about moving?

There was a fair amount of excitement about moving. By that time we were totally aware of what was happening in Germany and so we saw, we recognised that we'd escaped from something which could be very bad, which could have been the end. There was enough talk about people who had disappeared and so on. Also, because we had relations in England, we probably found England a little bit less strange than if we had known nobody. There were my cousin/uncles who were quite friendly and certainly tried to see that the family was alright. There was my father's sister, Grete, who was then getting on a little bit, she was the oldest of the children, and we certainly visited her regularly. I think… I must show you some pictures. Downstairs.

What sort of reception did you have when you first arrived?

Well we had the reception from my relatives, which meant that we had a reception, we had somewhere to live, that had all been arranged. My father's other brother, one of his other brothers lived in England, he lived in Seaford near Brighton, and he was my father's agent for his company. So there was that uncle there, so we had quite a few relatives, we weren't total strangers. [24:50] About the language: my father spoke English reasonably well, my mother less well, and never quite mastered it to the extent that he did. My father had been here after all when he was a young man. And again, the sort of odd memory, going shopping with her and she asking for 'a flash of orange juice', the German word *Flasche*, 'flash of orange juice'. That sticks in the memory, this kind of faux pas or this kind of… it's not a faux pas.
What sort of reception did you get from English schoolchildren your own age?

I don't remember anything untoward and with the way the school teacher dealt with us, I think she'd probably told the class that we were to be treated very normally. I don't remember anything, any kind of opposition until we were evacuated when there was one

particular boy we had a lot of trouble with. But he… I remember his name, a boy called Rutherford, but he was slightly ESN – educationally sub-normal – ESN, yes, educationally sub-normal. And he was a problem, but for some reason or another he took against us, whether because we were Jewish or because we were German, or because he just took against us. As I say, he was not quite a normal boy.

And you attended school in Kilburn you said? You initially attended school in Kilburn?

Yes.

What was the school called?

Essendine. You got it wrong – E-double S-E-N-D-I-N-E. Essendine. Essendine Elementary School in Kilburn. Very close to the Paddington Recreation Ground … probably you wouldn't know it, it probably doesn't exist any more, the Kilburn recreation ground. There was a big park, we used to go regularly for playing, to play. What, we were eleven years, ten, eleven years old. Yes, that's right. Eleven years until October of that year. By that time of course the war had started, in September.

[27:33]
What did you play in the park?

I specifically remember the roundabouts. I remember those very much, but no doubt we did other things as well: swings, roundabouts, just mucking around generally. Not I believe cricket.

It sounded like you had a very supportive teacher when you first started school.

As I say, the teacher was particularly supportive, particularly… she knew what she was doing. But the other thing, the school was in a big Victorian building, probably totally condemned nowadays, but it was next door to a lunatic asylum, they were adjacent to each other, and the school playground was adjacent to the public place for the lunatic asylum and at that time they took as lunatics people who really had nothing wrong with them except that they were crippled for one reason or another. So people for example who had – what's it called? [polio]

The name escapes me for a moment, but one of the things which disables you, but which doesn't spoil you mentally, people like that were put together with the lunatics. So there was, almost frightening over the fence, these strange people. That's a very vivid memory and absolutely can't happen now. For one thing, people would be treated quite differently, much more in the community, but they wouldn't just lump together all these different classes of disablement. Some were mentally impaired, but many were not, they were simply physically disabled. Cystic fi… You know the thing.

…brosis?

Fibrosis, cystic fibrosis, yes. There were examples of people like that. I'm doing this now, reasoning backwards of course. I didn't know it at the time.

Did you ever talk to any of them?

I think there was some talk across the fence. I don't recollect really, but I've got a feeling there was. Just the sort of odd memory. That is a vivid memory because it was frightening to young children. I don't know whether others were frightened, but we certainly were.

[30:35]
How long were you at school for before you were evacuated?

A few weeks.

That short a time?

Oh, quite a short time, yes. We were evacuated in September and I think we probably went to the school, we came to England in April, we probably didn't go to that school until after the summer holidays. We might have done, but I'm not sure. My guess is that we went immediately after the summer holidays and then there were a few weeks before we were evacuated. I don't remember the time before that. I know we didn't go to school until we had some kind of glimmering of English, so very, very slight, but we had some. Enough to notice my mother, to laugh at my mother and her flash of orange juice.

How did you… did you enjoy being evacuated?

Yes. I mean that for us was a good experience. We loved the countryside, we were very happy with the family we were in.

[closed between 31:46 – 34:56]

Did I tell you the story of when we went out to… Mr Gentle was building a greenhouse and he needed bricks and we had a little trolley attached to our bicycle and went… there was a wall falling down at the local church and we collected bricks from that and took them home and took them back for him to build his thing. He got us up to that I suspect, but anyway the police called. I don't think it was… it wasn't a great event, the wall after all was falling down, but I think we received something of a warning. But again, the memories of having the trolley attached to the bicycle, filling it with bricks.

It's interesting you describe taking to country life so well after living in a city for the rest of your life, it's…

Yes, yes, yes. And since then I've always liked to come back to it now. And this is where I differ from my brother who hasn't, who is very much a city dweller. And one of the ways we've grown apart is from both having had a similar liking for music and theatre and so on, he's persisted in this, goes regularly to operas and concerts and plays, whereas we haven't done that, my wife and I have not done that. And I suspect influences of wives are important here too. Very important.

How does your wife differ from your brother's?

Very much, yes. Totally different.

How?

She is I think far more intelligent. My brother's wife died in October last year, incidentally. She is much more intelligent, but as against that, probably much more philistine. Her great love is literature and reading and perhaps the theatre. Jacqueline is much more music, opera,

concerts, ballet, that side of it, probably far less reading and she's an artist, she enrolled in art school and was in art school all her life. Became quite a proficient and talented painter and sold stuff for sort of a thousand pounds a throw, which is not bad.

[38:00]
You mentioned that your mother was also interested…

My mother was very much an artist and I'll show you some of her pictures. If we were downstairs you'd see them on the wall.

Did she paint at this point in her life when you were a child?

She… yes. She painted, she did photography, during our childhood certainly. She was very much a housewife too but she had no job as such at all, she had no career, her career was her art and she did paint, go to art school – I can't remember her going to art school in Berlin but I suspect she might have done - and she was doing quite a lot of photography, studio photography. But she went back to her art in London in her later life. I think I mentioned that she was at the Camden Town Institute, got the name wrong there slightly. The Camden Institute, and still carrying her student card at ninety, and proud of it.

Did you see much of her when you were evacuated?

More often than many evacuated children saw their parents because we were so close. So it wasn't, it wasn't such a great job for her to come out and see us, which she did probably once or twice a month, and it wasn't so difficult as we got a little bit older, for us to go to London. And in the end we cycled, we cycled everywhere. In those days we cycled. The bicycle was a thing in the way which children don't use bicycles nowadays in the same way. It was absolutely free and Ailsa reports the same thing in her life, she lived on a bicycle. And so, the twenty-five mile journey to London was quite straightforward.

When was your father interned?

I can't remember exactly how long he was interned, but I think it was less than two years and I think it was probably more than one year. I always think it's about eighteen months but I

don't have any accurate record of that, though once again we can try my brother to get some more accurate picture of it. I can do that sort of chasing. But I've got a feeling neither of us know exactly. It was an oddly confusing period; the war, we'd come to England, we were evacuated, we were with a new family, our mother was in London, father was on the Isle of Man. Really very confusing, but I don't remember it as being that… being confused by it. We were there in Bedmond, went to… our school was evacuated, we didn't go to the local school. Our school was combined with another local school, St Paul's School – not *the* St Paul's – St Paul's Elementary School from, I think, somewhere near Islington. And we were, the school was housed in the village hall. Lessons – there were no classrooms – so the lessons were… this gangway was for history and this gangway was for whatever. And I don't think there was a great deal of age differentiation either, there must have been some, but I think on the whole we were taught all together. It's interesting that I don't remember that sort of thing. I remember being at a music lesson with the teacher whose name I remember, Mr Lee, and next door was the history lesson and I was certainly very much more interested in the history lesson next door than in the music lesson and it was one of the few occasions when the teacher then asked for the difference between a quaver and a minim or something and I had no idea and got caned for inattention. The one and only time I actually remember being caned, across the hand. Great pride.

Were you a musical child at all?

No, no, no, no. Obviously like music but never a musical child. I've never played an instrument or anything like that.

You mentioned being caned – was the discipline at your school quite strict?

It varied with different teachers. A teacher like Mr Lee was very strict, others were far, far more relaxed and lax. And some of the teachers were very encouraging so that when my brother and I started to explore, did a lot more reading, explored in particular as I mentioned last time, ancient history and so on, they were extremely encouraging about that sort of thing. And the headmaster, whose name I suddenly remember, Mr Brangham, who was the one who suggested that the most progressive career we would have would be to join the Post Office, which I found incidentally subsequently it was a good career for those who couldn't go on to grammar school. And many of the people who rose very high in the Post Office started that

way, as telegraph boys. So there was a career to be made and we never know what would have happened.

[44:45]
Where did you go to grammar school again?

In Willesden. By that time my parents had moved to Cricklewood in London, north-west London, in a block of flats called Ashford Court, where we had a flat and the local was Willesden County Grammar School, which subsequently became – many years later – became quite a notorious secondary modern, it changed. But at the time was regarded as a good school.

You mentioned that you'd had some difficulty getting into grammar school and…

Yes, because we came from elementary school, we hadn't done the eleven-plus, and it was our mother who fought to get us into grammar school, to get us into the school. She tried several schools I think, but finally persuaded the headmaster to take us on and we were taken on, although we should have been in the third year, we were taken on in the second, for the second year, and although we – well no, there was no reason why we should go into the A stream, so we were put into the B stream, and the difference between the A stream and B stream was really quite immense. There was real class division between… division in esteem between the A stream and the B stream. The B streams were regarded as the roughs and the morons and the unintelligent, the A stream were the elite, the people much more probably from the middle classes and much more likely to go into the professions, whereas the B stream didn't have such aspirations. So the B stream was probably much more like the secondary modern school than the A stream, they did relatively few of the exams. Whereas the expectation in the A stream was that you would go further. Although the sixth form was quite small and anybody who was anything was expecting to do science, or medicine. Quite a few went into, subsequently into medicine. [47:45] So the arts class for one reason or another was much smaller than the science class. You noted that I had said that the science teaching was bad. I think I should change that. It's not that the science teaching was bad, the science teaching was bad for us. For many others it worked. And I suspect it was bad for us because we came from an elementary school which had done no preparation for that kind of thing at all, whereas the people who had gone through the different streams would have had

some kind of grounding in science, something which would have helped them to understand later and I think these teachers didn't recognise that, so they were bad in that way rather than necessarily bad teachers.

So science hadn't been taught at all to you until you got to grammar school?

Not at all. All we'd done was what we'd picked up from our reading, and that was not in fields like physics and chemistry, that was much more in human sciences.

How well did you do at school?

How…?

How well did you do at school?

Well we started off in the B stream of the second year and almost after one term transferred to the A stream of the third year. So we caught up. And the consequence of that is that we had a very hard start in that stream, we didn't do at all well in the first few terms and we were simply behind everybody else and had missed out on a lot of foundations, as I said with the science. Now, equally missed out, for example, in English grammar, I know no English grammar, I still don't know any English grammar, but somehow or other I learnt to write, so I can do that. But I've still got a blank, which I could have caught up if I'd ever wanted to, but I've never been driven to study English grammar. Whereas of course others had done Latin and so on and so on and knew much more in that sort of thing. And Ailsa, my wife, would still concern herself about my lack of knowledge of grammar, so I have to start to think what an adverb is. I think I know what a noun is, but subjunctive or pluperfect subjunctive…

[50:43]
Why did… you mentioned that at grammar school your favourite subjects had been in the humanities mainly – yes?

Yes, I think they were in the humanities, in particular English, English literature that is, history, geography as well. I think we had a hankering to like science, but weren't quite up to it at the time.

You mentioned English literature – did you read much for pleasure at this time?

Yes, we were always great readers. And we read Russian classics at a relatively early age and worked our way through Dostoevsky and not Tolstoy quite that much, but certainly some Tolstoy. So *War and Peace* is not one of the books I've read, but *Anna Karenina*, yes. But no, we were heavy readers and read probably a little bit ahead of our age group. And I retained this heavy reading until later life, but oddly enough I have for the last ten years done very little reading.

Why?

Maybe I do other things. And it's not on the… I don't necessarily mean the computer, I mean more like gardening and so on. So if I have a choice between taking up a book or going into the garden, I go into the garden. And so I find this curious because at one time I thought I would, that would be something which would remain with me for life, but it hasn't quite.

It's interesting that you went from… how do you go from enjoying the humanities at school to doing economics at university – why did you make that decision?

That decision, I noted last time Miss Stevenson who was a geography teacher. And there was a group of us who discussed what we would do, we were fairly close friends and we decided that, we somehow decided, I can't remember exactly how, with discussion with Miss Stevenson that this would be an interesting subject. Partly related to economics also being related to politics in a sense, and that was a thing which interested us. We were probably more interested in the political side than the technical side of economics when we started. And that's what drew us to it. And so it was not unrelated to the humanities. The fact that my view of academic economics now is very different, I kind of despise it now.

What interested you about the political side of economics in particular?

I think we probably grew up – we've already mentioned that my mother was always very much a progressive on the Left, more in what she said than what she did, but that's by the way. I think we grew up becoming interested in this. It's difficult to know how these things

happen, but we certainly became more and more aware of what was going on around us in the social sense, in the economic and political sense through our sixth form, partly because we had I think quite an intelligentsia in the sixth form in that once we were in the sixth form there was quite a politically aware intelligentsia, both amongst the scientists and the humanities people. So there was a lot of discussion on politics. And it was primarily a progressive, as one would expect, a progressive left-leaning intelligentsia.

Is this communist in any sense?

No, I don't think it was communist, though the communists were part of it, yes, they were certainly a part of it. I don't remember any anarchists, but certainly communists and some of the teachers were communist at that time, it wasn't a bad thing to be. After all, the Russians were our allies. We followed the war as we grew older in considerable detail. We had maps and we looked at the maps, saw what was happening. And by the time the election came in 1945 we were really very much aware of what was happening.

[56:42]
Did you think about the decision at the 1945 election, do you remember how you felt at the time?

Oh, we were very strong on the Labour side. Yes, we acclaimed that. And certainly have kept that Left allegiance all my life.

Did you have any particular hopes of that change in government in 1945?

Yes. Yes, yes. And were not aware of the difficult times we were really facing. That was something we were not aware. But I do remember we got into correspondence with one of the very well known economic pundits who were very much from the orthodox economics, laissez faire economics, got into correspondence with him. And what we wrote to him then, which he refuted of course, I still believe we were right.

What was this?

This was really very germane with the budget tomorrow, is that there is a need for welfare considerations, that without these welfare considerations the economy wouldn't actually work, it's a necessary part of it. That the stick for those who are at the bottom end isn't the way to… well, this won't work, doesn't work. And we argued that it is wrong morally and it doesn't actually work.

Who was the economist, if you don't mind me asking?

I've been trying to think of his name. I think his name was Strauss, but I'm not sure. He was very well known, not an academic journalist, but a journalist – not an academic economist but a journalist, but well regarded in academic circles. Again, one might be able to get that name out of my brother. I say, I've been trying to think of it, but I can't.

[59:18]
And this was a debate you entered into when you were at university or before?

That was before we went to university, that was just before we went to university. We started getting engaged with that. But going to LSE of course made us want to think about that sort of thing, although the first subject we wanted to take as our specialist subject was not economics but anthropology, because that had been our earlier love.

It's interesting that as we're moving into university and you're talking about subject choices, again it's you and your brother, it was our choice.

Yes, yes, yes. It was very much our choice, absolutely together. We went to the same presentations, the same bazaar where the specialist subject leaders put their subject in front of us.

Did you get involved with – you've mentioned ping-pong last time as one of your main interests.

Table tennis.

Table tennis.

Never talk to a table tennis player about ping-pong!

Excuse me. I was just wondering, did you have any other hobbies, interests at the LSE?

[1:00:46]
Just trying to remember. We were members of a number of societies but I can't remember at this moment any of them specifically, being very active in them. We were somewhat active in the union. I became, in this case it's me, I became an officer, one of the very low level officers of the union. Actually room booking officer. But we were very reticent. Don't forget at that time we were schoolboys and the other people were ex-service, so we never talked at union meetings. We went to union meetings regularly, were interested, but we never talked to them, we were simply too shy to speak amongst those people with their… some of whom had commanded all sorts of things during the war and so on. It was quite, in a way, difficult because of our relative shyness and reticence and their self-confidence. We simply didn't have that self-confidence. This meant that we didn't join in quite as much as we might have done, as we would have liked to have done perhaps.

Do you think there are any advantages to having that mix of backgrounds there as well though?

It was too one-sided. In general I would say yes, but there, ten per cent were from school, ten per cent only.

Right, so it was…

Ninety per cent ex-service.

That is quite an imbalance. I'd always thought of it more as fifty-fifty.

No, no. In the year we went it was ten per cent. As the years passed the balance changed. Probably by the second year it was already different, but the year we entered there was ten per cent.

Sounds quite a daunting prospect.

Yes, yes, yes. Yes.

Do you remember any of the other sorts of societies you were involved in – were they political, economic?

I suspect they would have been more social and political. I know there was a dramatic society which was very active and had some absolutely first rate people in it. But again, we were too reticent, too shy to do anything there. [1:03:56] I don't know whether I mentioned it last time, in the last couple of years at school we were members of the Air Training Corps.

No, you didn't mention it.

That's something. We joined the Air Training Corps, as one joined one thing or another, in our school it was the Air Training Corps. And in the Air Training Corps you had to do various things to show and gain proficiency badges, like in aircraft recognition and so on. We got our badges in aircraft recognition but I think found it difficult doing the communications, the Morse. Morse code, that was something which we mastered fully. But, the most interesting thing is, we were terrible, the whole school was terrible in its parade work. In the Air Training Corps one was expected to do drills, the traditional drills or so on, falling in and all that, you see it in Dad's Army – we had to do that. And the big day came when we were being inspected by a senior RAF officer, Air Commodore or something, and we were paraded and at that point we lost it completely, our group lost it completely. We marched up to a wall and he didn't give us any… our commander didn't give us any orders, so some marched on the spot towards the wall when we came to the wall, some turned round and walked back. It was total and absolute chaos. I'm not sure why I didn't mention it last time, because it's one of these very vivid memories of a total disaster of that inspection. The other thing that happened is we went to camp at Yeovilton, which was the HMS Heron, it was the navy air force, the naval air force. And again, what I remember vividly is, apart from the fact of going up in the air and flying, which was exciting, on the very first day we got there we were on parade and watching a couple of planes in the sky, Corsairs, and they – one was a trainee and one was the pilot – and they went into each other and both planes went plunging to the ground. So it started with this terrible tragedy. That's a vivid memory. But the other thing is,

amongst our colleagues in the ATC were some sixth formers who were somehow much more precocious than we were and who were, all the talk was about being, what they could do with the WAAFs, and the talk was great, what the achievements were, I don't know. But there were a couple of twins, there were twins who were much more shy about that sort of thing. Our interest was getting up into the air and flying, which we did. An interesting couple of weeks, I think it was, at Yeovilton. Particularly interesting as subsequently when I was doing research I went back to Yeovilton on a rather interesting research project, looking at the relationship between what, when the – this was computer projects – were started – do you know Prince2? This is before a project can be signed off it has to be evaluated by the Treasury and there's a particular instrument for doing that and it's called Prince2. And if it passes the criteria, the project can go ahead. So this is a very careful evaluation of what this project will do. And what this project was to find out, whether projects which… what the projects which had been signed off and had gone ahead, what they had actually delivered as against the forecast, because the Treasury never looked back, they never tried to do that. So we looked at a number of major projects: the court system, but also the Yeovilton system for the maintenance of aircraft and others, so I went back to Yeovilton to look at that, and again it was wonderful systems which bore no relation whatsoever to the project. None of them did. Some of them delivered more or different things, some of them didn't deliver anything at all. There was a whole range. But it bore no relationship, very little relationship to the actual project proposal.

When was this?

This was about… this was by that time I was doing the research at LSE. This must have been in the early eighties. Oh no, sorry, by that time I was with London Business School, it must have been the late eighties. Yes, that's right. It was in the late eighties. It was the most interesting project which the Treasury didn't like our findings at all and we weren't allowed to publish them.

[1:10:23]
Probably actually, just bring this up at some point in this interview – have you ever had to sign the Official Secrets Act at any point?

Yes. Yes. I've probably said already much more than I'm allowed to say about it. I haven't given any details whatsoever. But it was really very interesting. We looked I think at five or six projects.

A lot of a military nature, I'm guessing?

No, no, no. That's the only one that was a military one, the others were all civilian ones. One of them was – and we visited Cardiff for the purpose – was the court system. They had devised a system for providing information on court procedures, in particular for scheduling court procedures and recording and archiving what was happening, and that system was not very well devised at all. But Cardiff was one of the first implementations of it, so we went to the Crown Court at Cardiff to see that.

While we're actually on this subject, is the Official Secrets Act going to cause you to have any things in this interview that you can't talk about in any detail?

I suspect what I've just talked about is as much… It's the only time I had to sign the Official Secrets Act, I think. I may have had to sign it, yes I think I had to sign it also when I was an adviser to the Select Committee, special adviser to Select Committee, I had to sign the Official Secrets Act.

It's good for future historians to know these things because they sort of explain things that they would have expected you to talk about but…

Yes, yes.

That's good to know. So you actually, in the ATC in the forties, you actually got to fly a plane?

Not to fly a plane, goodness me, no. No, no. The thing was to be taken up by the pilots on flights and there were aircraft ranging from the Avro – it's one of the ancient planes, one of the very slow, cumbersome plane used for reconnaissance but not capable of defending itself properly. And the most advanced plane was the Meteor. And the thing was to try to get on to

a Meteor. And some of us managed to. Neither my brother or I managed to get to a Meteor, we managed to do the Avro – what's it called?

Is it an Anson?

Anson, the Anson, yes, yes. The Anson, you know it. It was the Anson. So you know all about the Anson.

I do, but it would be interesting to tell me what you know about the Anson for the tape, it sounds like there's a story behind it.

Not much of a story no, no. Only that compared to the Meteor it was a slow, lumbering plane. Nevertheless, going up for the first time in an aeroplane, in a military aeroplane was quite exciting. We didn't do anything spectacular at all, but we knew that okay, one got on an Anson, but the thing one wanted to get on to was the Meteor. [end of track 4]

[Track 5]

I wonder if we could talk a little bit more about your father. You mentioned he was an… forgotten the word. An Anglophile.

Yes, yes. My father had been, I think I mentioned this, a commercial apprentice in England at the turn of the century. He was born in 1888 so my guess is it must have been about 1910 or thereabouts, a little past the turn of the century. How long he spent in England I don't know, but he certainly had a particular appreciation and love for England from that time on. If there were any particular experiences he had in England, he never talked about them, so I don't know about that. All I know is the effect that he was… he had a particular concern and love for England. Maybe he had an affair when he was here. A young man, I don't know.

Just in that your father's an Anglophile, I was wondering about your mother, how did she feel about a new country?

Oh, she didn't have this particular relationship with England, but she thought it was worthwhile. Again, she had relatives here, which meant there were connections. It wasn't a totally strange place because her relatives were there. Her uncle had married, as I said, my father's eldest sister and she had, her nephews were here. So yes, she… I don't know whether she expressed any reluctance about going to England or not, not that I know of, but as children we probably wouldn't have known.

[02:17]
How did your father feel about the fact he was interned when he got to Britain?

I got the impression from talking about him, at the time we were hardly aware, but talking about him afterwards, that he thought it was a very reasonable thing to do. If he had been in a position of authority, he would have done the same thing. He was critical, as many people were, of some of the injustices which took place within it but he said by and large it worked very well. And again, I've heard this from many Jews who were interned at the time who were in the same camp as he was or that group of camps, who found that the experience was in a sense something which was good for them. It was, don't forget it was an event, a situation where they were pushed into close proximity with each other, rather than spread

around thinly in a population and that made for good comradeship and there were all sorts of friendships formed and forged for life. The one which of course is best known is the Amadeus Quartet, which were a group of – you've never heard of the… The Amadeus Quartet is one of the best known and best loved quartets, now probably no longer functioning, they're past it, but at the time in the sixties, seventies and so on, they were – fifties, sixties, seventies – they were one of the best known musical group, classical music groups, and they were formed in the Isle of Man. It's one of the best known products of that period, but it epitomises in a way the way things worked there for that group of people. I don't know whether you've come across Sir Claus Moser? Sir Claus Moser was a, became a professor, he was involved, he was an economist, he was involved in the formulation of the Education Acts so he became very well known for his work in education. He was a statistician and economist and he became head of the government's statistical service. Now, his history is not unlike mine. He's a couple of years, a few years older and he was at LSE, already a lecturer when I got there as a student. But I got to know him a little bit better. And he again speaks of that age in the internment camp as something which was, allowed them in a sense to grow, which scattered in the community they might not have been able to. So he speaks in quite a flattering way about it, but always the sense of regret for the ones who missed out, the ones who were for one reason or another mixed up with the Nazi group and of course the ones I think I mentioned earlier, the particular ones who suffered most, who the worst of the Nazis were taken to Canada and amongst them were a few of these people and they had a rather hard time of it. What is interesting of course is the way people survive these incidents. Torture and imprisonment and so on, people survive that, or many people do. But this was not torture and so on. But regarded as a hard time by others, it was in a sense an experience, a different experience from which some of them benefited. No doubt some didn't feel like that.

[06:38]
You mentioned that your father took up cooking?

He took up cooking, he became – I don't know how that came about – but he became one of the cooks in the camp and rather liked cooking and from then on he was the cook in the family. I don't think my mother ever liked cooking very much. Certainly I can't recollect a dish she cooked or anything about it, whereas my father was quite keen. Not particularly a studied cook, that is to say he didn't read recipe books, he did his own things and he did them quite well.

Had he not cooked at all before then?

Not to my knowledge. I was not aware of that. I think, thinking back now, that in Germany we had a cook. As I say, we were a fairly affluent middle class family and I think we had a cook. I can't remember much about that, but it occurs to me now that's how it must have been, because I don't think my mother cooked, or did much cooking. Maybe I'm maligning her, but I don't think so.

[08:00]
Can we go back – as this memory's popped up – maybe just go back to that flat in Berlin.

Yes.

And could you describe it to me?

I remember it as a huge place with very large rooms, well furnished, and not much else. I can't remember whether it had a nursery, though I guess it had a nursery. I remember it had very large chandeliers, but odd things like that which suggested that it was a great size. When I went back to it after the war I didn't go into the apartment but I saw that the building was much smaller than I thought it had been. One's childhood impression of hugeness had shrunk down a bit. It was probably quite a sizeable apartment, but not massively big. And I don't know how many bedrooms there were, I've no idea of that kind of thing at all.

Have you got any strong memories about being in it or particular occasions when you were in it?

I don't remember much more, that garden I talked about, than the interior of the flat. Again, what I'd like to do is to talk to my brother and see whether between us we dredge up memories about that thing. What do people remember about their pre-teen places where they lived, because they know nothing else, that's where they live. So there is no particular consciousness of that unless you've got a comparison and I don't have a comparison.

No. What about your home in England?

Well do you remember, do you remember much about your house, the place you lived in in your… when you were seven, eight, nine, that sort of age?

Yeah, I think I remember a fair bit. But again, it's sort of specific instances of things, it's…

Yes, yes.

Did you have a radio in your flat?

I don't know. My guess is we did. We certainly had a gramophone.

Do you remember which room the gramophone was in at all?

One of these wind-up gramophones, which it had to be, a wind-up gramophone. I know we had that. I can't remember a radio. I can't remember listening to the radio. Perhaps we didn't have one.

Did you have any toys you played with indoors?

I only remember outdoor scooters, but we must have had toys indoors, we must have had toys indoors, we must have had ample things, but I can't remember playing with any particular toys. Outside - scooters, that kind of thing. Tricycle first, we had a tricycle first, I remember a tricycle, vaguely, and then graduated from a tricycle to the scooter. And first of all the scooter, which you drove with your feet, and then one which you had a sort of pump action to drive it. Yes, trying to reflect on these things. It's not… a lot of it is just simply not coming back. It's there somewhere no doubt. And maybe a different conversation with my brother might stir some things which haven't come out yet.

Do you remember if you had friends round to play?

Well, I remember, the kind of incidents, I remember the ones I mentioned last time like being on the children's camp and I think I mentioned the one in Czechoslovakia which was awful and the one in Germany which was on a sewage farm. I remembered being on a sewage farm

and that the sewage was used for the plants and the particular thing which sticks in the memory is that on a particular day in the week a van would come round and we would cluster round it and buy… the van would sell things which we liked, but I don't think they were sweets. I think they were more things like smoked fish. [laughs] I could be totally wrong, but I've got a feeling it was smoked eels and things like that. My… I've probably got taste buds which have got a better memory than other things, there's certain things which I still like which I liked from, my guess is that I got to like in those days. Like smoked eel.

[13:52]
Are there any tastes in particular that you remember from childhood?

[pause] Texts, I can't remember anything at the moment. Yes, of course, of course, of course, the Erich Kästner books. Have you heard of the Erich Kästner books? Erich Kästner was a children's writer who wrote children's adventure stories, the best one which has been translated into English was *Emil and the Detectives*.

Yes, I've read…

You've heard of that one? That's from this author, Erich Kästner and we read his books avidly. There is a whole set of them. They were sort of boyhood adventure detective stories. *Emil and the Detectives* is an example of it. He was, Erich Kästner was also funny. People got into funny situations. In a sense perhaps rather like Tintin, who you must have come across.

Something of a fan actually. [laughs]

This is not a connection I've ever made before, just making it at this moment.

What about Emil and the Detectives *did you like?*

Mm?

What about Emil and the Detectives *did you like?*

I don't remember sufficiently… I remember it as a story which was in itself exciting, but also had some very funny moments in it, very funny situations in it, which was true of this guy, Erich Kästner. It might be worth looking him up at Google and see what it says about him, because until we just talked I'd totally forgotten about him. Asking about texts, yes. I can't remember any others at the moment but they might come back to me. Now that would have been in my last years in Germany because they were books for children, but for older children, so probably from the age of eight, nine, ten, that kind of thing.

You were talking about…

Fairy stories I don't remember at all. Those I must have been… the Grimm stories, but I can't recollect now whether the Grimm stories came from – or the Hans Andersen stories – came…I learnt about them afterwards or whether I took them in at the time.

[16:54]
Talking a little bit about your palate a little while ago, are there any tastes you remember from your childhood?

I mentioned earlier that some of my things which I like would probably come from those days and the ones I mostly recollect now are the ones which are not customarily eaten here. Liked smoked eel, which is a comparative rarity here, but which is something I've always liked. Other tastes, really… yes, yes, there's an episode now which I recollect hearing about, remembering vaguely. When we were quite young both of us had scarlet fever. Scarlet fever's quite a severe disease, very few people get it nowadays, but we were very low and apparently before the scarlet fever we pretty well ate everything. After the scarlet fever we became very fussy and certain things, we didn't like certain things and my guess is that they lie behind some of the things I still think I don't like rather than know I don't like. And I can give you examples. Cucumber. Now, cucumber is… many, in fact quite a number of vegetables and green things which for many children of course, but there was this switch after the scarlet fever, we were, my guess is about only two or three years old when we had the scarlet fever and it did set us back. But cucumber, my brother still doesn't eat cucumber. Now I've learnt from Ailsa to like cucumber and I now eat cucumber very happily, but there are a number of things like that.

Which you'd eat before the scarlet fever but not afterwards.

Which we ate before the scarlet fever. After the scarlet fever, I'm told that we restricted our diet considerably, what we were prepared to eat became much more limited. So, I liked carrots and still like carrots. But Ailsa must have had a similar experience because she doesn't like carrots. [laughs] I suppose we all have had experiences which still dominate what we think we like. You were willing to try the mussels so you're clearly willing to try things. [20:05] I told you we went to this expensive restaurant, Gidleigh Park – have you come across Gidleigh Park?

No.

Gidleigh Park, it's one of the top Michelin starred places in this country. It's in the middle of Dartmoor. And the chef is Michael Caines. Either you're interested in these…

I'm familiar with the name, yes.

Michael Caines is one of the top chefs. And I had a dish which contained an ingredient I would not normally touch, ever touch, and I was going to try it, come heaven or hell, I'm going to try it. It was delicious.

What was the ingredient?

Celery. One of my 'nos'. One of my no-nos.

What were your favourite foods as a child?

I guess… most meat dishes I think: chicken and… Chicken was a comparative rarity. At that time chicken was given to people who were sick and chicken soup was given to people who were recovering. They're the sort of things which I certainly liked. Otherwise I guess I liked most meat dishes. I have no particular recollection of anything which stands out, though I know that carrots were always, diced carrots were always something I liked. Why, I don't know. No, there's nothing which stands out.

[22:03]

Did your diet change when you moved to Britain?

I think it changed when we were evacuated, because we went from what was a typical probably Continental type of meal and the way of cooking to something which was very typically English. But I'm not conscious of a significant transition. All I can say is there must have been one, but I don't think I was conscious of it. Probably eating much more fresh fruit, fresh vegetables, because we had all of those things. Lots of… living in the country at that time, one got a much better diet than in town, both in terms of variety, but above all in freshness.

You mentioned you were in the ATC, was this when you were evacuated or later?

Sorry?

You mentioned you were in the ATC, was this at the time you were evacuated?

We were back in London then, yes. And other experiences at that time were flying bombs, which were a very vivid experience because we came quite close to them. There were several occasions when the flying bombs came very close, one particular occasion – you know that the particular vivid experience of flying bombs, you had to be concerned when you heard the drone of the machine, when the drone stopped you know that the flying bomb was coming down. And there were several occasions when that happened and on two occasions, I know at least two occasions when they dropped relatively near. In one case we were in the flat in Ashford Court and the thing went off in the house on the road across from us and I remember the dust rising from the – the building was shaking – and I remember the dust rising from the windowsill on that occasion. On another occasion we were playing with several friends in the park and a bomb came very near and we all sort of dashed for shelter somewhere. But again, the most vivid memory is the cloud of dust and smoke and so on where the bomb landed. But that's the kind of experience which of course nearly everybody had in those days. We did not witness any of the V2s, which were much more scary because they came out of the blue, you didn't know they were coming. And the stories that they were gas explosions rather than German bombs so as not to frighten the population.

[25:43]
Why did you join the ATC, while we're on the subject of things that are flying?

Did we enjoy the ATC? Yes and no. No, because we were so bad at drill, partly because we were badly drilled, but we were very bad. And I must be one of the few people who at that time marched with both hands going at the same time, instead of in opposite directions, they were both, they were either going up or down in parallel. Now that's very difficult to do, but I did it naturally and I think my brother did it as well. There were two of us marching in this peculiar way. But the biggest incident of course was this story when we were being inspected and we marched up to the wall and [laughs], and total disaster.

Where were you being inspected?

At the school, in the school playground.

Did you gain any useful skills from being in the ATC?

Yes, aircraft recognition. I don't remember any others. As I say, Morse was not my strong point. I could sort of do it. I don't remember many of the codes now. Aircraft recognition, I don't think there was anything… certainly not drill. That became a byword for how not to do it.

Did you keep up with the ATC when you went to university?

No, not at all. We left the ATC, when the war finished I think the steam went out of that sort of thing, one no longer felt one had to. What we hoped was that if we were called up we'd go in the RAF, which was our preference, and that might well have been, but in the end we escaped being called up for some peculiar reason in terms of a small window. I think I mentioned that last time. [28:16] When we talked downstairs I mentioned that I hadn't said anything about the hobby of photography.

No.

But we took that up at school, we became interested in that and my parents, I'm not sure whether it was my mother – I think it was probably my mother – had an ancient studio camera, one of these huge things with bellows, and which exposed plates, not film, plates. And I think it was half plate size, if you know anything about half plate, it's quite a substantial size. That was a very versatile instrument; it could be used for taking photographs with plates, but of course it could be used the other way round as an enlarger. So it provided a kit for us. We did the whole chemical thing of doing it and we did it with our friends, our friend Steven. I mentioned earlier that we'd had some very close friends, and that was Steven. And we became in a sense the school photographers, so we would take things and at one time the school had engaged a professional photographer and one of the things we could do with our studio camera was copy pictures, so we copied his studio, his picture and sold it at a cut price and we got ourselves into a little bit of trouble over that because we were clearly thought to be cheating a professional, which indeed we were. But we took, certainly we took pictures and we made really quite a lot of studio photography in which we would dress up and act particular parts and take the pictures. Some of those are really very good. When I look at them – we've still got some of them somewhere – and when I look at them, hey, this was really quite good. So we spent a lot of time with that particular hobby and I kept up photography for a long time. Indeed, at one time in the, I guess in the 1980s when we were moving house, I insisted that the house should have a darkroom, facilities for a darkroom, and we did indeed find a house which had facilities for a darkroom, it had had a darkroom, excellent. But then our daughter had a baby, I think, and a nursery was required for her – she lives in our house – I'm trying to think which one it was. Anyway, the darkroom was converted into a nursery so I lost that facility, but when it came to colour photography I as going to start doing that, the chemistry myself, but this was interrupted by the baby and I never took it up again, I never did the… simply took the photographs but never did the whole business again. And yes, I did a great deal of photography and I think took some quite good pictures, but never entered into competitions or anything. Never took it up in the sort of semi-professional way some people do. I simply took pictures and got them enlarged and got the best ones enlarged. And have, if you look around here, you'll see hundreds of albums. Carefully took records so that we've got huge archives of photographic records.

What's the attraction of photography on that scale?

I really enjoyed having my pictures, reliving, having my pictures, of being of sufficient quality to say, I can hang this on the wall. Like that, I don't know whether you like it or not, that picture from Regent's Park. I think… I like it, I think it's a good picture. And so all over the house you'll see pictures of mine and it's only in comparatively recent times that I've stopped doing it, when the switch came to digital. And in a sense I'm frightened of digital because it gives you too many… it's too permissive. My brother's still keeping it up and he goes somewhere and takes a thousand pictures. Alright, we can delete it… but the amount of editing which is needed to make use of it is forbidding. So that's one reason why I haven't taken it up and I think I've got to get back to it.

So are you a careful photographer?

Mm?

Are you a careful photographer?

Yes. Yes, yes, yes. I didn't just snap idly away, I was very careful what I took, but I took a lot. I think when we went to the Antarctic I took thirty-six rolls of film. Mind you, the Antarctic is special. I recommend it if you ever get a chance, before they stop doing it.

Before it melts perhaps.

Yes.

Did you do your own developing?

No, I stopped doing it when colour came in. I was going to do it, but at that point when I could have done it, there was a reason why I couldn't, and that was that the baby came into the darkroom.

That's interesting – did you do your own developing originally though, back in the forties and fifties?

Yes, yes, yes, yes. I always did my own developing. And enlarging, because our studio camera was capable of doing enlarging and… It was a very versatile instrument.

[35:18]
Did you have any other hobbies when you were growing up, in the sort of teenage period?

Yes. I don't think particularly, photography was our great thing. We did, as I mentioned earlier, a lot of reading, but I don't recollect any other habits. At one time we did stamp collecting, we collected stamps. That was in our early teenage years I would guess. It started I think in Germany actually when we were sub-teens. And we did have quite a large collection of what we thought was quite good stamps, which we sold after the war to raise money for something and got a frightfully small amount of money for it, incredibly small amount of money for it. Either we sold it very badly or they were of very little value. I think probably the latter was true.

Can we return just to have one final question about photography, this idea of taking a careful picture interests me and I'm just wondering how would you go about taking a photograph if you're this selective about it, how do you do it?

I would look for something which provided a picture which was framed properly, which provided what to me seemed a picture which had the right contrast between light and shade and a comp… I would look for compositions really. So I would go around. And if you look at some of my pictures you would see the composition element in it.

I've noticed that. Is there a technical aspect here as well in terms of exposure time, focal length, that sort of thing?

Yes, to a certain extent, but I was never that… that wasn't nearly so much my concern as composition. So if I had a choice of going manual or automatic, I'd often choose automatic rather than go through the hassle of the getting it exactly right. I knew what to do, but I found it too much of a hassle and too little difference between the automatic and the manual, whereas of course any good photographer would say it's got to be manual, I can't let it go to automatic. In fact automatic is pretty good.

Do you remember any big changes in your hobby over time? You mentioned the change to colour later on.

Yes, and the way the film became more and more tolerant to different conditions. So that you could use faster film, which gave you the… which didn't, as in the earlier times, the faster the film, the poorer the detail in a sense. It all became incredibly good. Now of course with digital, it started off with that side of it not being so good but now it's caught up and it's better. Digital now has got all the qualities which a single lens reflex could do.

So I'm guessing you replaced your mother's studio camera with something more suitable?

Oh yes, yes, yes, yes, obviously. That was not a very mobile thing. That was a studio camera and you couldn't easily move it around. No, I've had a succession of cameras from all the usual Box Brownies to quite a decent but not top class single lens reflex.

Are there any you remember with any particular fondness?

I suppose my Canon EO5.

The SLR?

Yeah. My first useful camera was called a Finetta, which was quite a good one, but much less good than the Canon. And the point about a camera like that, like all that range of cameras is its versatility. Relatively lightweight but you can do a great many things with it.

[40:10]
Can we return to the LSE for a moment?

Yes.

You talked last time in some detail about your teaching there but I don't think we discussed how you actually got on in your degree. What mark did you get?

How I got on with the degree? We both got 2:1s and we both got average marks of very close to seventy marks, so we weren't far from a first, but we didn't get a first. We had a scattering of firsts amongst… an average mark of something like 69.4, something silly. We had the same average mark. When you looked at the distribution it was different. It just averaged out to the same. So one can say, yes, yes, we're twins, we got the same mark, but in fact the distribution was quite different.

And you both went on to research afterwards, initially for a PhD you said?

Yes, yes.

What was the PhD subject?

My subject was, I was doing work on sterling balances and in particular I was looking at Egyptian sterling balances, and as you know from a PhD, for the time being you are the greatest expert in the world on the subject you're looking at. So for a time I probably knew more about sterling balances in Egypt than anybody else, but it wasn't terribly interesting [laughs], what I knew. But I did research as a research assistant, first of all for an economic historian, Julia Hood, on shipping conferences. And in fact, from my point of view, shipping conferences were far more interesting than sterling balances.

What made them interesting?

I'm, in a sense, a historian manqué, I like history, I find history really very interesting and this was the history of how these shipping companies – you know what a shipping conference is? It's really a cartel. A cartel of shipping companies. How these shipping companies formed and then tried to control their market through the shipping conferences. And trying to trace the history of this was really rather fascinating. So it was a piece of, as I say, economic history, but quasi-historical research, which was interesting. And then I did some work with an economist called [Graham] Dorrance, who came from Manchester I think actually, Torrance. And he had a theory about sterling, about exchange rates which got rather crushed by other economists. But I worked with him and I found that quite interesting. In fact I found working with people like Dorrance and Julia Hood really much more interesting than working on my own on Egypt's sterling balances, which was a poor subject, poor choice of subject.

Was it your choice of subject or one that had been assigned to you?

It was, came out of a discussion with Professor James Mead who was the chairman of the department, the head of the department.

[44:20]
So what takes you from starting a PhD on sterling balances to leaving for a business career?

Well, one of the things was that an academic career seemed a very long-winded way to get anywhere and it seemed that to make our way in the world a bit we would have to look outside the university. I think this wasn't hard and fast decision, but we thought we ought to try that and so we started looking for jobs. I say we, because it was we and we went to various, we were interviewed by various people, we went to various things. And after a little while I was offered the job by J Lyons. In that particular case I think I followed an advertisement for jobs and got into it that way. I can't remember exactly how. Whatever it is, I was taken on in their statistics office on that cost accounting job which was, which became after a little while pretty boring because it was very repetitive. Interspersed by bright moments. The bright moments came when you had to investigate something. There was a, for some reason or another, there was an under-performance or over-performance by one of the units you were doing the cost accounting for and you were helping in the investigation. You were never the principal investigator, it was always your boss who was that, but you helped in an investigation, and some of those could be quite interesting but that happened, that was not a daily event, that happened once in a while.

What did the day-to-day job involve?

The day-to-day was posting transactions on to account records. So you got the transactional data, you posted it to accounts, you balanced those accounts and you had this horrible job of balancing the accounts, and they became part of what was called the White Paper, which was the weekly trading analysis, cost analysis of the department you were dealing with. And what our unit was responsible for then, but this was the job of the senior person, was then to explain the performance of that department as against the pre-set standards. There were several different kinds of standards which were set and you had to do it. And that was

enormous value to me afterwards in understanding what business data processing is really about, and it provided a model of a system which provided very rapid feedback to the management on what was actually happening on a day-to-day basis. And this was one of the characteristics of Lyons; they had built this infrastructure which enabled them to very rapidly look at what they were doing and how this was comparing to what they were expecting to do. So there were comparisons with standards, there were comparisons with forecasts, there was comparisons with what had happened at the same time in the previous period. All sorts of comparisons.

Did you think about this as a useful learning exercise at the time or is it something that occurred to you later?

This is something at the time a limited learning experience, but not that great. No, that came much later when one started analysing what one was doing, much more being reflective later.

It's interesting you described it as a system. Well I'm just wondering, are you thinking in that system mould now or does it come later on in your career?

I think in Lyons there was always a degree of systems thinking, they had already had the systems research department, the systems department. What other companies called O & M, they called systems. Later on, they followed the rest of the world and turned their systems department into an O & M department. They renamed it.

O & M?

But in the 1930s already they talked about systems. And so there was, one was taught this kind of systemic view of business processes. They were there for a purpose which one can analyse and understand. They weren't just traditions, as in many places they were simply traditions, that's how we do it and that's how we've always done it. There was some questioning about it. That was I think an extremely valuable Lyons lesson which one became really conscious of only subsequently in a reflective way, but which at the time was nevertheless imbued in one, it became one's way of thinking. And that made it particularly intolerable when the people around you were not thinking that way. They were doing it, well that's the rulebook, that's the route we follow and let's spin it out to last a week.

Is this what was typical practice?

It was absolutely typical, absolutely typical. This is our work for the week, let's make sure we do it in a week and not in less time, when in fact the amount of work you had to do was far less than a week's work.

So this is the people in the stats office at this time in Lyons?

Yes. And subsequently I found that in most other places. People manage their work to fill the time and they try to do it to allow themselves, to give themselves the flexibility of being able to cope perhaps when pressures arise, when pressures arise for one reason or another. And pressures do arise from time to time, either because a larger number of transactions or because something has interfered with the process, such as a big, somebody's made a big mistake and one's got to go and do a lot of corrections. I say that, having made one such big mistake myself.

When was the big mistake?

Well, it was just a mis-posting of the transaction, of quite a big transaction which led to a discrepancy and a major investigation of why this discrepancy occurred, what gave rise to it and was this a business failure or was this a failure in the system. It was a failure in the system, as exemplified by myself.

And this is when you were still working in the stats office?

Yes.

[52:25]
Who were your colleagues there?

My colleagues there, there was the head of that group, a man called Kirby, Alex Kirby, who was an up-and-coming star, later became quite a senior person, and there were the clerks who did the job, who did the daily job. He sat at the front facing us and we did the work and he'd

call us up from time to time to do special investigations or special things, and he would be in direct contact with the director who led that… whose department this was. Usually a member of the Lyons [should be Salmon, not Lyons] or Gluckstein family. So he'd be in direct contact. So there was no intermediate levels. This again was one of the smart things about Lyons, that there was direct contact between the person who was in charge of doing the job and the directors who made the policies. And he would act on their behalf to make all sorts of enquiries and we would then help to make those enquiries, what would happen with so and so. Supposing we changed the mix, what would happen, and we'd do some of the calculations. That would be some of the more interesting work, but by and large it was just the routine. We had to complete the posting of the transactions, doing the balancing, then making sure that everything balances. And one learnt that way that balancing things, one's got to understand what these controls actually mean, that the errors might be due to all sorts of things including failures in the control themselves. And when I went later to start teaching the subject, I found that very few people had any idea about that. They said oh well, one balances one's accounts. But nobody had any idea that the nitty-gritty of that actually contained all sorts of interesting material.

Could you describe this, the room you were actually doing this in?

Yes. It was a large open room divided into sections. So there was a desk at the front with a person sitting, the boss sitting with his back to the window and he'd have perhaps three rows of desks stretching back perhaps three, so perhaps twenty people working for him. And there was one section and this would be provincial bakeries and laboratories, which was our section, and the next section was kitchens, with again somebody sitting in front there, and then the next section would be some other department, bakeries perhaps.

Did you have any equipment to help you or were you doing all this by hand?

You had adding machines, calculators and as I said last time, many of the clerks there felt that to use such machines was beneath their dignity and denied their capabilities. Their capabilities included adding up a row of numbers just like that, going… doing it, which I couldn't do. And they would have… and they actually despised one if one used an adding machine to do that, even though I suspect the adding machine made fewer mistakes than they did, I can't tell now.

So you were working in the statistics office using these mechanical calculators.

Yes.

Do you remember hearing about the fact that Lyons were designing an electronic calculator or a computer?

Nothing at all, not a glimmer of that until I actually did hear about it. For most of the time I was there I didn't know about that. Neither did my colleagues so I suspect the more senior people like Kirby did know something about it, but they weren't talking about it. Why, I don't know. Maybe it was just until something happens, we don't want to talk about it.

[57:37]
Had you heard anything about computers more widely by this point?

No, no. The only time I'd come across computers, but in a very different way, is the Phillips machine at LSE, which of course was an analogue computer, though I wouldn't have been able to describe it that way at that time. I don't know whether you know the Phillips machine? I think we talked, did we talk about the…

I don't think we talked about it on tape actually.

Phillips machine?

Yes.

The Phillips machine was a model of the economy which worked on the basis of tanks of water and valves which you could set, on which you could set interest rates and discount factors and so on and it would change the flow of water where the water represents money. And so you could see what happened with the economy if you changed interest rates or if you changed this sort of thing, production or whatever. A very clever device which could be used, which was intended primarily for teaching but in fact could be used much more widely for research. It was invented by an LSE lecturer called Bill Phillips. Bill Phillips is a fascinating

character in his own right. He's a New Zealander, an engineer by trade, started as an engineer, but felt he wanted to do social sciences. He was captured by the Japanese in the Second World War and he was on the Long March, the horrible experience there, but I think escaped or whatever, came back to New Zealand then came to the LSE as a student and wanted to do sociology. And he got a relatively poor degree in sociology but was recognised to be really a rather brilliant mathematician and seemed to understand economics, and so he switched to economics and then was taken on to the staff and he devised the Phillips machine, which became world famous, and he himself became very eminent economist indeed, econometrician indeed. So the Phillips machine is something we… Bill Phillips was quite a friend of ours, so we got to know quite a lot about the Phillips machine and saw it in operation, and so on. So that was a computer, this was an analogue computer but I wouldn't have recognised it as such at that time, it was simply the Phillips machine.

Can you describe the Phillips machine to me?

Yes. As I say, it consisted of tanks of coloured liquid which represented different stocks of money in the bank, in the Exchequer and so on, and it showed the flow of money as you changed various variables, economic variables. If you increased taxation it would squeeze this tank and do something to that tank. And so you'd see the way the balance in the economy changed as you changed interest rates or… taxation or consumption. It modelled the economy by means of recognising that there are stocks and there are flows. Stocks, and the stocks, the flow, as things changed the flows changed which altered the stocks. So it was an extremely good model on Keynesian terms of the economy.

Is this something you used yourself?

No, no, no. I only saw it demonstrated and it helped me to understand economics, and even now I think of that model rather… I find some of the stuff which is being talked about at the moment in terms of budget restriction, with the cuts and so on, total hundred per cent ignorant economics, it just doesn't understand it. What matters is not this or that, but the aggregates. It's the amount of demand which determines what happens. So if you start cutting as you're going to do, you're inevitably going to reduce the total volume of demand. Now you might want to do that if your resources are being stretched, but our resources are under-employed. So when your resources are under-employed you gain nothing by cutting. It's just… argh!

[laughs] Just seems to me total nonsense. I mean I would put a dunce's cap on George Osborne. But any understanding of use of Phillips machine would have demonstrated this very quickly.

It sounds like a very visual, vivid representation of what's going on.

Yes, it is a very visual one, it is a very visual one. But underlying it is of course a particular model, which is a Keynesian model. And in the Keynesian model, it deals with aggregates, which for example the current thinking which distinguishes greatly between private spending and public spending, that's not the important point, what matters is the total aggregate spending. Whether it comes from this side or that side is not the important point. Anyway, that's my quarrel with the current economics.

So you've described the Phillips machine, I'm just wondering if you can describe to me what happens when you actually perform a calculation with it.

What you see then is that the tank which holds let's say, the bank's money, depletes and the tank which holds something else goes up. So you see how different sectors of the economy behave when you change some of the variables. And it also shows you the, again, the aggregate thing is whether the whole economy is collapsing or whether the whole economy is expanding, or whether it's in a steady state. So it shows you the way these aggregates move around. [1:05:15] There is quite a good description of it in a booklet – I've got the reference for it somewhere – if you're interested I can give you that. As it happens, that booklet – can't remember what's the name of it. Political… it's a PEP booklet. PEP were the Political and Economic [Planning] something, describes three things: it describes the Phillips machine, it describes the LEO computer and it describes something else, I've forgotten what the third thing is.

As examples of computers in an economic sense then?

No, as things which were relevant at that time, which were new at that time, interesting things. Interesting developments in the field of economics. So that's… And as it happens I know the person who wrote it quite well, though I didn't know at the time that he'd written that.

Who's this?

A man called Tivey from Birmingham, who was at LSE and then went to Birmingham University, became quite a… who died quite… no, whose wife died quite recently. She was a research assistant of ours. Marjorie Tivey. But he became quite a well known and eminent economic historian. Tivey, Tivey.

What was his first name?

I know it so well but I can't think of it at the moment. Len! Len Tivey.

[1:06:57]
Could we talk a little bit about Bill Phillips – did you know him in the forties at the LSE?

We knew him socially a little bit. I think he was my wife Ailsa's first tutor. But we knew his wife and we knew them socially so we had… they weren't friends, but quite well known acquaintances, Bill Phillips. Then he went to, left LSE to go back to Australasia, to Australia, became an economist professor at the Australian National University and I think finally returned to New Zealand. But as I say, he was an interesting person because he'd done… He was the most modest of persons, he had no side at all, nothing like that. Why are all these people making all this fuss about me, kind of thing, person. Yet he'd done a tremendous escape from… he'd done an escape from the Japanese, one of the great adventure stories, and found his way back somehow.

Did he talk about this at the time?

No, not very much, but you heard about that afterwards, I think somebody wrote a biography about him. We knew that he'd been through things but he didn't talk about it himself.

What sort of chap was he to know?

He was a small, modest, nice guy, as I say, with no particular side on him and no arrogance about what he'd done. He had used his engineering skills with his economics knowledge and he'd given up on the sociology which he didn't do very well. And therein lies something else, the discontinuity between economics and sociology.

Two completely different sorts of subjects.

Two different subjects in which there is very little, economists have very limited range of views about the human condition, about humanity, about how humans behave. They work on the basis primarily of the rational man, but economic behaviour is based on rational thought and they give very little credence to what comes from the sociological side about variability in the human condition characteristics and that rationality plays a very small part in behaviour.

[1:10:17]
I'm wondering, you're trained as an economist at the LSE but you've also got these other interests: the history, the anthropology we've talked about.

Yes, yes.

Are you in this narrow economics mindset do you think?

No, absolutely not. Absolutely not. And this applies to the other as well, we've both of us given up on economics or on the economic models of the traditional economists completely. And we gave up a long time ago on them, as them having a total failure, almost a deliberate failure to understand what actually goes on, what humans, how humans behave and that the rational, the models of rationality simply don't hold. There are a few economists who've said that again and again and again, but they're not listened to. And more and more the elegance of the mathematical model overrides the reality of the world as we know it.

Did you have these concerns with conventional economics early on in your career?

Sorry?

Did you have these concerns with conventional economics early on in your career?

I think the answer's yes. There was at one particular point as undergraduates we had to make a presentation, that's the two of us, and we chose to make one on the work of an obscure Romanian economist who had ideas counter to those prevailing and we tried to… we thought that actually it looked rather interesting. We tried to present that, but total failure, this was not regarded as acceptable.

On what grounds?

That it denied… that went counter to the model which was the accepted model, that's all I can say. Now, was this due to our incompetence in presenting it or the fact that we had actually misunderstood the real situation, or was this the obstinacy of a professional cadre of economists who excluded our views. History of science is full of this. My guess is that all these things worked together – we weren't terribly competent at presenting it, those views of that economist were probably flawed.

Who was the economist – do you remember?

I've forgotten his name, it was a Romanian economist, obscure Romanian economist. Maybe he's come back into the reckoning, I've no idea. But we had discovered what he had said and thought that made sense to us in terms of what we could see the economy was actually doing. But as I said, the model, it denied the dominant model. It denied that the dominant model was appropriate. We were talking about, oh yes, I remember now. We were saying this was the free trade argument and we were arguing that protection could in fact be a better solution under certain circumstances than free trade and that in fact the argument for free trade always is that the, if you look over the whole of the situation, not just for an individual country, then free trade gives you a better total yield and this guy showed that no, under protection you can actually get, can be better all round yield. Now that's totally counter the prevailing argument, but we put that argument and clearly it wasn't accepted and didn't work. But what I'm trying to say is, we were already sceptical of some of the dominant economic thinking at that time.

[1:15:29]
To return to the computing part of this for a moment.

Right, yes.

I was wondering when you were having this sort of limited contact with the Phillips machine you actually learnt about LEO?

I don't think I connected the two because LEO worked in a totally different environment, it had totally different functions, it tried to do totally different things and of course was digital. But it wasn't the digitality of it, it was what it was there for. Here was one thing to model the economy, here was the other thing to actually work with business processes and try to make those business processes more effective. And the two didn't relate to each other.

[1:16:30]
When did you first learn that LEO existed?

I guess it was when the notice went round that people were invited to come on to this course. It wasn't a free choice because it was only people who – you may have wanted to come but you had to be selected. It's only selected people who actually went on that course, though the invitation went out originally to everybody. So the senior people selected those they thought might be appropriate for it and clearly I had made sufficient impact to say I might be one of those people. I wasn't aware that I'd made such, that kind of impact, but clearly I was selected. It wasn't somebody trying to get rid of me simply, which is another alternative view.

Do you remember what the notice actually offered? Do you remember what the wording on the notice was at all?

No, I don't remember that it all. I wish I did, but I can't remember it at all. But there might… I don't know whether there's anything in the book about it. There might be in the *LEO Chronicle* – you've come across the *LEO Chronicle*?

Is this the LEO newsletter?

No, it's more a diary of LEO events, the *LEO Chronicle*. I think a copy of the *LEO Chronicle* is at the Manchester Library and that's where one ought to look to find out about that sort of

thing. Again, ask Mary, because she was in exactly the same position as I was. I didn't know Mary at the time, but she was – what was she doing? I've forgotten what she was doing.

Ice-cream sales possibly.

Ah, probably yes, she was in a different section, in the ice-cream section. I was provincial bakeries, yes, yes. And my brother when he came went into a different office altogether, called the catering office, but which was fulfilling exactly the same function for the teashops. So his job was in fact very similar to mine when he first came there.

[1:19:14]
I think we should probably think about wrapping up for tonight in a minute, but I just had one or two questions I wanted to drop in quickly. I was wondering why you went to work for Lyons in particular? Was there anything about the company that attracted you?

No. As I said earlier, we tried quite a number of places. I know one of the places we were interviewed for was the Burton tailoring things, another one was Marks and Spencer. We probably tended to go to people which had Jewish, Jews at the head of their company as being likely to be slightly more sympathetic. This was certainly true of Lyons and Marks and Spencer, but we tried other companies as well. I can't remember all of them, but they tended to be in the retail field, they tended to be in the… why I don't know, rather than the manufacturing field. Can't now think back of why, but we may have tried manufacturing companies but simply had no luck. At the time, getting jobs was not that difficult, but our special position in a sense as not quite British, although we were British by that time, possibly made a difference. I don't know. Anyway, Lyons was simply one of a hatful of companies we tried for and it happened to be the first one to offer us a job, but it could have been at that time any company. We were very conscious of the fact that wherever you started was not necessarily where you were going to finish, but you had to start somewhere.

Other question was just a quick clarification. I was wondering what O & M stood for?

Organisation and methods. Yes, that was the name given to the offices. In many companies in the UK, organisation and methods was despised as a [the part of a] company which ordered the office furniture. In one or two companies it really, like Lyons, it really was concerned

with organisation and methods. But in many, it was the department which looked after furnishings and providing furniture for the offices and the shape of the office and things like that.

Shall we call it a night?

So, things certainly like are we going to have an open office or closed office would be the kind of thing an O & M department would look at, rather than at business processes.

Just sort of furniture, how you lay out a business.

A little bit more in the sense, as I say, should we have an open office plan or should we have people segregated into separate cells.

Not necessarily with the same systems approach behind it that Lyons had.

Yes, yes.

I think that seems a good point to stop for the evening.

Alright, good.

[end of track 5]

[Track 6]

So after seeing this notice for LEO, what happened next?

Whether it was a notice or whether somebody actually came and said would you like to, I don't know, I think it was a notice, but I'm not sure of an accurate thing. Mary might tell you. But it was one week, what was called an appreciation course, but it was in fact an aptitude test and it was, as far as I was concerned, a pretty tough course. We learnt in a very quick, short time some of the elementary things one had to do to program, one had to learn about the binary system and so on and we were given exercises and during the day I was often quite baffled what was going on, but by the time I'd worked it out, in particular talking about it with Ailsa in the evening, we both learnt more or less at the same time and I clearly did sufficiently well in all this to be selected to join the LEO team, not immediately, but a little while later. And the only other person from that course who was selected was Mary. I think we were on the same course, I'm almost certain we were on the same course, and she was selected and joined LEO team, I think just a few weeks before I did, and then I joined. The lectures themselves were given by the small group of people who were in the LEO team then and I particularly remember Derrick Hemy. Derrick Hemy was the principal programmer and he turned out to be a brilliant programmer. He was an ex-Lyons employee who had worked in the war I think in some technical, I'm not sure whether it was radar or not, but in some technical area, and had joined the LEO team, I think if not the earliest on the programming side, very, very soon after that. And the other eminent person, so to speak, apart from David Caminer, was Leo Fantl. Leo Fantl was a self-taught mathematician, he was another refugee from Czechoslovakia and he turned out to be… his speciality, one of his specialities was analysing what was accurate computing. And this was extremely important, so he could see numerical methods, he could use numerical methods and he could analyse it and he could see how errors were propagated. This of course was terribly important. I suppose numerical analysts knew about it, but the world at large didn't. So he became a very important part of the LEO team. And the third person was John Grover. John Grover was also I think a Lyons employee, far less brilliant than either Hemy or Fantl, but really the steadying force; reliable, totally reliable and steady and a good teacher, whereas Hemy was a poor teacher. I worked with Hemy a little bit later and it was a struggle, although in the end his brilliance told. He was one of those outstanding programmers. Like David Wheeler at Cambridge in a sense. I mention Wheeler in particular because Wheeler invented, invented I suppose the… he wrote

the first bootstrapping routines, the initial orders and Hemy did the same for LEO. One of my first, earliest jobs was to make some amendments to these initial orders and working with Derrick Hemy's code and that code was so intricate because you had a tiny space, you had to do everything within about thirty instructions, so each instruction formed the next instruction and you went round the cycle forming and reforming the instructions to do it. And so what you saw on a sheet of paper was simply a set of brackets in which the instructions were formed and following that, I found very difficult.

[05:37]
How much actual programming did the course teach you? Was it just sort of an aptitude test?

That appreciation course taught you the rudiments of what programming was. You had to do little exercises, but that wasn't real programming, it was really very, very primitive and we used I think an assembly language. The notion that some people have that you're programming in binary, in some of the early computers that was true, but it was certainly not true on EDSAC where they'd already invented a… one calls it a primitive assembly code but in fact it was quite sophisticated. It was really very sophisticated in terms of its ability. You still had to, when you were doing real time debugging, because we did at that time a certain amount of debugging in real time, then you only had to see the instructions on your oscilloscope, in binary of course. So you had to read the instructions in binary, but we never wrote them in binary. So we always wrote them in the assembly code. And the assembly code, as I say, was quite sophisticated. It had relative addressing, so you never used absolute addressing. That meant you could use the store much more cleverly and so on. It had a symbolic code. In our case the symbolic code was numerical rather than as in most other assembly codes, an acronym. So you'd use AD for add or something like that. In LEO the add instruction was, the symbol was number twenty-eight, I happen to remember. And it had macro instructions so that you could use instructions which were actually not in the… hardwired into the computer, they were manufactured instructions. And of course you had subroutine facilities, again coming from David Wheeler who invented the closed subroutine.

Sounds quite a comprehensive set of programming tools you had.

It's quite a comprehensive… and subsequently we found that some of the other companies hadn't developed nearly as far. But this is partly due to the influence of Cambridge and Wilkes. Wilkes always wanted to ensure that he had a practical machine which people could use, whereas the Manchester idea was much more to demonstrate that it was possible to do a stored program computer, use a stored program computer, to use the von Neumann model. But Wilkes, Maurice Wilkes wanted to make sure, I have something which can be used round the university by the technicians and scientists and so on and therefore I have to make it. And he imbued that in his whole team. And so it was a different, the Cambridge team and the Manchester team were really quite different in their nature.

Did you see much of the Cambridge computer team when you started?

No. No, no. Hardly aware of them. That one learnt about later as one got more involved in it. At the time there was very little talk about that, though particularly amongst the engineers, it was much more important to know about Cambridge, because people were sent to Cambridge to learn about computers. [10:00] And one of our chief engineers, a man called Lenaerts who had been a clerk in Lyons before the war, had worked in radar in the air force, was then picked out to join the LEO team and was sent to Cambridge as our help in getting the EDSAC working. In fact, how much he actually produced there rather than learnt, I don't know. I think he was useful.

How much did hardware come into the course that you went on, if at all?

I think one can say it was virtual, we didn't actually work on the hardware at all. We saw the computer, we were shown it, but we didn't really work on the hardware, we never produced any programs which actually worked, they were just exercises. And the intention was not to make us into programmers at that point, the intention was to test whether we have the understanding and the ability to work with it. Very different things. Subsequently when I joined the LEO team, then obviously the direction shifted towards actually working with a machine and being able to debug on the machine to do this real time debugging on the oscilloscope. Took a little bit of getting used to, but of course many people have done it.

So you actually saw the computer when you went along to this course?

We were taken to the computer. I'm almost certain that is so. One's memories in a sense concatenated between that time and a little bit later, but I think, I'm almost certain we must have been shown the computer. I certainly talked to Ailsa about having seen the computer.

[12:09]
Could you describe what it looked like to me please?

There were large racks of circuit boards… which had sliding in and out components. Sorry, each, the circuits were divided into racks, the racks slid in and out so the computer from the earliest days onwards was modular, so that you could take out a unit and replace it by another unit. It occupied a fairly large amount of space. The other thing one remembers was the mercury tubes which were under the floor and were quite long for the LEO I, they were shortened by the time it came to LEO II, but I think they were sixteen feet long. Certainly quite long. You know how it works, the acoustic…

When we encounter anything, it's always best to explain it, not necessarily for me, but for future listeners.

Yes, yes. The acoustic… they were, the storage comprised mercury delay lines. What happened is that the input to them had a quartz crystal which converted the electric signal into a sonic signal, which travelled along the mercury at a much slower rate than obviously the electric circuits, hit a crystal at the other end and was converted back into electricity. And so the, what was stored went round and round in the mercury delay line. The arithmetic circuits also had registers which were – there were a variety of registers – most of them I think were also delay lines. Don't remember whether they were mercury or not. You had to slow the thing down to be able to actually operate the arithmetic circuits, they were very short little delay lines so they were very, very much faster than the main storage. Most of the early computers used delay lines, but the Manchester computer used drums – sorry, used cathode ray tubes, used cathode ray tubes, a Williams tube. Most of what I know about that machine I suspect I picked up, I remember from much later rather than from that particular time. I'm simply not quite certain about that, I must have known quite a lot. I must have known quite a lot of detail, but I can't now say at which point I picked up things. Just talking about it now, I'm beginning to visualise knowing about it, knowing a great deal more than I thought until five minutes ago I knew. Tricky thing, memory.

[16:23]
What did the machine actually look like from the outside?

From the outside? As I say, it was lines of racks, steel racks with the units in them which, pull in units, masses of wiring behind the racks, that of course was one of the most vivid things one remembers, is the seemingly intricate wiring which went on behind and how anybody could find their way through this, but in fact it was probably much simpler than it looked. It was certainly much clearer to the engineers who were working with it. It had a control desk, at the front was a control desk with oscilloscope, oscilloscope displays, so you could see what was going on and you could sit there and single step your way through the program. It had a teleprinter which would print a log, so you had a constant log which was part of the initial, which was part of the software. At that point the operating system was relatively small, but it already had quite a few functions and one of them was printing the log. [18:13] One of the most important logs, log entries was 'past point of previous stoppage'. So the system broke down fairly frequently and one of the earliest things we learnt and did was to have, to ensure that if the system broke you could always start off from the point at which you broke down or as close to that point as possible. So whatever you did, a copy was always made available so that you could start up again from that, and I think we were one of the earliest people to do that. On the whole the mathematicians weren't so bothered about that, but for the kind of very time critical work which we knew was time critical, we knew we had to do that and became increasingly valuable that one could do it. As the reliability of the computer increased, it became less necessary, but we kept that, we always had that, the possibility to restart and never having to lose more than *x* minutes of work. So we, copies were taken at regular intervals. So I think you could, you would never lose more than… I think the maximum one could lose was twenty minutes, but for many things it was less than that.

Do you remember your first proper day working on the computer?

Sorry?

[20:02]
Do you remember what your first day was like?

Not at all. Not at all. Probably from what I do remember, more concerned with the people who were there and getting to know them, than the machines. Certainly in those very early days most of the time and the first time was spent in training, seeing how programming worked, going through other people's programs, being shown how that program worked and how to do things. Showing how the tricks one had learnt formally and so on were actually used in practice. I think this was an important thing. One of the lessons we learnt immediately, instantly, is that you could not go on the machine without having your program, what you'd written down, checked. And that discipline of checking every program before it went on to the computer lasted throughout my days at LEO, became much less important at the time when the balance shifted between the valuable things being human time, as against machine time. But at that time, the valuable thing was machine time, so if you could save a minute by spotting an error beforehand. And it was also a very good discipline. It was a good discipline for the programmer who knew somebody else was going to check it, it was good… if you get the computer to check it you don't have to own up that you've made a mistake, but if somebody else checks it you know immediately, so it was an important disciplinary and control function and it was an enormously important learning function for both parties – the programmer and the checker. The checker effectively learned to program by checking other people's programs and that's how we did a great deal of our learning in the early part of the early days. And the particular person I learnt most from was Derrick Hemy and his very, very clever programming.

Could you give me an example of how it was clever programming?

It's in a sense the fact that every instruction was constructed by another set of instructions. So I can't think of examples. I mean every routine worked like that, every loop worked like that so that the loop had its own counter and that counter was an address to a location in the store, and so on, so every instruction was not a fixed instruction, it was a variable instruction. That's commonplace. But it is the sheer intricacy of Hemy's programming which was instructed, what one could achieve with the power of this, the way we could use instructions to form instructions and the way we could use constants and variables in the… to build up the instructions. The kind of programming which largely went out when stores became… largely you could have exploded routines. But at that time exploded routines were unusual, they were so tight. [24:23] We had to balance two things. On the one hand we had to optimise the use

of storage, but at the same time you had to ensure that the timing of the loop was within the permitted time for the input and output channels to be fully occupied, but never having to… they shouldn't have to wait too long, but you were never allowed to exceed the cycle of reading punched cards or paper tape, or whatever it is. So we had to have a kind of precision about your programming in terms of these two things and they were often in conflict with each other.

What were the input and output channels at this time?

The machine had paper tape input, punched card input, manual input through the keys, which was used when you were debugging on the machine, real time debugging. And output it had punched card output, paper tape output and the printer. Two kinds of printer: there was the teleprinter, which was used for the log and things like that, and the line printer which was used for producing whatever you were producing – invoices, payslips and so on. The operating speeds were a hundred cards per minute output, 200 cards per minute input I think, if I remember rightly. The other thing about the… we used the punched cards not in the traditional punched card where each column represents one digit, but they were punched in binary in rows. So you read the card across rather than up and down and of course, being punched in binary, it had much more information. And each card also had a check sum of the contents of the binary digits. So one of the processes which you had to do when you read a card is check, create the control total and also then when it's read again, check that the card is accurate. We made a great, an enormous amount – again, this came in very early lessons – the importance of timing, the importance of accuracy, the importance of restarts. These were the kind of disciplines which we learnt and which were insisted on.

Who insisted on them?

David Caminer was the prime source of that kind of notion and the insistence on maintaining these standards, always maintaining these standards, never going on the machine until your program had been checked, always having a control total, letting nothing, leaving nothing to chance. And of course one learnt that control totals are, the error can be in the control total as well as in the other in the things. So one learnt a lot about building systems which were secure.

With all this great attention to detail before you actually start inputting things, did you still have errors coming up?

An enormous amount of attention. There were several kinds of checks. Again, anything which came in had to be checked. If there was a deterministic check, one used it, ie that it had to be, something had to be within a certain value. If they weren't you'd use probabilistic checks. It ought to be in this range, it doesn't have to be in that range but it ought to be, and send warning signals if it's not in that range. But the discipline on checking and ensuring that everything was plausible was really finely honed and there was… it was David Caminer who was really behind this. [29:25] David Caminer himself had been a Lyons employee since the thirties and he'd risen to be – he was a management trainee I think – he had risen to be the manager of the systems research office before he joined LEO, before he became part of LEO. He was in many ways an outstanding person. Sometimes very difficult to live with, a fierce temper. He was a stickler for perfection, for getting things right. If you didn't, he could be absolutely furious, throw his pencil at you, things like that. Partly his fierce temperament and temper were due to, I think, were due to the fact he'd lost a leg in Egypt in the war and at that time he was often in considerable pain, which I suspect had an effect. He became somewhat more gentle as time went on, but he retained some of that, he retained that spirit of getting things right, that the devil's in the detail. You've got to get it right and you have to look after that detail right up to the end. He was a hard, a very hard taskmaster, but also one who in some ways provided the leadership that one kept up the standards. And the people, most of the people who'd survived, there was a very low turnover, but I think we all hated David Caminer and appreciated him at the same time. He, as I got to know him well we became very good friends, became to appreciate him more and more, his capability. [32:18] So we had a team of people who were very, each very different from the other and coming from a great variety of disciplines. There was a person like Leo Fantl, a self-taught mathematician. There was John Aris, a classicist. Mary Blood who'd taken French, languages. Myself, an economist. So Lyons weren't looking for brilliant mathematicians, they were looking for a different kind of skill which is often in mathematicians, but not necessarily, so you can find it elsewhere. The most… the cleverest programmer in many ways, as I said, was Derrick Hemy, but the most natural programmer was John Gosden. John Gosden had been at Cambridge, had taken mathematics at Cambridge and had finished with rare distinction, he got a pass degree. There aren't many pass degrees in Cambridge mathematics, but that's because he had many outside interests. In fact he was a very good mathematician and he was

an outstanding programmer and subsequently became very much a designer, a software designer. Later on he went to America and became an adviser to the government on computing. He was one of the President's advisers on computing and became a vice-president of one of the big insurance companies responsible for all their computing, Equitable Life company. John Gosden, very easy manner, very relaxed, but coming up with clever ideas all the time. We relied a great deal on him. He was also, interestingly enough, probably the, one of the few people who read the literature on computing. I don't think I was aware of computing as an academic discipline. John Gosden was and he read, he studied it and he contributed to it in a way which few of us did. We were inward looking, to Lyons, to LEO, to the jobs we were doing, not outward looking to the computing community as a whole, and in the end that didn't do us any good because we didn't see what was coming; the American companies and their very different ways of doing things.

[35:55]
You mentioned a moment ago that the skills that Lyons were looking for, sometimes found in mathematicians but not always, I was just wondering what do you think that skillset was that they were looking for at this point?

I think above all the capability of logical thinking without necessarily knowing formal logic. If you knew formal logic that would be useful, could be a useful asset, but you didn't have… they were looking for people who had a rational thought process, a logical thought process and who had something of an analytical mind so that they could see problems and break them down and analyse them. I suppose one could say they're reductionist rather than wholist, but that I think was the kind of thing they were looking for. But having said that, but also somebody who could also see the larger picture, who weren't too limited in this reductionist mode. But, as I said again, we were very, very different. John Aris with his classics background, very different from Peter Hermon who was a mathematician, and who subsequently played a major part in British Airways computing systems, developing the Boadicea reservation system, which the claim is that it's far, far better than the derivations of the American SABRE system. I've never compared the two so I can't judge it, but certainly it became a major earner for British Airways in selling it to other companies and he became a main board director. Peter Hermon is still very much part of the LEO Foundation, he's our treasurer.

[38:21]

Could you tell me a bit more about how you all got on socially together? Early on.

Yes. Lyons as a company prided itself on having a social side to it as well, so that it had lots of clubs, it had its own sports grounds. So one of the aspects of working for Lyons was this social component of it and for the LEO people this was very important, they formed their own cricket teams and so forth. That social life became important, partly because we worked so very hard. Another attribute of David Caminer was that he didn't believe that home life was as important as work life and he insisted that work came first. So we very often had to work late into the night and through the night at that time, but there was also that social side. So we were in a sense quite clubbable: bridge and so forth. Lyons was also a very hierarchical company with facilities, different facilities for different levels of management. So there was, managers had their own lavatories, they had their own keys to their own lavatories and these weren't to be used by anybody. There were different levels of canteens for… from the board of directors to the others. The lower levels of management had their own canteen and the food, being a catering company, was pretty good. But one of the privileges of working at night is you could actually eat in the directors' dining room in the middle of the night and you'd always get something absolutely splendid. They lived on the fat of the land. This was, don't forget, at the time when rationing was only just finished, so they managed to do very well for themselves. And one of the pleasures was to be able to go, at midnight or some time like that, go and have breakfast or a meal.

[41:15]

What level were you normally entitled to go to for a canteen?

My normal… when I first started at Lyons I was below the management level. When I joined LEO I was still at that level and the important thing was to get up to the next level, which was the lowest management level, which was called F grade. Ask Mary about F grades, I think she became F grade before I became an F grade. But from that point on, you had the managerial privileges: managerial lavatories and the managerial canteens and so on. F grade and above were the gentlemen and ladies, the rest were the… So that was the important, in terms of one's career, that was an important step, getting F grade, and certainly, not getting it if you were working at LEO or it being postponed was a huge disappointment. It wasn't something which was won easily, but in the end I think we didn't take that long to get there.

You mentioned that you had to work overnight an awful lot at this time?

Yes.

What was a typical working day like?

Typical working day… you did… you got in, you did your job which was writing programs, was checking other people's programs. A lot of discussion with other people on what you did and how you did it. I have mentioned this kind of buzz about the whole thing and we were always doing something which was new. Some people, some of the people were much more talkative about what they had done, others were much more reticent and closed, but by and large, people talked about what they were doing. So you did your own thing. [43:45] We were working in an open office in groups with the senior people having offices but open door offices – I think it was always open door offices. There were, in the early days, the more frightening people like David Caminer, and I haven't mentioned TR Thompson – TR Thompson – TRT – was really the father of LEO, he's the one who had gone to America, had come back with the report on LEO. TR Thompson's history was he had taken a… he had also been a wrangler at Cambridge in mathematics, had gone into, joined a business company, department store I think in, somewhere in the Midlands or the north Midlands, and was recruited by Lyons, if I remember rightly, in the late twenties and quickly became a senior person in the administration working under Simmons. Simmons who, if anybody was the intellectual, provided the intellectual capital of the company J Lyons, it was JR Simmons. He was the person who transformed business processes, who looked at business processes analytically, transformed them and made Lyons one of the most efficient companies. So, one of the things we always said is, the jobs LEO did had to be very good indeed if they were going to make any advance on what was already being done. And when we looked at other companies in the UK it simply wasn't so, there was always fat to be trimmed. There was very little fat to be trimmed off the Lyons' jobs. But TRT was in many ways eccentric and he was… he could be frightening, partly because he was so very, very quick on the uptake, he understood things instantly, but also in a naïve way. He thought that we were all like that and if he understood something, he thought we understood, no, let me give you an example. [46:52] One of the earliest jobs I dealt with in the 1950s, one of the most complicated ones, was to do an analysis of the Ford Motor Company production system, their production control

system, and that was quite a difficult system to understand for somebody who came from a different area. Nevertheless, I produced a block diagram showing how the system worked, and I showed this to Thompson and he said oh, that's fine, you now understand how the Ford Motor Company works. Of course I didn't, I had some rough ideas about it, but far from understanding it or knowing how to cope with it, what to do with it, how to improve it. But he would assume, yes, that block diagram, that explains everything there is to explain. So at one level he had a huge amount of penetration and understanding, somebody said he was the quickest mind he'd ever seen, I think it was Peter Bird said that. But at the same time there was this naivety that… So he thought, Thompson thought that there was no problem for which there was no solution and one could get to the solution fairly quickly. And of course I don't think he knew about complexity theory and the uncertainties. There was always too much certainty in his life and it would be interesting to have a biography of him because he was instrumental in the formation of LEO, he led LEO, he was the head of LEO team. But he failed to see things because he thought that everything was soluble in an utterly straightforward way.

How much did you see of him on a regular basis?

Not a great deal, not that much of Thompson. But we were a small group so we did… one was always conscious. The person one didn't see a great deal of was Simmons. Thompson yes, he was with us, it was a small team. David Caminer, all the time. One came across David, one could come across David and work for David all the time. As we grew we were divided into teams and the distance became perhaps more remote, but in the early days there was very little distance between us and that played an important part in our education, in our understanding what was going on. And so we I think very quickly got quite a deep understanding, although we weren't conscious of having that deep understanding, of business systems. And it wasn't until later one discovered that in many places that understanding of the business system didn't exist. As I mentioned earlier, even at very senior levels the actual business process was only partly understood. And very little in systemic terms.

[50:55]
You mentioned that you talked a lot about your work with your colleagues, what exactly did you talk about? What sort of topics?

We certainly talked about the kind of job we were doing, kind of jobs we were doing and how we had tackled those, down to the level of a particular way of doing a loop, a particular way of doing it. Or somebody who said that this thing happened so frequently I've put this in a subroutine and yes, you can use that subroutine as well. So this became part of a subroutine apparatus. It was fairly intimate talk about the work we were doing. So we had quite a good knowledge of what other jobs were going on, so if I was doing tea blending I would also have a fairly good idea what was happening on the teashops job, although the teashops job was not my job at all. Again, the fact that we checked each other's work meant that one accumulated this knowledge both of technique and why it was being done. So one would discuss, you've done it in this way – why have you done it that way? And then Gosden would come up with a new particularly good, new way of ensuring things were done right. Fantl, on the question of, well if you do that, on accuracy, do these calculations where you're rounding off yield the required degree of accuracy or do you have to do something else, do you have to go to another level to get it right? And these sort of things became very, very important with some of the outside jobs like the most memorable one being the tax tables, which I was working on under Leo Fantl and the huge excitement of the actual budget day, like today, budget day, where we didn't look, we had no idea what would happen. We were sitting there waiting for the despatch from the House of Commons on what we had to do. Of course the civil servants had given us clues on what kind of things we had to accommodate in our programs, but we were never certain that the Chancellor wouldn't come out with something completely different. If it was structurally different it could affect us completely, it could scupper us. If it wasn't structurally different, if it was mainly the rates which were changing, it was easy. Producing the tax tables. But there Fantl's notions of accuracy were so important. We remembered these but in a way, an academic department would have done perhaps more naturally as part of numerical methods. But some of us weren't acquainted with numerical methods in that sort of formal way. [54:41] Again, one remembers the meetings with outsiders, that is to say, with people who were possible clients who wanted jobs done. And working with them to see what should be done. I think I mentioned last time, Nivison's – you got the name wrong – the stockbrokers. Nivison's was a small stockbroking company, but the head of it was a man who saw computers as giving him something new, that he could provide his clients with more information on yields and things like that, more quickly than his competitors and so we produced the weekly report. But working with the guy himself, I think it was Nivison himself, was interesting. We worked with Attwood Statistics in producing statistical tables. It was an immensely interesting life because one was constantly meeting new challenges and

new ideas and different things one got to do. One worked with a huge range of different things and as one got more experience, one was able to contribute more to, well, let's see if he can do it this way, or wouldn't this kind of thing be better for your clients. In that way one got more and more intimately involved, but also constructively involved. And in those early days that's how we saw our role, as making things better. When… the world changed when IBM and the mass producers came in and our customers, instead of wanting to… they weren't interested in our ideas, they were interested in buying the best computer for what they took to be their job. Instead of looking at jobs, one looked much more at benchmarks and we weren't interested in benchmarks so much. Of course we did it. We were interested in looking at the customer's problem, understanding it, understanding their system, see how we could improve it. But they weren't interested in that, they wanted to compare computer *x* against computer *y* by looking at benchmarks. Now I think I need to break off for a few minutes, if that's alright. How are we going on your timing?

[end of track 6]

[Track 7]

I was wondering if you could talk me through the process by which you actually program the computer to do something.

[laughs] Starting where?

This is my next question actually – where would a job start?

Right. The job would start with… first of all there are several levels: the top level, the highest level is at which it's simply a concept by a managerial team that here is an area which could be… which needs attention or which could benefit from attention, possibly through the computer. Now the ideas often came from what had been the systems research office, which kept an eye on all the business processes, or it might have come from an individual manager from a department or a unit. It would then be discussed at the highest level at which that point in my career I was never involved in the highest level, that was the level of the directors and managers, and whether this should be put forward. It would probably be then handed to somebody like TR Thompson or David Caminer for a first appreciation of does it look like something which is worth doing. In the earliest tasks most of the detailed analysis would have been done by Caminer himself, so the quite well known teashop job is almost entirely based on the analysis of the teashop business processes by David Caminer and his typically meticulous working through of how the teashop system, the teashop manageresses actually determined what they wanted to order and seeing that there was a pattern to that and that pattern could be captured by the computer and make the whole ordering process that much more efficient. Later on as the team grew and as more jobs grew, we became ourselves involved in these kind of things, the word would come down that we should look at this. For outside customers, it's often the outside customer who would initiate it and we would then do an analysis of the system. What were they actually doing, where could improvements be made, where were there weaknesses in the system, partly from discussing it with the people who brought you the thing, partly from talking to other people around there and with different companies this worked in different ways, in different departments it worked in different ways. Sometimes there was a, almost a professional look at this by something like a systems research office. At other times it would be an individual idea and somebody would come to you and say let's have a look at this together. [03:56] Looking at a particular job, for

example, I worked for quite a time with the stockbroking company, Durlacher's, and one of their partners of Durlacher's, a man called John Bennett, had the idea that one might use computers and I worked very closely with John Bennett in finding out how the stock market worked and how the stockbrokers operated and where there were improvements which might be made, what was it they were actually looking for. And as a result of that was able to outline a plan for them on what might be done, again working very closely with John Bennett. And on the basis of that, subsequently Durlacher's bought a computer and we did the job. So that's at the higher level when one is outlining a plan. At the more detailed level, when it was decided to do something, for example, the tea blending job which I was very closely involved with, the most senior people had already produced an outline specification of what one might do. From then on it was a question of finding out in detail how the business process worked, looking at ways in which that might be streamlined through the use of a computer, which mainly meant taking things which had been operating, or business processes which had been operating in a kind of silo and seeing whether one could provide something which was more integrated. We were looking for combining things, that data had to be entered a single time and all the processes which stem from that data could be done on the computer, whereas in the traditional system, the data had to be entered into this silo and then into that silo and then into that silo, so one might be keeping stock records, one might be doing costing, one might be providing information for buyers, and so on. Trying to see whether we can integrate those into a single thing with the principle, use the data once, once you've got the data, bleed it dry. Or as John Aris says, 'sweat the data', make it work. And the process then was to almost start basically, what records do we have to keep to be able to do all the tasks which have to be made, design something like it, of the database. At first we didn't use database technology, later on one used database technology, relational structure of the database and all that. One invented one's databases as one went along to start with rather than using prescribed forms of data structures. [07:34] But as soon as possible one broke the things down into block diagrams and flow charts and we would not start programming until we had a fairly clear picture of how all the blocks worked together, how the data was used in its various forms and then start structuring this into a set of routines and systems, always recognising that we had limited amount of storage and that therefore this had to be broken down not into one job which did everything, but a number of jobs which one took off from the other into chunks which were manageable. As few as possible because one didn't want to re-enter anything. There was a cost involved and also risk involved. Every transfer of data involved a risk that something was going to go wrong with that data and therefore one always had to maintain a

reconciliation between the first, the way the data first entered and the way it was developed through the system and therefore can always work backwards from the result to that data, that was always reversible. That way one ensured that the system was working. So these were the kind of principles one used in breaking the job down, that one should be able to do that, break it down into manageable chunks, flowchart these into detail and then start coding. And over a period this would be revised again and again, it was an intricate process of doing it and then seeing whether one… this doesn't quite work, do it slightly differently or do it in a better way. Or listening to somebody saying, well why don't you do it this way. Then assigning, as one got more senior to lead a team, assigning work to the individual people going with them very carefully through what is all this about so that they understand not just that little bit they're doing, but they understand how this fits into the complete integrated system. Integration was… it's not something which came with the latest ERM software, integration was something which we thought of from the beginning and I think this was one of the LEO features that they wanted to do that. Now, when we worked for other people, for clients, they often wanted to keep the jobs in their silos. So we had to try to persuade them that the benefits would only come if you can actually integrate it. [11:00] One of the things I discovered quite early was what later became to be known as the synchronisation problem – do you know the synchronisation problem? There is often a theory going around that if you try to do a hundred per cent of a task you'll never finish it, and there's something in that. And they talk about the Pareto thing. You do eighty per cent which – eighty per cent of the thing – and that's all you need to do, the twenty per cent will look after themselves. But there is a synchronisation effect. The moment you leave anything out of the system, you have to have different kinds of interventions to deal with those twenty per cent or ten per cent which are outside the system and unless they are synchronised with the eighty per cent which is being done, you're going to get delays in the system and errors in the system and one of the reasons why many systems fail to deliver is because of a synchronisation effect. For example, if you are doing something which involves maintaining a database of stock records and you deal with most of the transactions but not all the transactions, every transaction which you don't deal with which is dealt with on a different timescale through an intervention – manually or through some other system – will make sure that some stock records are not at the same level of up-to-dateness as others and in some cases they will actually go wrong. Classic example of things going wrong in that way is the Ford Motor Company where the maintenance engineers had access to the spare parts store and took, where they had to do a particular maintenance job and required bits and pieces, they simply took them out of the store and this led to a

synchronisation problem, you couldn't keep, the stock record then proved to be inaccurate. The moment it proves to be inaccurate people say well, I can't trust the computer system and start keeping their own records, the little black books. And gradually the little black books take over from the apparently automated system because the discrepancies, partly because the discrepancies go, partly because people now have their own control of the system. And so many systems go… you've heard of the work around, you know about work arounds, various ways of working around the system, and gradually as time passes the two systems diverge more and more. That's one of the reasons why many systems don't actually deliver what is expected of them. And behind that lies the fact that you can't do a comprehensive system, that you can't build a completely comprehensive system. One discovered that quite early. In my case I discovered it was working with North Thames Gas Board. We were doing an experimental job for their stores and I discovered then that, oh yes, they said, if you do this chunk of things, that's alright. Don't worry about the rest of it. But then the rest of it, which was only in terms of number of transactions a tiny amount, spoilt it. Made the job, made the job, made the accuracy of the job disappear. Your stock records were no longer thought to be accurate. Once those inaccuracies appear, discrepancies appear, people lose their faith in them and start keeping their own books.

So looking at the whole system from the start is important then?

But impossible, almost. So there's a contradiction, there's a paradox there. Yes, you can get the system going by taking the bulk of it, the eighty, ninety per cent, but that itself has consequences which are difficult to cope with and require a lot of skill to cope with, and if you're not aware that that synchronisation problem exists, you won't cope with it. If you are aware of it you can try to do something about it.

What can you do about it?

Mainly ensure that the delays are minimised as far as possible, the things are brought at least at a periodic level periodically back to, to be accurate so that you rewind the system in a sense.

[16:48]
So this sort of system side of programming…

The system side became more and more the measure of the thing, became the important thing. The programming, initially the programming was the mainstay, the main thing, but that became more the routine as we learnt to do it better, as we improved, and the important thing became, how is this system, how is this business process actually going to work in the real world, with the real complexities of the world with people not necessarily doing the right thing all the time. Indeed very often not doing the right things, and intervening. Once they kept their own little books, feeling the right to intervene. I'm not sure to what extent this is happening now, but I suspect that same problem still exists. And interestingly enough, in the analysis of what goes wrong, that's not often given as a main reason, as one of the reasons, but it is one of the reasons why things don't work.

So once you've specified, you know, you've done your initial job, you've done your block diagrams and your flowchart and you're ready to start programming, how do you actually program the computer, what's the nitty-gritty part of this?

What's the nitty-gritty part of this? [pause] Putting down the code. Putting down the code, lots and lots and lots of code and checking and checking, checking flowchart against code, code against flowchart. In our case always having a second party checking the code against what is specified, which is the flowchart. But very rarely checking the flowchart against the original specification, so that's another possible source of error. But it is putting down code and improving that code as you go through and testing, testing, testing. Again, one of the skills is devising testing as you go. How do you make as comprehensive a test as you can do. It means thinking of all the events, the most unlikely events which may never have occurred, but could conceivably occur. But building the testing itself and specifying the testing of how is this system going to be proved, how are we going to ensure that the system is going to work, both in its sense of its logic but also in the sense of its timing, is it going to meet the time constraints, given transaction date is not necessarily reliable. It may come late, it might be delayed somewhere or something. We worked of course at that time on batch processing. Subsequently when the processing became online, the situation changed in some ways. The… in a batch system one could be tidy and know what one is doing, in an online system things occur more randomly and you have to deal with it as it arrives and you don't know the consequences and the batch process, at the end of that process you know what's happened. In an online process things are happening all the time. So it's…

Could you briefly explain the difference between the two for the tape? Between batch processing and online?

Batch processing is that you collect all the data for a task and when that data has been collected you do the job and produce what results you need. Online means that the data arrives as it is created, often as part of the creation. That means you don't have a complete set of data until some cut-off point. You have to deal with each piece of data as it comes along and that makes the checking of that single piece of data perhaps easier, but it means you don't have a comprehensive, you don't know the totality of what has happened or is happening. [22:15] It's interesting that at LEO we started thinking in online terms, in real time terms with the teashops job, which was one of the very earliest jobs, with the teashop manageresses phoning in their orders. Of course this wasn't in real time in the sense that they placed an order whenever they thought of it, they had to think now's the time to get my batch of orders in.

How do you actually – I'm presuming that you're writing out programs on paper first?

Yes. We had coding sheets, you write them on coding sheets. You had two kinds of sheets; the actual code and the store layout, the important thing. One of the first things you did in planning a job was your store layout, how you're going to lay out your store in terms of dividing it into sections. Once you had database technology, that in a sense looked after itself, at least part of it looked after itself, not entirely. But before you had database technology you had to devise the way you laid out your stores in terms of data and programs and you had the different sections. And an assembly code which allowed you to do that very straightforwardly. And we had sheets for stores and sheets for program. Of course, there's a strict relationship between the two, because when you're forming instructions your store layout gives you the addresses for the instructions.

How do you go from having this program worked out on paper to actually having it on the computer?

In our case, in the LEO case, having had a second person check it, you then put it in computer form, in our case in punched cards, punched with the program punched in the decimal form,

in normal punched card form, which would then be converted by the computer into binary cards. And from then on you used the binary cards as input to the computer for the programs, the programs were all on binary cards. Data was on traditional decimal cards and this would then be fed into the computer and you would tend to test, check it out section by section, creating artificial data to test the program. You, once you had got a section right you bound it in with the next section and you gradually bind the sections together and each time then test it with the new section added and whatever new data comes in, until you had a comprehensive whole. It sounds neat and tidy but it's never quite like that. But you gradually build up the program till you can do a totally integrated test of all the sections, including the different runs. We divided it into sections within the program and then separate runs for different programs. So the output of one program might be the input into the next program. So in the tea blending job we had one main program and then a separate program for ullages. Ullages are… there's always a loss, when you're making tea there's always a loss in that and these ullages had to be dealt with separately for the purposes of costing mainly.

[26:54]
Are you actually entering this data into the computer yourself or are there other data entry clerks or engineers there to help you?

You worked, when you were testing a program, you worked with an operator, you worked together with an operator. Partly because the operator had to learn the system anyway, but partly because you did, this was a way of getting it done efficiently. You worked with the operator on the computer, you handed the operator the programs, you worked with them then as the program was tested. From fairly early days we had division, we introduced, first of all the programmers did their own operating, but very soon a group of people became the operators with a different, somewhat a different skillset, who had to know a little bit of programming but mainly had to know the operating procedures. Documentation was very, very important and David Caminer insisted on it so that there were several levels of documentation. There was the documentation which was intended for the users, there was the separate documentation, it was intended for the operators, which gave precise instructions on how to operate the system, what the system did on, what the output was expected to look like, what they had to check to make sure that things were right, and above all, the restart procedures so that one could restart, as I said earlier, very quickly, so that we never lost time. So even if the computer was misbehaving, one could rescue the situation, even if it took a

little bit longer than it would normally do. I don't think in a number of years we missed any significant targets, despite the fact that the machine sometimes was playing up.

You mentioned earlier on that you had to look at a cathode ray tube for debugging.

The oscilloscope, yes. Yes. And we had the facility for single stepping through the program, so if you had a problem you could single step and see where things were going wrong, but this was not encouraged because we were told that it was a sign of failure if you had to do that, we should go on clean, but of course one never quite did.

What do you actually see on the oscilloscope display?

One sees rows of blips. The blips were quite clearly defined and the blips were the binary, so you'd see nothing, nothing, blip, nothing, nothing, blip, blip, and so on. And the oscilloscope, if I remember rightly, had lines on it so that you could tell this part was the instruction code, this part was the address code. Yeah, so that is the easy reading.

How quickly did you learn to read binary?

One got to be very fast. One got the facility very quickly. If you didn't, you couldn't, you had to do that. Even so, some people were much better than others, some people could read it. I was fairly, relatively good at it but not, far from the smartest. And that means that errors could be made if… it wasn't difficult to make mistakes.

How frequently did errors happen?

How…?

Frequently did errors happen?

I don't think one can generalise on that. You'd have a good patch when you seemed to go through error free, through things error free, and then you'd have a bad patch where things just went wrong with you all the time and you couldn't see why it went wrong and you might call in somebody to help you. Either somebody you were working with or somebody more

senior than you or something. So we helped each other that way, but certainly my experience is that it's very variable. You get a period of several days when you haven't made a single error when everything seems to go through smoothly and others when you are struggling, fighting the machine all the time.

[32:21]
You've talked a little bit about the group of programmers who were there at the start, just so I've got it all in one place, how many of you were there to begin with?

I don't think it was more than half a dozen. There was the Caminers and Thompsons on top and then there were, yeah, half a dozen. It quickly grew, it very quickly grew. When I came it must have been half a dozen, perhaps six to eight or something like that.

Were there many women in the group?

Only, at that time only Mary. There were always… there were never a lot of women. The second one who I think joined us was Betty, Betty Newman. Who we're still in touch with, lives in the Lake District. She worked for me in particular and she was a very, very good programmer, but limited to… her capacity was in a sense limited to programming. She didn't have a wider systems picture of things. So given the specification, her coding would be quick, accurate and good. And I think there were some people like that who were very good at programming, less good at seeing the business processes. And less interested in seeing the business processes. There were also, some of our team as we grew were specifically concerned with mathematical problems and then again, as we grew, the software programmers rather than the business programmers. There was more rigid division between people. Not rigid because people floated from side to side. One of the interesting things you might have noticed it in our book, is the very large number of tasks any particular person would be involved in and how soon after training they would take a fairly senior position in that. They would be expected to do a major job. What other sort of interesting jobs? Did I ever talk to you about the railway job?

You haven't mentioned the railway job, no.

[35:25]

The railway job, we were asked by the British Transport Commission, I think as it was then, they had for statutory reasons to – I think the fare system was based on it – to know the distance from every station to every other station. That was a fearsome calculation and as the network was changing, the railway network was changing, they had to be recalculated and they asked LEO – this was still in the very early days – to calculate the minimum distance, not the minimum distance, the distance between every station on the network. It turned out it wasn't every station, it was some 5,000 stations. But this was quite a big – station to station distances – was quite a big job and how to do this on a small computer. If you had a large store it's easy enough, but if you don't it was quite difficult. And David Caminer devised a way of doing this and John Gosden built an algorithm for doing that. And I… and this was subsequently in recent years somebody discovered this was happening and wanted to find out about it, has written quite an interesting research paper on the railway job, which I have here.

Ah right, we'll have to get a reference for that.

Yes, yes.

You mentioned that it was common for people to be working on lots of different jobs at once.

Yes.

Did you tend to work on specific jobs individually or were you working in more of a team environment?

We had groups which were doing a specific… so I would be doing a major job like the teashop blending – not the teashop ordering – the tea blending job, there I'd be working with a small team, primarily myself, Betty and possibly one or two other people, and that would take up, while that job was in progress that would take up the vast bulk of my time, but at other times one was working on a whole range of jobs rather than this one major jobs, so the pattern changed a bit, the pattern varied a bit. But over a period of six months one would be working on quite a variety of different jobs. And very different in their nature. So sometimes you would be working directly for Lyons, at others one would be working for clients who were using our computer and subsequently were buying our computers once we started going into the manufacturing business. Another kind of recollection, I don't know whether I've

talked about it before, is in the very early days when LEO was first established, it was used by a number of companies in the military side, mainly aircraft manufacturers, and they took over the computer, they did their own programming, they took it over and we weren't allowed near the computer, there was a tape put around the computer so that we couldn't see what was going on because it was highly secret work, not that we could have gleaned anything from looking at it, but there was always these sessions when these people came in, these foreigners with their highly technical work and took over the computer for half a day or whatever and taped us off. [laughs] That went on for some time, but in the end it didn't take that long before all these companies getting their own computers. I know one of the companies was de Havilland's who came. I think they were probably our most regular visitors.

[40:03]
What's… can you describe to me what your working environment is actually like? Are you in your own office, are you in the same room as the computer?

No, we had, in the early days we had an open office. I would sit, there would be desks close together and one worked with a group of people at those desks. Subsequently when one became senior, particularly in the offices, the offices in Birmingham and Manchester and so forth, one had one's own office, and open office outside it. But obviously open door, was regarded as de rigueur that it was open door.

Where's the computer in relation to your office?

In a different building. Hold on – was it in a different building? Yes, LEO I was in Cadby Hall and we were in Elms House, that's right, it was in a different building. We started off being very close to the computer but then as we grew a little bit we were moved out into a different space so that Elms House in Blythe Road still exists, but now occupied by EMI.

[41:34]
Talked a little bit about some of the aspects of working for Lyons, but I was wondering if we could just discuss a little bit more about how they were to work for as a company.

Yes. Starting off in the statistical office, statistics office as a clerk, I don't think I recognised or knew much about what was really going on about the major business processes. One knew

one's little bit. And there isn't a great deal to say about it, there was a certain amount of office discipline, which coming straight from university one wasn't used to. That certainly was a noticeable feature; one was expected to be at one's desk at a certain time and if one wasn't, something would be said.

Did you have to clock in?

Yes we had to clock in, that's right. No, we didn't have clock cards but we were registered in, if I remember. In the factories it was clock cards. As far as I remember now, we were registered in and it was noted if one was away in the toilet too long and so on. So there was a certain amount of discipline which, coming from university, one simply wasn't used to and which I regarded rather lightly, I know that. On the other hand there was quite a strong social thing through the various clubs, which I didn't begin to join until much later. One of the reasons was that I'd been relatively recently married and wanted to get away as quickly as possible so that evening social events didn't attract me that much. Later on I took much more part in the social events, partly because I stayed late anyway. I had no comparison with other companies at that time to know how Lyons differed from other companies. Later on I learnt that they did differ quite a bit in terms of the rigidity with which things were done. Lyons less rigid than many other companies. Although it seemed tight discipline to me, there was much more freedom than there were in other places. And the social side of it was encouraged.

How were you expected to behave at work?

I think apart from the kind of time keeping disciplines there were no particular rules. You didn't have to stay silent or not converse or anything like… I think it was a reasonably relaxed atmosphere and one paced one's work in one's own way. So there wasn't somebody saying, have you done this yet, have you done this yet, although a certain amount of that went on. Certainly if you fell behind, that would have been noticed, but I think, as I mentioned earlier, there was a certain amount of slack built into the system, and so if you were at all competent you could do the thing in the expected time and do better than that. I could do my week's work in three days comparatively comfortably, but other people stretched it. I keep coming back to that because it's one of the things which struck me most, that people were viewing the work side of it perhaps in a slightly different way to mine. [46:08] One could do one's job without being interested in the job, what the job was about. But one couldn't get advanced in

the company without that, one couldn't advance one's career that way. So for the majority of people, they just did their job and that was that. For others, including myself, one was concerned, what was this job actually doing, what was it for. And one learnt about that mainly by the things which went wrong, by the discrepancies, the variances, because one had to try to… one of our jobs, or the job of the group was to explain what the variances were about, so one learnt about the business, or one could learn about the business. There were some, in the statistical department there were some specialists whose job, whose sole job was tracking down these variances, a kind of audit role, but not an audit role in the strict accounting sense, much more in the business process sense and one of the people who was incredibly good at this job, I can visualise him now, was an albino. He was a refugee like us from Germany, from Austria, he was, seemed to be almost blind, he peered, had this close to the thing, he was albino, but he was incredibly good. He had a knowledge of what was going on in the company, second to none, in the groups which he was dealing with. So whenever there was something serious, it went to him.

Were there any perks with working for LEO, sorry, Lyons?

Sorry?

Were there any perks for working for Lyons?

Yes. Dinner in the directors' dining room, or late dinner. Other perks… I think the main perk was simply the interest of the job, simply that one was at the cutting edge of things. Everyone was very much aware that one was at the cutting edge of things and that things were being done, had never been done before in that way and that it gave opportunities for understanding things and for improving things, making the way the company worked better and one took some pride in doing that.

Sounds like an exciting time to be working there.

Exciting times. I say now, exciting times. Of course there were…

[interruption]

there were…

[interruption]

Yes. One remembers at this stage the excitement and thinks of it as one continues, but there were obviously periods of ennui and boredom, there have to be, and there were. And there were periods of disaffection. One felt that one was being ground down by the meticulous way we had to do things by David Caminer, for example. One really felt at times ground down by that. When he flung a piece of documentation at you for the third time because the documentation wasn't good enough, then you could feel angry and disaffected and at times this turned to group disaffection. There was a sort of conspiracy; we can't get on with this, this is… we have to do something about it. And at one time there was a kind of conspiracy, but it didn't last.

What do you do if you're dissatisfied with work?

Sorry?

What do you do if you're dissatisfied with something in that way?

First of all you try to say if it's on good grounds when you talk to your seniors you can get things changed, but mostly it wasn't on good grounds, it was on grounds that he was absolutely right in insisting on the standards and those standards could be hard for you. It made you do things twice when you think once would have been enough. But that in the end I think he was proved right that in doing it we helped to eliminate errors, we made things work and there were very few failures. There were some failures, but there were very few failures at that time. I think it was an incredibly successful operation and we enjoyed that, but we also suffered from some of the tedium of going over it again and again of doing that.

[52:34]
Was computer reliability a problem at this time?

Computer reliability was a problem, but not a major problem. Occasionally you were hit by it when there was a bigger problem. We never, as I said, in years, we never failed to deliver

what we had to deliver, but at times it became very anxious, it was very anxious. And yes, it was a nuisance when you wanted to go on the computer and there was a problem with the computer. There was always something else to do. I don't think we had to hang around very much.

How did your own career within the computing department progress from when you first started?

I guess I had a relatively slow start because I was not a natural programmer. I became a good programmer but not a very natural programmer. And then I had, I was I think recognised to have a good understanding of the business processes and as a result of that, I quickly was called upon to talk to clients, to talk to customers and rose fairly quickly in the hierarchy to become a senior programmer, to become after a few years the head of the… the chief consultant of that. I became more and more involved in the marketing side of things, but marketing through systems, through our understanding of systems, not marketing through our understanding of selling, which we weren't very good at, which we weren't trained in. I imagine yes, I became a senior programmer leading my own team for really quite a short time. It seemed long at the time, but looking back it wasn't a long time.

How long?

I don't know, eighteen months, two years. I don't know. Something like that. The teashop, the tea blending job was about 1954, so it can't have been more than a year and I was the lead programmer there. I'd already taken the lead in another job which was one of our failure – not a failure, it was cancelled – the one which was dealing with a… reserve stores and when rationing stopped the reserve stores finished, so that job was no longer valid. What was interesting about the job was its level of ambition. Again, trying to get an integrated job for the whole of the range of tasks involved in that. By the time we came to our merger with English Electric I suppose I had been at LEO about ten years and my job title was Chief Consultant and I was in charge of all the local offices. We had offices in the City of London, which was outside my sphere. My brother actually was in charge of that at one time. But I had offices in Birmingham, Manchester, Rotherham and Glasgow.

This is later on in your career?

This was sort of ten years into my career. That sort of rose reasonably rapidly to these positions over a period of ten years or so.

[56:56]
Do you remember when you first started this job and first moving into computing, what did you think the prospects were for computers in business?

I think our first, the first thing was mastering this thing rather than thinking about its overall role. That came, really did come later when one began to see what we were actually doing, rather than writing code for the computer. Let's see, I started by doing some really software, minor things in software and one's conscious then of the computer but not as a task, role in the wider world. We gradually got to know that, certainly by the time one got one's own job one began to see the importance of computers and one began to get something of the philosophy behind the LEO ideals from Simmons and Thompson and so on and then one begun to see the role of computers and really thought of them as transforming the world. I had, for example, I had not read the report written by Thompson and Standingford until many years later, until much later, and so then – I say many years later, some years later, a little time later – and only began to recognise then what the ideal had been behind these computers and the possibilities they foresaw, began to read much more, like the book *Faster Than Thought* which I mentioned, by Bowden. But began to be much more computer conscious and realised one was at the forefront. It had always, one had always seemed to be at the forefront, but in the sense of dealing with a situation which hadn't been dealt with before, one was at the cutting edge of that. But one didn't see it in the broader sense of this is what computers are doing for society, or in the world or in the economy or on business. That came gradually and a little bit later. But then one became very conscious of it indeed. By the time one talked to clients, one could try to paint pictures for them of what this might mean for you. I hadn't really thought about this division between the early times when one was concentrating inwardly on simply getting the computer to do the thing you wanted it to do, to thinking about, it's all in the wider world.

That's interesting because I wondered, because you have this systems perspective from quite an early point, I was thinking about it from that point of view.

Yes.

[1:00:22]
Earlier in the interview you described the ambition of what Lyons were trying to do – when did that become obvious that they were trying to achieve something big and sweeping across the company with this machine, that it wasn't just your little corner of programming?

I suspect… I can't think of a transition at the moment when it occurred. But I suspect it came quite early. I've got a feeling now that there was an intense concentration on getting to understand this thing and being better at it. As I say, I was not a totally natural programmer. There was also one's career progression. But I've got, I think one began to get an appreciation of where LEO came from, what LEO was doing not in a very formal way, but one began to appreciate it as one read more and talked to one's colleagues. But I don't remember a eureka moment saying, ha, this was really computers are about.

I'd like to talk in a bit more detail about working with external companies. I think that might be a good idea to sort of combine it with your career path because I'm guessing there are different companies that come into this at different points.

Yes, yes.

[1:02:12]
So for the moment I'd just like to ask, what were some of the earliest jobs you worked on?

The earliest jobs I worked on were, as I said, some of the software things, but almost immediately after that started working on LEO applications and the first one I had any significant role in was this reserve stores job, which was a major job, which I did most of the coding myself, but where the job was killed almost as soon as it was launched, because of a change in circumstances. The failure was the failure to perceive what was happening in the wider world, was not mine, it was at a higher level than mine. And then became involved in the tea blending job, which was my first major undertaking. I had been doing checking on other people's programs, for example, for the teashops job and various other things which were going on. Although I'd never had anything to do with the other major jobs like payrolls, I did some, clearly did some checking for that for other people. But the kind of jobs were the

teashops job, the payroll job, the reserve stores job, the other applications. And then my first outside job for outside clients were for people who were using our computer rather than for sales and that was the Nivison's job - the stockbroker's job, the job for Attwood Statistics. But my first major outside client, people who might buy our computers but who were also – that's right – they were also using our computer for technical calculations, was CAV. Have you come across that company? CAV were part of the Lucas Group – Claude [Charles] A Vandervell. They produced carburettors for motor cars, they were a major part of the – CAV were a major part of the motor industry providing accessories for part of the engines of motor cars, so it was a fairly large production company and CAV were one of the earliest users of our computer, but mainly for technical calculations for their pumps and carburettors, for their dynamos, dynamos is what they were also producing, electrical part. Carburettors, dynamos, that kind of thing. And they had… I was working there with some of our mathematical programmers but I didn't understand what… wasn't involved in those jobs at all, but when CAV began to be interested in using computers on a wider sense for production control, I became heavily involved. They had a… executive called Wilkinson who was really a very far-sighted individual and he saw the possibilities of computers and I remember certainly working quite closely with him in designing a plan for how CAV would use computers for their production planning and they were one of the fairly early purchasers of one of our computers. Having said that, I've remembered another job which I was involved in earlier than that and which made me something of a specialist on the production control side. This was a job for a company called JD Francis who were watchmakers, clock and watchmakers in Liverpool and Standingford, the man who'd gone to America with TR Thompson and written the report, Standingford and LEO executive, had left – a Lyons executive – had left Lyons and become a senior executive, if not the boss, of this watch company, watch and clock company, and Standingford suggested using the LEO computer on a service basis for doing weekly production scheduling job. And that's one of the first outside jobs I really became involved in and this is where I learnt a great deal about production control and production scheduling. And also one of my… I did what I thought was a breakthrough in the way production control can be done on a computer. Previously production control had often been done on… production scheduling had been done on punched cards systems and they used an analytical process where they had a pack of cards for each product which designated all sorts… so there might be a particular clock or particular car or something and then all the parts which went into it… so it was an analytical process from the top down. Now, I thought I invented the synthetic way of doing it where instead of having the list of parts for a thing, each part

showed which product it went into because a particular part would go into many products. So this was a synthetic process and using the computer one could more effectively use a synthetic way, but one could go both up and down the tree, one could go down for doing the breakdown into what parts were needed and up to do the costing, so could work it both ways. And I thought I'd invented it and I was very pleased with myself. I only subsequently discovered that David Firnberg at ICL had done, used exactly the same method, had discovered it as well and no doubt all the other places in the world had been doing it. But I thought that was an innovation and it certainly made that job work.

Was this something you took on to later jobs as well?

Yes, yes, yes. I became a specialist in production control, which is why I looked at the Ford Motor Company and did that famous block diagram which Thompson thought had solved the problem and didn't. [1:09:43] So I did a lot of production control work, I did a lot of work with the steel industry. Again, I became a specialist in the steel industry.

When do you start making these visits to external companies rather than ones just connected with Lyons?

I suppose that started in… pretty quickly, because the Ford Motor Company placed an order for LEO for their spare parts store and I became very heavily involved in that, I led that team which did that, working with the Ford Motor Company team. Incidentally, I've written a paper on that, so that's something one can look… I don't know to what extent you want to look at documentation where things are documented.

I think as well as putting a little biography of you at the end, we also have a list of collected resources to go with you, if you like, so that's one I'll add to the list.

No, in a sense off the record, I became… Ford Motor Company, quite recently one of their computer people learnt about the early history of computers and contacted me and as a result of that I wrote this paper on the early days of computers at Fords. I think I called it… *LEO and the Model T Ford*. Do you know the Model T?

I think I've read the paper somewhere.

You've probably read it, yes, yes, yes. It gives an account of that particular job, in *The Computer Journal*.

So what position are you occupying in the company by the point that you're going out on consultancy jobs?

I was a senior consultant or chief consultant. The senior consultant by that time. That's what they called us. We weren't consultants in that sense. Well, we were, yes, yes, because we were advising people on how to do their jobs rather than how to… buying computers from us. That was the intention.

So over the sort of period from starting until this point about becoming senior consultant, how does your career actually change?

Rapidly. [laughs] No, it changed in that one got more and more involved with the senior people on the other side. Instead of working with the lower levels, one worked with the most senior people. One worked at director level, very often with companies. The transition must have been fairly rapid from doing relatively high skilled but low level jobs to doing jobs which were much more concerned with systems and how business processes operated and how one would change business processes and how computers fitted, could be used in that company.

And this becomes more your area of expertise then?

That becomes my area of expertise, absolutely. It's where my skills and things particularly lay in having fairly quick understandings of how different businesses operate, being able to see how they might be able to use computers, where they might be able to use computers, how they might be effective on that and what was required in terms of resources for making that work. And I can't remember the transition, but it happened fairly quickly. The first step in this was working with somebody like the stockbroker from Nivison's. Oh, Mr Potter, his name was Potter. Comes back to me. He was the stockbroker. Very bright guy. One meets lots of bright people in this career, one meets lot of people who think they're bright but are not so bright.

[1:14:34]

But when you first started off doing these consultancy jobs, the sort of late 1950s period is the one I'm most interested in right now, what sort of reactions did you get from the people you were talking to in the businesses you were consulting?

Yes. It varied. On the whole I got on extremely well with these people and I was involved in several important clients. Let me give you another recollection which dates from about the transition from doing the job of programming to looking much more into systems. I was sent to ICI, their paints division, who were one of the earliest companies to – in the UK – to buy an IBM computer, a 650. So this must have been in the late fifties, early sixties perhaps. I was sent – must have been fifties, yes – I was sent there to talk to, what they had done and ICI were extremely proud of what they had done and I looked at it and thought my God, how primitive. They were doing, they were simply replacing a punched card system with a computer system and there was nothing clever about it whatsoever. That's at least what I thought. So that was one of the sort of learning episodes, by going to see what other people were doing with computers. Later on I worked with other divisions of ICI, in particular with the Lightning Fasteners division, and we did a very interesting service job on a weekly basis based on statistical forecasting of sales and at that time they produced most of the zip fasteners in this country and the job worked extremely well, it helped them enormously. But the Japanese came in with their zip fasteners and blew Lightning Fasteners out of the water. Just couldn't compete. So a job which was supposed to help ICI Lightning Fasteners didn't do enough to save them from the far more efficient and cheaper Japanese fasteners. What was interesting was the rapidity with which what had been the major supplier in this country disappeared.

I'd like to talk about all this, the consultancy angle of this in particular but I'm wondering if now would be a good time to take a short break?

Yes, yes. Yes, I think it would be.

[end of track 7]

[Track 8]

The process you've described of studying a problem before you actually start coding, it all sounds very neat and tidy – was that always the case?

No. In fact one of the things we learnt very early on and a practice is that when you're doing something new, you can never second guess the outcome. Analysis doesn't help you. You have to on the one hand think what might happen, but the most important thing is you have to meticulously experiment. So if you're using a new output form, for example, for a manager to take action on or something, it's no good just printing something and hoping the manager will use it. You have to design it in such a way that this means something to him and that means that you've got to try several different alternatives, get him involved in the design process and try the design on that person before you start any coding whatsoever, except the rough coding to get the thing printed. Similarly, a particular recollection is, we used in a very innovatory way mark sensing. Salesmen would go out with a sheet, an order form, on which they could mark the quantity by putting x's in columns and so you can get combinations and so on. But how do you do that, how do you know this is going to work with the salesmen who are all sorts. You have to try different paper qualities, different colours, different marking signs. It turned out that the best results were if the marking sign was a top hat. Not a cross… top hat. But one has to… an important aspect of this early process is designing an experiment which itself has to have some validity. So you've got to be fairly sure that this experiment is going to give you useful results. That's an art in itself and wherever you have an innovation there is a virtue in doing some kind of experimentation. And most of the development models don't actually have that built in. There's prototyping, which is doing this on a much larger scale. But not for this input form, that output form, this algorithm, whatever. So all the way through you've got to say, what is new, can't we second guess how it is actually going to come out. And this turned out to be a most important lesson and one which I've very much taken into my teaching.

Did you ever have any unexpected outcomes?

Always unexpected outcomes.

Are there any that stick in the mind in particular apart from the top hat?

Not on a trial… not on that top hat. No. A system designed for the lingerie firm, Kayser Bondor – does that ring any bells? Kayser Bondor was the leading lingerie firm in the seventies and eighties perhaps. Kayser Bondor stockings, silk stockings and so on. And their system was designed for the buyers, but it wasn't done in this way of checking carefully so the instructions to the buyers were in a form which the buyers somehow didn't respond to. So again, one has the work around, people didn't use that system. The buying suggestions simply accumulated in piles. Why? Because they hadn't been thought through carefully enough, above all it hadn't been experimented. Another thing is, did we get the buyers on our side? Getting the buyers on our side, getting the buyers on side is so important, that's always true but so often neglected.

[04:38]
Did you encounter any opposition when you were bringing computer systems into other departments?

Yes, one always encountered some opposition. Again, one wants to make use of that opposition as a positive feature, it's telling you something. It's not a negative feature, simply rejecting, it's a positive feature telling you something. You've got to take it into account, if you don't you're in trouble. But of course you get mixed reactions and so sometimes you have to follow your nose in terms of which of the things is the most appropriate to try. In some cases there have to be opt out things and there's a particular system – this is one of Enid Mumford's systems for Rolls-Royce – where clearly the department she was working with, a large portion of the department was very happy with the system and they took a major part in helping to design it. But there was a group of people who didn't like it at all, who didn't want to get involved at all, they wanted to opt out of getting involved in the whole thing and what was done is not to discard those people but simply find an alternative job for them which they were more comfortable with. They were taken out of that particular scenario, put into a different scenario. In the process of systems analyst, got to be so careful about those particular issues; experiment, getting people on board with you, and one learns it the hard way. But in Lyons, particularly the experimental side of it, was always… that came from their systems research days.

So there was already a sort of system set up there to accommodate that.

It was already… we couldn't do anything without that question being asked – have you tried it, does this work, when it's new. And how are you going to try it.

So in the case of Lyons then, the solutions were essentially coming from other… the problems for you to solve were coming from other departments within the same organisation or were you…

The solutions could come from anywhere. Often we brought fresh ideas and some of those ideas they said, oh yes, that's right. Sometimes they said, don't be silly. And the experience of course is that the person that the… on the shop floor, the one in the… at the mill, knows all the detail and all the wrinkles which the managers often don't know, even if they've come up through the shop floor themselves, that was still some time ago and new wrinkles appear all the time. Again, a good example, working with… what's the name? Guest, Keen and Nettlefold's. These companies no longer exist – Guest, Keen and Nettlefold's were the largest hardware producers in this country providing hardware particularly for the motor industry – Guest, Keen and Nettlefold's. Nails… they started as nail makers but they did a very large part of the sort of things which went into infrastructures. This is in much later days, this is in university days, not LEO days, but the lesson is the same. They adopted an EDI system – EDI, that is that the supplier company and the buyer… the purchasing company and the supplier company have a joint system so that one system speaks to the other and places the orders. Now, what happened before, this relationship between the buyer and the seller was largely executed by people called progress chasers. You've come across progress chasers? British industry was run by progress chasers. They were the people who would ensure that things happened, in particular between the suppliers and the buyers. They would ensure that if an order had been placed that it was actually being manufactured at the suppliers, that it was being distributed, given timetables. The progress chaser knew what was happening and the progress chaser was in close touch on a personal basis with his opposite numbers in the supply companies. Now we introduce a computer system and all that knowledge of the progress chaser goes out of the window and the subtle details which you never hear about through a formal system, such as the guy on the other side has got a drinking problem or that his marriage is breaking up, that's going to affect the situation and he can do something about it, never gets into the system. The progress chaser, those guys knew what they were doing. And so when the EDI system came, it was smart in many ways, but there

are some things it simply didn't know about and some of the critical things the progress chaser was much better at doing.

It sounds a, almost dehumanising system in some extent, you know, not taking into account the people there.

Well that has been one of the criticisms of computer systems and the belief then that whatever the computer system says must be right over and above what you know yourself. No, if you get rebellion against it you get the alternative systems. If you accept it, you may get yourself into trouble.

[11:12]
Did you ever encounter any apprehension about the fact you were installing computer systems in other organisations?

Yes, yes, yes. Some people would be very conscious of that sort of thing. You found all sorts of rivalries coming out, that by installing a computer system you were serving one group of people at the expense of another group of people who would feel slighted by the system, it seemed to be taking over their roles but it wasn't taking over the role of those people over there. And so you get rivalries and problems. Again, a particular example, slightly different but the effect was the same, was with a company I worked with a great deal, British Oxygen, who introduced a system. They had a manager who was very bright, very keen on computers, but he was not sufficiently senior to know what was going on at the top level. So he went ploughing ahead, very confident, and took his department with him, not knowing that at senior level they had decided on a change in structure which would make the way the job was being planned totally redundant. They went from a system of central distribution to one of regional distribution and the system had been designed on the assumption of central distribution and I think he lost his job in the end. I remember his name so well, he was a Scottish accountant.
[closed between 13:04 – 13:15]
I'd worked very closely with him and we'd in a sense mutually admired each other for what we knew. I didn't know what he didn't know. And the company was being stupid, it didn't realise that it was going ahead, was changing structures while other things happened. It's like my example of complexity theory. Complexity theory is if you throw one pebble in a pond

you can compute the ripples, you know what they're going to... If somebody else throws a pebble in the pond then the ripples form an interference pattern and the outcome is no longer clear. If there are three people sending, throwing pebbles… Now an organisation is like a pond, all people are throwing in pebbles all the time and they can interfere with each other. But the guy who is throwing in the pebble, he's only thinking of his own pebble, he's not thinking of what impact it's going to have on the ripples of the other things. That's in a sense what complexity is about. There are other things too. If the landscape in the pond under the water varies and you don't know it, then the competition of the ripples becomes almost impossible.

It's not necessarily a neat system problem at all, just something with lots of things you haven't foreseen when you've started off the operation.

You haven't perceived and you cannot compute. The cause and effect relationships are intertwined.

[15:09]
I'm just trying to think about where we got up to with your career and…

My career, we were talking about the position I reached sort of going through from being a junior programmer to being in charge of the various regional offices, much more marketing function and having the title of Chief Consultant.

What were the steps in between the two – you mentioned senior programmer a little while ago.

Senior programmer, senior systems, senior analyst – we called ourselves consultants: consultants and senior consultant. Sometimes there was no formal step, one was just doing a slightly different job, the job had grown rather than the title had changed, but ultimately there were some titles such as Chief Consultant and it was really meant to flatter me, in the sense that there were other people who were doing very similar jobs who didn't have that title and whom I had no particular control over. So for example, as Chief Consultant I did not deal with any government systems, this was done by somebody else.

So your main area of concern was just commercial installations.

Commercial, business systems for private industry. Hugely varied and as I said earlier, I was very much involved with the production industry and steel industry, but also later the financial industry with the Stock Exchange.

From the sort of start of your time at LEO to this point when you become Chief Consultant, how much had changed in the LEO computer department around you?

It had grown hugely and very fast. We were producing advanced computers which had extremely high capability, but we had a very poor marketing sense. We still worked on our principle, we know best, and we were regarded as an arrogant lot of Londoners. And people no longer wanted to get advice from us. In a strange way it worked this way. Our first… Lyons had a reputation for being advanced; they formed an institution of office management, I've forgotten the exact title, name of it, of which the president was John Simmons and most of our early clients were fellow members of that and so there was a natural admiration already of Lyons. But once we had creamed off the top of that we were in the ordinary commercial market we no longer knew, we sold ourselves to as many people as we could and we were meeting a different kind of people, people who weren't, had no knowledge of Lyons in particular, had no particular admiration for Simmons and Thompson and so on and knew best themselves, or thought they knew best, we didn't think they knew best, that was one of the problems. And IBM came in, flattered their top management, gave them what they wanted, very often not what we thought was best for them, but they didn't listen to us. So in a strange way we shot ourselves in the foot by our determination to know best. We said we'd work with you, we'll work with you, but we'll find ways of doing things.

[19:40]
I noticed you mentioned that Lyons had moved into actually producing their own computers by this point.

Yes.

Did that involve any of you on the programming side of it?

Yes, indeed. LEO started, Lyons made the decision to build its own computer first of all, that's how it started, it made a decision to work with Cambridge, use the basic EDSAC model, adapt it to be a business computer where Lyons determined what other characteristics which a business computer should have as against the EDSAC or the other machines which were primarily used for technical calculations and what it needed above all was not so much computing power, but the power of input and output. So it was designed as a multi-channel machine, as against the EDSAC which I think had only two channels: an input channel and an output channel. And it quickly noted, got the idea that these channels have to overlap; they have to be independent and overlapping so that you could read from this reader and that reader. And if you had new devices you didn't try to put them on to existing channels, you devised a new channel so that they could work at the same time. And Lyons were quite innovative in the devices they attached. I don't know whether you, probably again before your time, most retail shops, particularly in the garment industry had tags and these were readable tags and there were special machines which could read those tags so you could do an inventory and do all your counting using these tags. We developed a machine to input these tags directly into the computer, and so on. We developed a mark sensing document reader, which instead of reading mark sensing cards would read documents of various kinds. And I've talked about the design of these documents, and so on. We linked what was then the fastest printer, the Samastronic printer, and we caught the occasional cold in doing that. And the very first cold we caught was a very serious one. We linked magnetic tape very early on and we chose magnetic tape produced, but the system was produced by Standard Electric and failed. And that put us back, in terms of magnetic tape, put us back several years so that we had to rely on input and output and principal storage on punched cards, binary cards admittedly, but punched cards, whereas other people were already using magnetic tape. We came back into magnetic tape a bit later.

What changes do the LEO computers themselves over this period actually make for you as a computer programmer? What difference does it make?

Huge development in the software, like operating systems and languages so that programming became, I suppose became easier. Above all, the huge increase in the amount of storage you had so that we could work with much bigger stores and that was such a release, that was such a… the amount of storage put such a tight grip on you. It is incredible looking back what we did with that small amount of storage, but it was inhibiting. And gradually over the years all

these things improved. LEO I was the most primitive, LEO II was faster but had much more storage. LEO III had multi-programming, time sharing and all that sort of thing. We were certainly up with the field in terms of computing technology and ahead in some things, until I think it came to the mini computer. We had nothing which could match the DEC computers as a compact, small computer with a very high capability. We were tending to go bigger and bigger.

How much were programmers like yourself actually involved in this development process of the computers? Were they just sort of new products that arrived and you started using them?

Some of the programmers, totally, very much. One of the features of – I was going to mention this earlier – one of the features of LEO was the close relationship between the engineers and the programmers and the systems people too. The engineers, under the guidance of Pinkerton, and Pinkerton in particular – paid huge attention to how we were using computers and we had in the design of the computers, particularly by people like John Gosden, played an important part in specifying LEO III. But the interaction between the hardware, the operating system and the commercial systems and so on, the application systems, was regarded as, there was a close linkage between those and if all three parties didn't understand something of each other's work, one couldn't do it properly. So design was very much a joint effort in that sense. [26:18] There were several aspects of the way we worked which were models and there were several aspects which were hopeless like the marketing. Hopeless is an exaggeration, but… We didn't recruit a marketing person until comparatively lately, a professional marketing person. We got that first marketing person from Lyons itself, a great guy in chocolate sales. But chocolate sales and computers weren't the same, he never understood computers, so that was a false move until we got round to get somebody who was more professionally competent. We finished up with an ex-IBM man – Ken Barge who'd been a senior IBM man. And yes, we learnt a few things on how the market had changed and how one had to deal with it.

I'm interested in this thing you brought up a little while ago about the relationship between engineers, programmers and systems designers.

Yes.

Do you all work in the same place?

No, we worked… the engineers worked in a separate place. Originally when we started we all worked close together and sometimes one couldn't distinguish between one and the other, though I didn't know any engineering so I wasn't involved in that. But no, the factory and design office were in a different place. The software programmers and the application programmers worked in the same place and were often interchangeable so that a software programmer would also be doing some application jobs and an application person might be seconded on to a team. This was not a matter of saying we've got to share knowledge, but we've got to share resources, limited resources, how do we best apply them. But it had the effect of sharing knowledge.

By software, do you mean systems software?

Systems software. In particular operating systems and languages and utilities. We added quite a few subroutines, for example, through the Cambridge subroutine library, from our own work, in particular some of Leo Fantl's work.

Did you see much of the engineers socially?

Yes, quite a lot. Quite a lot. We probably didn't know them nearly as well as we knew our colleagues but we knew some of them quite well and some of them very well and again, one of the things is if there were maintenance problems, there had to be a discussion between the maintenance engineer and the programmers involved. So that was a joint activity with the maintenance engineer taking the lead, but the programmers acting as a feed and very often being able to say, we think this is where it is, this is where the problem lies, in these particular circuits.

[29:40]
So this was programmers pointing out to hardware engineers what the problems were?

Pointing out to hardware engineers where they thought the problem might lie, and sometimes they were right and sometimes wrong. But there was very close liaison. Very close liaison, yes.

Who did you actually have lunch with? We've talked about the different Lyons canteens – I'm just wondering who your typical lunch partners were?

Typical lunch partners would be fellow programmers but also engineers. I think to an extent there were cliques which got together, but having said that we weren't a terribly cliquey place, you do get that. And you'd go to lunch with *X*, regularly you'd go to lunch with *X* regularly or *Y*, so there was a group of you who tended to go together, but quite often you'd mix up.

Who were your closest colleagues in this small team at the start?

Who…?

Who were your closest colleagues in the smaller team earlier…

Probably people, certainly members of my own team like Betty Newman, but others similar place to myself like in particular Alan Jacobs. Alan Jacobs subsequently worked for British Airways and then became head of computing at Sainsbury's. Brian Mills was another one, who subsequently became head of computing at British Oxygen. Many of our, of these LEO people became very senior people in the application part of the industry. Engineers, I suspect the same, but I'm not so conscious of that. I think engineers remained, I've got a feeling that engineers were less mobile than – on the systems side – although we retained people for many years, there were very few people who went in and out. Yes, Alan Jacobs. Another guy I knew very well and worked very closely with, Arthur Payman, now in some senior computing position in Holland, except that he's retired, of course. John Aris. John Aris I got to know later. He was in charge of government computing and he became subsequently head of computing for the Imperial Group and subsequently director of the NCC.

National Computing Centre.

In Manchester, yeah.

What did you talk about over lunch, what would be typical topics of conversation? Was it all work or other things as well?

I expect at this season of the year it would be Wimbledon. I can't recollect anything which was in any way specific. Yes, we talked about the things we were doing, to a certain extent. Otherwise we talked about normal politics and sport and such activities, professional activities to a certain extent. Yes, we had… when we had our grumbles as we sometimes did, yes then we would talk about our grumbles and see what can we do about it.

Did you see much of LEO senior… rather Lyons senior management while you were working with LEO?

No. No. I saw the particular group I happened to be working with at the moment, so the main ones are some of the tea blending, in the tea business I saw them, but never at the very top. The sort of middle to top high level managers who were running the thing, who were doing the things and for whom the applications were designed, including tea blenders and the things, the tea tasters who blended the tea.

[34:28]
Can we talk through these jobs in a little more detail, perhaps the tea blending job?

Yes.

How did you come by this job in the first place?

It was allocated to me. It was one of the jobs which had already been specified by Caminer working with the tea people, so there was a specification which I've still got here. Tea was quite an interesting commodity. Lyons had a tea factory at Greenford where they made tea, but they also had warehouses where they kept tea. Tea is a product which is bonded, and so it's got customs charges on it, so it's bonded. It's obtained from three different sources, three or four. First of all, it's bought directly from tea gardens, so we had contracts, long term contracts with, for example, tea gardens in Rhodesia and southern Rhodesia, what is now Malawi, and in various parts of India. Secondly, it's bought at auction from Mincing Lane and these are weekly tea auctions. And thirdly, Lyons had their own direct, owned their own tea thing. So the tea came from all of these. Tea comes in chests and a group of chests which have got the same tea is called a break, so the unit of control were these tea breaks, which

were the number of chests of similar tea and the tea was either a long term contract in the gardens bought in Mincing Lane, in which case it had to be transported to Lyons' own bonded warehouses and it came out of bond when it was used in manufacture, or it was bought from the various tea gardens and every break had to be controlled, so that was the stock, so it was stock recording and keeping an inventory control system, which kept a record of all these different teas and their different breaks and their different locations, whether they were bonded or whether they were outside bond. That itself was in terms of the number of types of transactions quite a complicated job. But the important thing was to say which tea was available for blending, and there were a number of tea blends and each tea blend has a recipe in terms of the types of tea which go into it, but also a cost factor. The cost of the blend is determined before the blending takes place, the tea must not cost more. So one has to combine the teas in a certain way to get the taste, the blend, and the cost. So the system would send to the tea blenders the recommendations for each blend, but the tea blenders would then take their own decision on what they would do, how they would do it, but the test was always, are you doing a blend which fits into the style of the blend at a cost which is appropriate, that the variance doesn't become too high. It is a job which was very successful, it ran for thirty years, which was one of… I don't suppose it's a record but it ran for a long time. Of course it was amended, it went from machine to machine – started on LEO II and went up to LEO III and finished up, Lyons in the end bought an IBM machine, they abandoned their own kin and bought IBM and it was transferred to an IBM machine.

[38:44]
In the course of developing this job, did you actually have to visit the sites involved?

Yes, yes, yes. But at that time I was still sufficiently junior for much of that to be handed to me, what we do. Yes, I confirmed it and I went there to see it, because it was suspected that I would be interested in seeing it, what the job was, as part of my own motivation. At that point I wasn't so much concerned with design at the higher level, but design more at the programming level – how do we turn the specification, this user specification into a computer specification and then, above all, getting the job working. One has got to go back to those people to work with them, to make it work. How do we, again, test that the system is actually working. We can't do this by ourselves, we have to do it with the users. Very often one has to go further than the users, one has to think of… because the user thinks of the circumstances they know and one has to think outside that box. What are the circumstances we don't know

about which could conceivably happen, can we cope with it. So that's an input we were able to make. And again, it's in the same basic notion of experimentation. One experiments with what can go wrong and I think as criticism of the way we work we do far too little of that now. So for example, many of the security issues which hit us, we react when they hit us rather than anticipating what might happen through some kind of modelling and experimental mode. We don't think ourselves into the entrepreneur on the other side who is trying to subvert what we're doing. But it's another, he's simply another entrepreneur, often a very clever one.

Just ask you one or two final questions about the tea blending job.

Yes.

So you had to visit these different tea blending sites then?

Yes. The main sites were visiting the Mincing Lane tea auctions, which was an interesting experience, though one has no influence on that, seeing that, the tea factory where the tea is actually packet… mixed together and packeted and tested, and the quite separate blending room where the teas are blended, plus the warehouses. I don't think I ever went into a bonded warehouse, but I went to local warehouses.

What was the value for you to actually make those visits when you've already been given a specification of how the job should be done?

Simply putting the thing into its proper context, into a context which one can visualise. It's very difficult to visualise it otherwise. Again, it's a most important thing which a systems person has to do is to understand the context in which the job is being done, it's not a question of formal specifications, mathematical rules, it's a question of seeing how the people actually work in it.

[42:29]
What did other people within Lyons think about the work you were doing when you talked to them about it – if you talked to them about it?

Relatively little. In retrospect, less than one might have expected, so that you were talking about who did we eat with in the canteens, very rarely was the users. Though it might have occurred, but it was in the tea blending side, then while we were working closely together, yes, but in general no, certainly I'm not conscious of having done it. There may have been some of my colleagues who did, but I don't think so. They tended to, if they mixed with anybody, they would be more with more computer people.

Did you get much feedback from users once the systems were up and running?

Oh yes. [laughs] Inevitably, yes.

What sort of things?

Particular things which might be improved, particular things which had gone wrong, but also things which had gone very well. So in particular, a teashop manageress reporting how it had changed her life, it made her life much more possible and she was capable of doing a better job. That sort of feedback one got all the time. Lots of positive, some negative. Some very good ideas which came up, because again, one can't predict everything, one doesn't, if it's an innovation, one learns as one's doing it and then one says well, why don't you, or can we change the system, can we do this little bit.

Does this feed…

Sometimes we could, sometimes we couldn't. We tried to be as accommodating as possible but in the end one freezes one's specification for a time otherwise one never ever finishes. This again has this synchronisation problem I talked about.

So does this feedback have much effect on how you do the next job?

I guess yes, but I can't give you specific examples. Simply, it's part of the learning process. We didn't at that time talk about learning processes the way one does now, this was before the time of Senge and his *Fifth Discipline*.

[45:11]

You've talked quite a lot about the earlier part of your career at LEO, I'd like to move on to the more, the consultant part of it. Could you just give me a brief flavour of what your job spec was?

The goal was to… the goal was to sell computers profitably, as bare as that. And to do that it was expected of us to have a deep understanding of what the customer wanted. We couldn't sell it, we thought, unless we understood it. This turned out to be false, the people weren't buying it on our knowledge, they were buying it on specification of our computer which they analysed themselves and compared with other computers. So benchmarks were important to them, not our knowledge of their business. But we expected, the expectation was that we would do that. The expectation were to deliver results and indeed we had to produce accounting figures and so on, which scrutinised very heavily and we were certainly taken to task if we weren't, if I wasn't delivering, if that office, the Birmingham office, was not delivering, what can we do about the Birmingham office to buck it up. Why aren't the Birmingham office, which is in the heart of manufacturing country, selling more computers, that kind of thing. So there was considerable pressure all the time and this was subsequently replaced by the very different pressure of when we merged with English Electric. Part of the pressure still remained, but there was also the pressure of us versus them in terms of particular jobs, so although I was Chief Consultant, I had put over me an English Electric person

[closed between 47:20 – 49:19]

I'd like to move on to talking about the merger in a bit more detail later on, but there are one or two other things that have just occurred to me when we were talking about your role as Chief Consultant. So are you overseeing a larger organisation?

Am I seeing…?

Are you overseeing a larger organisation? You mentioned the Birmingham office – were there others?

Yes, I was responsible for basically the domestic, the home commercial market, as opposed to John Aris who was dealing with the government market; local government and central government and some of the nationalised industries. I dealt with the private sector and I was

in charge of the private sector. But my power as being in charge was in a sense limited by the fact that I had competition in that field from Caminer and Thompson, people above me were very active in that area. They did similar things to what I did and they did it with the seniority of being directors of LEO. So I had nominally the full power, but in fact it was very much shared with them. It worked reasonably well.

So what did you actually have to do in this job?

I had to see clients, organise programming teams, organise systems teams, organise people to go out and see things, but primarily do a great deal of seeing senior people myself. I went round industry seeing people, talking to them, and once one had got inside them I could send a team there to work there.

What sort of arrangements did you have for visiting senior industry – were you invited in or were you touting LEO to them?

Both. Very often we were asked as part of a tendering process. A company would say we're going to get a computer and we want IBM, English Electric, LEO and so on to compete and you'd be invited in. At certain times you knew this was happening but LEO weren't invited in. Then you might try to prevail on them to put you in. But the game changed, as I say, from doing benchmarks… from doing systems to doing benchmarks. So going in wasn't exactly the same thing. Yes, you had to talk to the senior people there, yes you had to make a presentation about the power of your computer, but you didn't have to talk about, very much about their system. Where you got in and talked about your system – and we had some companies where we did this – it worked much better: Renold Chains, Kayser Bondor and so on. We struck, with senior management, we struck it off with senior management, they appreciated what we were doing and we worked together, that was nice. The competition was squeezed out that way.

What were you selling?

Selling the range of LEO computers. Sometimes we were also selling service jobs, but that was primarily done by other people in our group. So we acted as subcontractors for quite a lot of jobs. Quite a lot of jobs were outsourced to us, in modern terminology. There were also…

liaison was particularly close when somebody outsourced their actual operations to us with the intention of getting a computer when they had a bigger load. So then the relationship became a rather different one. First one had to ensure that the outsourcing worked smoothly, worked properly, that our service section was doing it properly and all the time you were trying to say this is now the time for you to take over and run your own machine and when you won a thing like that it was great congratulations all round. In all, the total number of LEOs sold is by IBM standards peanuts, but nevertheless by English standards not bad, we sold over eighty computers altogether, which is not – and we sold them to the cream of English industry – so this is not bad.

[54:34]
You mentioned that you had to give presentations when you were selling one of these.

Yes.

Could you pick out one of these instances and describe it to me?

I can think of several. Yes, one which was something of a flop actually. British Insulated Callender Cables and we were – this was a competitive bid – we were invited to make a presentation. We were invited there to study their system and then make a presentation, although the other, our competitors were asked to do the same. And the actual presentation was made at the highest possible level on their side and our side so it was led by TR Thompson and David Caminer and I came third in the line. But they spent too much on theirs, so mine was squeezed out. Not totally, I had five minutes or so. So that's why I say as far as I'm concerned it was a bit of a flop. But my presentation was actually to give the most detailed account of what that application was… how we would cope with their systems, whereas Thompson and Caminer were much more talking about what we would bring to the show; our knowledge, our understanding and the computer itself. But I was supposed to talk about more of the application. But as I say, I was squeezed out of that. Nevertheless the others had done their job sufficiently well, British Insulated Callender Cables bought one of our machines.

Who were you actually doing this presentation to?

To mostly board members of British Insulated Callender Cables, certainly the chairman was there – I can't remember his name – and the heads of their… their very senior people, top level people. And that was an instant which in a sense was typical, though perhaps at a more senior level than sometimes you get. But that was primarily the way we operated, we did a study and then we did presentations to senior people, again, the Ford Motor Company, one we lost out on. We sold one computer to Ford Motor Company for spare parts and we then bid for their second computer for production control and the decision locally had been to buy it from us because our presentation, they felt they had confidence in us because we seemed to understand their problems and what it had to do, and the experience of the spare parts thing had been good. And then they got an order from headquarters in Detroit, no, it has to be an American machine. Just like that. And something which seemed like a certain sale, it was overnight turned around. That's the sort of thing which happens.

Were there any particular points you'd emphasise during these presentations about what your system offered as opposed to others?

I suppose we mostly, our understanding of our system, that we understood what their business was, that we understood their business processes and that we had a machine with a capability of dealing with that. We went then in detail through what that capability was which could deal with that. Sometimes simply in terms of the volumes which one had to, the volumes of transactions one had to process, that it needed a certain amount of kick to be able to do that. And that mere benchmarking will never tell you that, the relationship between the system and the machine. Yes, we boasted about the qualities of our machine, but we tried to put it in terms of what their needs were. I suppose that's how everybody does it in some ways. Some more emphasis on the one thing than on the other. These presentations were important, our liaison with the senior people at these companies, long after the sale was made continued to have a great deal of discussion and discourse with them about progress. We had review meetings frequently just to ensure that progress was good, which it sometimes wasn't. I've mentioned British Oxygen with the shift there and the failure. We had another computer at British Oxygen which went very successfully. I mentioned Brian Mills, Brian Mills was in charge of that project. We had… a very successful one with one of the big mail order companies. Basically on the qualities of our man, a man called Mike Jackson who had been an Olympic yachtsman. He had a dinghy, he was a dinghy sailor and had designed his own dinghies and his dinghies had been successful in one of the Olympics. That's Mike Jackson.

But he subsequently was hired by that company to run their computer and became then a mainline director of their company. It was a mail order company – Freemans. Freemans were big in those days.

[1:00:57]
Talked about the… doing these presentations, what sort of reactions did you typically get from the people you were giving them to?

I don't think one can talk about typical reactions. Most… if the people bought your arrogance, then usually you got a stimulating discussion and so on. If they didn't buy it and sometimes they notably didn't buy it, you wouldn't get that. No, we don't want to know, you're telling us, you don't want to know that. Tell us more about your machine. So it ranged. But I think my main memory is that by and large these things went quite well. I hope… but I do know that not all of them did.

I'm aware that LEO computers has got this teashop origin, was that ever a problem when you were selling systems to companies?

Yes. Yes. And this is where it helped in the early phase where so many of the people knew Lyons very well as a progressive and advanced firm because we were part of the same office managers' association, in other words, people who ran the business processes. And they on the whole knew us, but when we went outside that, then we had a lot of problems, people not believing it. And very often our… the people who we were dealing with directly and who trusted us had then a great job to sell it to their colleagues who said, who are you talking to, these teashop people – what do they know about the steel industry or whatever it is. Yes, one met that again and again. Some of the industry things were terrible. The steel company Colville's bought a computer from us and they bought a computer from I think one of the other English companies, possibly English Electric, I think probably English Electric, and the office people and the engineers absolutely didn't speak to each other. So they bought separate machines to do basically the same job. One for the engineering payroll, one for the clerical payroll, and other jobs. But it was such a stupid waste of resources, but there, the engineers simply didn't want to talk to teashop people. The engineering side didn't trust us, they didn't want to talk to us. They wanted to talk to English Electric which had their own… which were familiar with that kind of industry.

So the engineers wanted to talk to the engineers in that case.

Yes. So that sort of thing happened. But we talked to the… our customers were the office people. And so Colville's had two computers, which in itself one could say is not putting all your eggs in the same basket, but in fact was stupid in the context of their requirements.

[1:04:48]
You mentioned a little while ago that sometimes you became aware of tendering processes that you hadn't been invited to. How do you find out about those things?

…Many tendering processes go through a public process and invitation to tender, which is advertised. Anything in the public service has to go through that and as part of the tendering process the clients draw up a shortlist so that not all companies which could conceivably tender are actually invited to tender, that's the shortlisting process. So about the public one, one knows what's going on. The private ones, I suppose rumours fly around, one gets to know, again, through the context of the senior people. So one knows that company *X* is tendering. A company which we had some problems with in that way at one time was I think ICI, although at a subsequent, later stage there was one of their directors who was very keen on us. We never actually did sell them one, but we were taken up to their Cheshire headquarters and treated royally, and I mean royally, but we didn't get the business. But again, our presentation was about their business. I remember that quite well, I went up with TR Thompson.

[1:06:40]
What do you actually… sorry, I've completely lost the question I was going to ask. [laughs] I was wondering about the opposition.

Yes.

You've mentioned one or two other computer companies in passing, IBM being the obvious one, but I was wondering how you keep up with what your competition are doing?

We prided ourselves on knowing their computers better than their salesmen did and there was a particular example when we were tendering against NCR and NCR had at that time developed a device called CRAM. It was a random access device. It consisted of a row of magnetic cards hanging from a sort of rod and the cards would fall down and be read, you could select through the system, you could select which card you wanted then it would drop down and you could read it off, so this was a random access device. You could take any card from that. And we reckoned we knew how to use CRAM for that application much better than they did, but we didn't have CRAM. But I remember we had… actually there was some kind of argument and they certainly wrote to us and we certainly had an interchange about this, about us daring to say how they, how one should use their device. I've got a vague remembrance of this being a slight *cause célèbre* at the time. But no, we reckoned we could always know better than… again, our arrogance. We would know better how to use it than they would themselves.

[1:08:57]
Where would you situate LEO computers in comparison with the rest of the British computer market?

Computer market or computer companies?

Computer companies. Before the merger with EE.

There was one giant and that was ICT, the merger of Powers-Samas and British… BTM. That was gigantic as against us, but a very large part of its income still came from traditional punched card equipment. Nevertheless it had a wide selling range of computers. They replaced their punched card equipment in customer sites by computers, doing the same thing, but doing it perhaps a little bit cheaper, perhaps not. They claimed it was cheaper. That was their way of selling and so they had a very large market. So it was them as the biggest one in the country, of the UK ones, and then roughly equal I would think, English Electric and LEO. English Electric selling slightly more to the technical market and – I've forgotten one other one – and LEO much more to the application one. No, the biggest rival was Ferranti. Of course, I forgot Ferranti. And Ferranti tried to produce a range of computers similar to LEO; the Orion and so on, but fell badly behind at one time and the company got itself into considerable trouble, which is well known. But they were in many ways more like us than,

for example, English Electric. Also working on the basis of knowledge and understanding. And they were for a time quite successful, but I think we did very much better in the end. So I think we were probably number two in the British set-up.

Who did you see your key competitors are?

IBM. But IBM, the big American companies: IBM and UNIVAC, Burroughs. Burroughs almost sewed up the banking market. We did sell to one small bank, but that was all. NCR were also strong in the banking market and NCR were also strong in the retail market because of their cash registers. They were known there. [1:11:54] I was talking early about tags, I've remembered the name of them, they were called Kimball tags. Every garment had a Kimball tag which identified it and it was machine readable. Kimball tags. Yes, we did a major job for Richard Shops, now part of one of the other groups.

[1:12:20]
Did British government policies towards the computing industries affect your job at all?

It didn't affect it directly, but it did affect it – well, it affected it directly when they forced the mergers. The mergers were forced. The first lot of mergers, that is the merger with English Electric, was not forced by the government, but the creation of ICL was totally forced by the government by Wedgwood Benn, as he then was, Benn. Was Minister of Technology and he forced that merger. And I've always theorised – I don't know whether I've said this before – that it had a major mistake, that the military side of computing was kept out of that merger. So for example, English Electric had in Marconi the Myriad computer, which was mainly for military applications, and Marconi were kept out of the merger. So English Electric were part of the merger, Marconi which was part of English Electric, was not. Similarly, some other companies which were strong on military computing were kept out of the merger, and I think this weakened the British computer industry tremendously, because all that knowledge and skill and innovation which was coming from that side was kept out of the merger. And I've discussed it with very senior people who were involved in the merger and they disagree with me, but I still think I'm right. [laughs] I think the reasons why they disagreed weren't cogent.

I was interested a moment ago when you mentioned that you thought of IBM as your key competition – not the British companies?

No, no, no. IBM. And IBM took such a large portion of the market in the end. The American companies took a major slice of the UK market. The British companies got residuals. English Electric had a handful of commercial customers, they had a few technical customers. Ferranti, small handful; some abroad in South Africa and in Australia, but nothing, not more than a handful. Whereas a whole swathe of companies, much smaller companies to large companies, bought American equipment, in particular IBM. It became the dominant force and in any sales situation one knew one was up against IBM and their very skilful techniques. They believed in techniques, not their computers. No, they had some… the 360 computer transformed the market. For the first time you had a sequence of computers which were transferable from the bottom to the top. In the end it wasn't quite as transferable as it seemed at the time, but they were basically transferable. So you could come in at any level and you can transfer to the higher level. Now, on the whole the UK companies didn't produce ranges like that. They began to, we had our LEO III range but it wasn't as extensive as the range of the 360.

Were you still involved with LEO when the 360 came out?

Yes.

Or the IBM 360?

Yes, yes, yes. The 360 came in the early sixties I think, or was it late fifties? Early sixties I think. I left in '67 or '68. Yes, so I was well and truly in… I was at my most senior level when we were doing that. Now, I have to break off.

[end of track 8]

[Track 9]

When did you get married?

Got married in 1953. We'd been living together for a couple of years at that time. Our romance started in the statistical machine room at the LSE. We were both pounding our calculators, doing our work, but really waiting for a move from the other. There was already some kind of *frisson*. Of course, there was a third party; my brother. So Ailsa was never quite clear who was after her. Anyway, we dated and got together and LSE at that time still had commemoration balls aping Oxbridge and we had a commemoration ball, or a Valentine's ball, it was a Valentine's ball, at the Queen Elizabeth Hall at the South Bank and we went together and I went home with Ailsa and never came back, never returned home. Found my brother prowling outside, where is he, where is he. [laughs] This was in east London and we lived in west London, so he'd discovered where Ailsa lived and come to find out what was going on. So that was the start of the relationship and we then got married in 1953 because by that time we were thinking of kids and thought it more appropriate to get married. There was a certain amount of pressure from Ailsa's parents anyway that marriage was the right thing to do. I should think less pressure from my parents. My parents were simply wondering what was happening to one of their sons. Anyway, that's how it started.

So you actually lived together before getting married?

Yes, yes. Not an uncommon thing to do, but less common then than now. Yes, I think we actually got together in 1951 and married in '53. And had our fiftieth wedding reception at the LSE in 2003. Nice, a nice affair.

How did you get on with her parents?

Sorry?

How did you get on with Ailsa's parents?

Perfectly well. They were, originally I think it's come out of some conversations already, slightly suspicious of who she'd picked on, or picked on her. But in fact I got on perfectly

well with the mother. The father we saw much less of and he died very early, he died in his fifties from cancer and the mother died also early from cancer, but she was in her sixties when she died. So they were both, they both died very young, so Ailsa lost her parents. She was an only child so she had no siblings. We were both working so were comparatively well off. We lived first of all in a house Ailsa had been given by her father – given by her father – her father had contributed to it and the house was bought for, if I remember rightly, 1500 pounds, but that was before I came, and it was an interesting house. It was a Georgian artisan's dwelling. Most Georgian houses one thinks of as rather grand, but this was an artisan's dwelling but in the typical Georgian layout. So it was a rather pleasant house, but which had at the time no facilities, so it had a little bit added which had bathroom, toilet and all those things, things which didn't exist in a Georgian artisan's house.

[04:54]
Could you describe this to me?

Yes. Do you know the normal pattern for a Georgian house? The main rooms are on the first floor.

And it goes up.

So you've got the tall windows on the first floor and you've got smaller windows on the third floor and the lower floor, so it was in layout very much a Georgian house, but the rooms were much smaller than typical Georgian rooms and the whole surface area was much less, though not bad, and it had a nice garden. And the house became the refuge for really a vast number of families at one time or another. If they couldn't pay rent they went up into the attic. At one time we occupied a single room there and every other room was occupied by students and people like that. So it was quite a lively place.

So were these rooms rented out?

They were rented out, they were rented out. At the bottom, we made quite a lot of structural changes at the bottom to enlarge the room sizes and that's where I think Ailsa mentioned, talked about this widow who's now going into sheltered accommodation, she lived there with her husband. Ailsa already had the house before I came and had had residents, but we had a

succession of residents, they were passing through and some we were very friendly with. One of the things we did was always to give student parties. As we got a little bit more affluent, both with jobs, we occupied more and more of the house, so we took over, as people left we took over the parts. So by that time we were living, by the time we… '53, '54 we were probably occupying much more of the house and we always threw student parties and I remember one particular one, a Mexican party. It was hosted by our Mexican students and they just wouldn't go away, they stayed there drinking. They weren't too bad, it was still going on. There were quite a lot of those parties.

Was this when you were staff at the LSE or still students yourself?

I was at the LSE, I was at the LSE… no, I was at LEO and Ailsa was at the LSE, but the Mexican party, by that time I was at the LSE myself and we were occupying then the whole house. In fact I'm totally misleading you, by that time we were living in a different house, we had moved.

Where was the Georgian house?

It was in east London, in Leytonstone. And it was facing on to Epping Forest. Epping Forest comes right into east London and on one side of the road were a row of these odd houses, some of these Georgian houses, some Victorian houses, some more modern houses, and they were facing on to a common which was the part of Epping Forest. It was the very end, sort of came together, the very end of Epping Forest. So it was really rather nice and us here, the Epping Forest had its commoners and the commoners kept cows and these cows would wander on to the road. And a very vivid memory, one of the London fogs, we were coming home and trying to find our way home through the fog, it was very, very thick fog – you don't see that kind of fog now, perhaps you can see it occasionally up on the top of… in the Lake District - very thick fog, we walked into the cows and Ailsa had great surprise, walking into cows at that time. Anyway, that's not germane to my career very much.

[09:40]
How did your domestic life change when you started working for LEO?

It changed to the extent that I really worked all the hours of the day and night but we kept, we insisted we keep our weekends free. I don't think I ever, maybe once or twice, worked at the weekend. Other people did, but I made it a matter of principle I would not work at the weekends. But working all through the night was not uncommon and then getting a little bit of rest and then starting again, without coming home. When I say not uncommon, it didn't happen every day, but it happened sufficiently often to disrupt life to some extent. Then we started to have children. Our first daughter was born in 1955 and at the same time I suddenly succumbed – I was working at LEO, by that time I was making, 1955, had quite a lot of responsibilities, I was making definite progress, I was one of the people who were sort of targeted for being on the upward path and I suddenly got what appeared to be tuberculosis. And I had a cough and I had some blood and I went to the Hammersmith Hospital which was very close to Cadby Hall. And to my surprise he immediately called me in, he said you can just go home and get your clothing, come back again. And I was more or less written off, well he's got tuberculosis, that's the end of him. But in fact I had a disease which apes TB, called sarcoidosis, I don't know whether you've ever heard of it, sarcoidosis, and which can be quite easily treated with antibiotics. So I was in hospital for two or three weeks only and was then released and perfectly good, except that I had to have something you know well about, regular injections. But these were big injections, my bottom, and I had to carry with me my bottles of stuff and wherever I went, and I was travelling quite a lot, I had to go to the local hospital to get these jabs into my bottom, which became quite sore. [laughs] But that was a very… in the passage of time this became a very minor incident, though at the time of course it seemed very significant, particularly as we'd just had our daughter.

[12:38]
What is your daughter's name?

Frances, and she lives in Bristol and is a solicitor. And her special, her speciality is… oh God, the name escapes me now. When you try to get people to go together and to compromise, rather than litigate.

Conflict resolution?

It's conflict resolution but there's a name for it, a very common name which is just escaping me, it'll come back to me. [mediation]

Interested you mentioned that you thought you had TB and that was it – was that how you saw the disease at the time?

At that time TB was still very life threatening. Less so than it had been earlier, but it was still regarded as a very, very serious thing and people actually did think well, yes, maybe he'll linger on, but… Anyway, it turned out not to be, luckily, and I proudly have a record of having had sarcoidosis, which is a comparatively rare but well known condition. Nowadays they know much more about it than they did in those days.

Where were you living by this point?

We were living, at that time we were still living in Leytonstone. We lived for most of our early life, early married life in east London, first in Leytonstone and then we moved to Woodford. I don't know whether you know Woodford? Woodford is relatively upmarket, Leytonstone is relatively downmarket. One is very much working class, the other is very much middle class. Anyway, we moved from Leytonstone to Woodford. We sold the house which had been bought for 1500 pounds, we sold it for about 6,000 pounds, which was a relatively good price in that time, and we bought a house, quite a grand house – it was a very grand house – for what, 25, 30,000 pounds. Absolute peanuts. But then, my first salary at LEO was £315 a year. And Ailsa was getting I think about 400 at the LSE. Then I gradually moved up. And I don't think we were ever terribly well paid at LEO, but somehow or other we stuck there because LEO was something, was something else, it was something different. One knew we were in something which was rather special, and that's why, perhaps some of our arrogance came from. [15:38] Nevertheless, we had the, what was to us, the terrible disappointment of the merger with English Electric. It was sold to us that it was a merger, but it wasn't, it was an acquisition by them. It was Lyons selling out. Lyons selling out and we felt we were sold out. And the atmosphere changed, we had these other people to contend with and we in many ways despised these people, and I mean that, we really did despise them. The boss, in particular, our very strong man, very confident person who had been our boss, TR Thompson, suddenly became number two to Wilf Scott, a person he could actually run rings around. I'm not saying that Wilf couldn't… might not have been a better manager, he might have been, but intellectually he was not a patch on Thompson and Thompson felt this grievously, he was really hurt by it and in the end he left to join the Shell oil company where

he had, went in with a lot of promise as the man to do things, but really had very little support and in the end that collapsed. So he had a really disappointing end to his career, first with the merger, then with the… he went to Shell, where he thought he could transform the company or transform business processes, and he was inventive and innovative and they wouldn't buy it. They were traditionalists and they didn't buy it, didn't buy his ideas. And from having been in a position where if he had an idea it prevailed because he pushed it, he was now in a position where he had to fight for everything and no longer had the skill to do that, which he might have had in his younger years when he first started his career. Well, that feeling… we all had that feeling. Nevertheless, we stayed with this merger and company, I was still in a very senior position, I was still called Chief Consultant, although I was second in command.
[closed between 18:21 – 18:41]
So an element of questioning began to develop in me. At the same time Ailsa was rising in her academic career and then in 1966, '67, sometime around then, Ailsa was awarded a sabbatical and she got an offer of a visiting position, whether a chair or professorship or something slightly less, I don't know, in Wisconsin. And we wrote to Wisconsin and said, I'm doing this kind of thing at LEO, would you be interested in taking me, and they wrote back and said yes. So I went to my bosses in now English Electric LEO Marconi Computers, the full mouthful, Marconi were then at that time part of the outfit, and asked would they give me a sabbatical, can they live one year without me and give me a sabbatical. And they were absolutely clear, no way were they going to give me a sabbatical. And I really felt quite angry at that because I thought there was no reason at all why they shouldn't be able to do that. I was not indispensable, or if I was indispensable then I shouldn't have been number two.

[20:23]
Did the merger actually take you by surprise when it happened?

Yes, it did. It was totally secret, we were told and we had no expectation of it. And we were sold, we were told that it was a merger, that we were joining together with them, but it was very much the other way round. They were the acquirers, Lyons had sold out, had really sold out.

How did you actually find out?

We were told, we were told that the merger had actually taken place and the story gradually emerged what actually happened. I've talked previously about our leaders: TR Thompson, Caminer, Simmons, but in fact the chairman of the LEO company was a member of the Salmon family, Anthony Salmon and he was moderately good, he was quite good. The family was very mixed; some of them were really very, very bright and really good at their job. They were all third, fourth generation Salmons and Glucksteins and they'd gone through the firm by starting at the bottom and going to the top, but that meant that they spent a week at this department and a week in that department before they got their higher positions, and some were simply awful. My brother's boss was Mr Felix Salmon and he was just not interested. He was interested in art and he wasn't interested in that, he wasn't very bright either. So he made a muck up of it. Mr Anthony was a little bit better than that. I wouldn't have thought he was in the top drawer. He was a member of the family and the family lived on the fat of the land. They could indulge themselves and they did indulge themselves. And they had no hesitation in indulging us occasionally as well. So by giving the LEO people a dinner in one of the top hotels, the Trocadero or something like that, but in the end they had no compunction of selling us down the river either. Or, not selling us down the river, selling the company off when it became apparent that the net outgoings were… the investment they required in order to keep this business going exceeded the kind of income which it would generate, they simply sold out. And they were absolutely right to do so I think, but the way they did it was to us a betrayal. If you look at it from a higher level, yes, they sustained the company for a long time, they had sold a lot of computers, they had made some money, but by and large their total investment in computers I don't think was ever repaid. Came to perhaps just break even, but it wasn't a return and by that time the Lyons company was in difficulties. It was in difficulties not because of the way it ran its business, but because it had attempted to expand beyond the UK, it had made investments in dollars when the dollar was… I'm not sure now, it had used the wrong currency, as a result of that, that which had been perfectly reasonably suddenly exponentially started rising and it got itself into difficulties and had to sell out. But this happened after I left, to the Lyons company itself. But by '65, '66, '67, it was feeling the pinch and got rid of, got rid of LEO. [24:39] At English Electric, I have to say I was made responsible for all applications inside the English Electric company, something which was not very welcomed by the English Electric technology managers, IT managers, and I was much more of a figurehead than actually able to implement anything. I did some work with Marconi on their systems, but by and large my influence was fairly minor. The apparent role was much bigger than the actual role, because

nobody was told, he's the boss. So I had a kind of monitoring role more than the executive role. And yes, that was fine, it was interesting, I could see what was going on, but I could see their primitive systems using English Electric computers as against the much more sophisticated systems we've been talking about, we've been dealing with. And they were primarily on that time on the Deuce. The KDF9 had already been launched, but the KDF9 was primarily used in the universities and as a technical computer, it wasn't used as a business computer. Of course the KDF9 had lots of innovations, in particular – probably you know about that – the stack. This was an arrangement of the store called a stack, where you can optimise the way the store is used. Nevertheless, it always sticks in one's mind, the compiler they wrote for ALGOL, the Whetstone, the so-called Whetstone compiler for ALGOL, didn't use the stack. So it didn't make use of the most advanced feature of that computer, the KDF9. That's very much by the way. Anyway, the Deuce computer, at LEO we had learnt that you, anything which is over the medium term is likely to vary, you treat as a parameter. In English Electric they hadn't learnt that yet, they hard coded these things into the code and so if there was a change in the value of that variable, you had to change the code. Whereas with LEO a simple amendment form was put in to change the parameter. So we were parameterised and they were still doing a hard, hard wired the coding. The software was primitive, their compiler software, their operating system software in particular was absolutely primitive against what we had. So there were odd people still coding the machine code, which we'd never used. We had always gone to assembler level, they were still using machine code on things. This was in the sixties when… far beyond the time when one ought to be doing that. So this explains some of the contempt we had for them, why we thought ourselves so superior. We were superior. They had produced a small computer, the KDF2? I've forgotten exactly the name of it.
Six?

Which was designed as a process control computer and was splendid for that purpose, for industrial use, as a process controller. But they converted it into a business computer called the KDF6. That was really a very miserable computer indeed in terms of its capabilities, but they persisted in trying to sell this over our LEO computers which were, without any doubt, very much better, had much greater capacity, were much more suited to the kind of business processing which we were doing, rather than this hybrid KDF6 which was really developed from a process control computer with very different requirements. All these things led to a certain amount of questioning, nevertheless, I was extremely well treated, I was well regarded

and I had important jobs and interesting jobs. So there was the failure to give me a sabbatical which I felt aggrieved about and then I was offered a job by CEIR – have you come across CEIR? Later became the company SCICON, one of the big international consultancies. They headhunted me and offered me a very senior position at a salary well above what I was getting, and again I very seriously thought I would take that and I went back to LEO, the LEO people and said look, I've received this offer, and they immediately matched the salary and sort of patted me on the back, you're the top guy, kind of thing, here. So that was very flattering, so I stayed on, I didn't go to CEIR. I always wondered what would have happened if at that point I'd gone to CEIR in that very senior position. [31:00] Instead of that, I stayed on at LEO for another year or so with that fairly deep feeling of dissatisfaction about the way the merger was working and at that time the LSE, the LSE had already established a small computing group within the statistics department and they were providing a kind of a computer service. The, one of the statistics professors, Gordon Foster, had this under his control and he was very actively interested in pursuing the idea of LSE taking computing seriously, both as a service to the whole of the LSE community and as an academic subject as a discipline to study and research and develop. And opportunely, the NCC, then a government body not a private body, offered grants of £30,000 to two places for establishing teaching and research in what was then called systems analysis and I don't know who bid for that, but – the full range of people who bid for that – but certainly Gordon Foster was one of the people who bid for it and Sam Eilon, Professor of Operational Research at Imperial College, also bid for it and they're the two who got the grants of £30,000. The LSE then thought who could fill that position and I don't know whether it was a competitive thing or whether they came straight to me, they knew of me through Ailsa of course, I'd known Gordon Foster slightly, not very well at all. Anyway, they recruited me, they asked me whether I would take that job and by that time I was willing to do that, for probably a range of reasons. One, dissatisfaction with what was happening in the UK computer industry and particularly with English Electric LEO. The possibility of going back to LSE, which was after all my alma mater and where my wife worked. So I was very tempted and I was offered, because the grant covered only part of what was required, I was given the job of computer services manager to establish a computer service at the LSE and a research fellow and management to do the other side, the research into teaching in systems, what was systems analysis. And I moved to LSE. There was a great deal of sort of head shaking, why was I doing this, but I got a very good leaving party and well wishers from the LEO people. So the transition took several phases: the merger, the sabbatical, the offer from CEIR and by 1967 I

was ready to move and moved to the LSE. Also by that time I was beginning to feel a real need to reflect on the experience I'd had for the previous sixteen years. I'd been sixteen years in LEO and I felt that I had done the job and I'd gone on doing the job, but I'd never had the chance to really reflect on why we were doing this, what we were doing, what we could learn from that. And so the idea of going to university and studying it in a much more reflective way was very appealing and I thought that was something which needed to be taught, because again, from our arrogance we knew how to do it, if we wanted to teach it, so that we didn't go down the way English Electric had gone with their stupid systems. They will hate me for that. But that's how it was.

[36:05]

How did you feel to be leaving the computer industry after sixteen, seventeen years by this point?

Sixteen years, I'd been sixteen years at LEO. How did I feel? Well, I felt at one level that change was necessary for me. I'd reached a kind of limit there within the merger and very soon after that the negotiations were already going on for the ICL, the formation of ICL. That was going to cause even more personal grief, fighting for positions. Instead of fighting for one, in fact advancing the cause of computing, one was fighting for positions. Many people felt that. They were fighting for their position within the company, they were fighting for their careers. And the move was a good one, it was the right timing. [37:08] And I went back to the LSE which I'd always had great feeling for and I had this, these two jobs of establishing the computer service, which was fun, and where I had some ideas on how to do that, and establishing research and teaching. Now as I said, there had already been a small unit within the statistics department who were very much computer science and numerical methods inclined, that was the direction they were going and I wanted to go in a completely different direction. So there were two people, in particular Mike Garside who was the head of that group, and – I've forgotten the name of the other one – they decided subsequently to leave and went to Southampton University and had reasonable careers. Neither of them made it to the top, I don't think either of them got a chair, but they made reasonable academic careers in those places, going in the direction much more of the numerical method side rather than the kind of business process applications I was interested in.

[38:42]

You mentioned the computing service aspect of it there, had you been responsible for the computing service bureau at LEO as well?

No, no, never. Oddly enough, my brother had been at one time for a period. But no, I'd never done that, but I'd seen it, I knew how it worked and I worked with those people. I'd never had the responsibility for that.

I was just wondering what the regional offices you described earlier actually did?

The regional offices were primarily sales offices and consultancy offices. The way we… they were sales offices, let's be blunt, just sales offices. And they helped our clients, they had no permanent staff but if a client needed something we would bring in people from London and they would stay in Birmingham and work with the particular client we had. That was, at Birmingham it was Smith & Nephew, primarily. In Manchester I think it was Renold Chains and in Glasgow it was Colville's. So these were the range of companies which we – there were others too, but they're the ones I remember – who we worked with quite closely and our regional office had responsibility for that. The regional office in Rotherham, in Sheffield and Rotherham, was actually an office within English Steel, within the steel mill. They had space in which we rented our LEO office.

What was typically in one of these LEO offices?

Really quite a small suite of offices, perhaps three or four rooms, no more than that, one of which I would occupy when I came there. I was there, I was peripatetic; I went from one office to another. I had my main office in London and operated mainly from London, but I went to these offices and would stay there perhaps a few days and then move on to perhaps another office. So there was always a local manager and my local manager in Birmingham subsequently became the Privacy Commissioner.

Who's this, sorry?

Can you remember the names of the Privacy Commissioner? There's a man called Thomas, but this is the man before Thomas. He was the first Privacy Commissioner, was my second in command in Birmingham. So each office had its own second in command who was

responsible to me and my job was to lay down what that office did, basically, and monitor what they were doing and particularly see clients and try to drum up business.

[42:01]
Sounds like there was a lot of travelling involved as well?

There was quite a lot of travelling. At that time I was doing a great deal of travelling, I was doing an enormous amount of travelling.

How did you travel?

Considerable amount of travel by car, but also of course by rail. Glasgow by air, always by air for Glasgow.

Did Lyons English Electric fly you first class or business class or economy?

No-one expected, at that time one was expected to travel first class and I had a company car. I had a Ford Zephyr so it's quite a good, quite a big, biggish car. I started with the Hillman and then as I went up I got bigger cars. [laughs] One did. One of the…

What did you actually wear to work?

I think I wore a suit. Generally one wore a suit. One was expected to wear a suit, certainly a collar and tie, shirt with tie. And yes, one was expected to wear the suit and in particular as one met senior people, the managing director when he carved the meat would be properly dressed. Yes. Things were far less casual than now, everyone was addressed by one's superior by one's surname, not Frank, but Land.

Is this your superiors within LEO or your superiors…

Within LEO, within Lyons, one always addressed one's inferiors, the people who were responsible, one addressed them by their first name. That began to loosen towards the end of the period, but certainly at the beginning this was absolutely *de rigueur*. It went with the

managerial lavatories and all that kind of thing. Again, something which was finished after a time. I don't know at what time they dropped these things, but they did begin to drop them.

As someone who moved up through the different grades within Lyons, could you describe the difference in the lavatories to me, it's something I can't quite imagine.

The only difference was the managerial lavatories were used less frequently because there were fewer managers than other people. They were equally clean, they didn't have thousand pound lavatory seats. No, I don't think there was any significant difference to the feel of them.

No gold-plated taps or anything?

No gold-plated taps, though in the directors' lavatories there might well have been. I don't think I went to the directors' lavatories. I might have done, yes, yes, when I was in the directors' dining room. Sometimes Anthony Salmon acted as host when we had important people and he was a very good host. Oh yes, yes, quite an interesting thing. At one time, one of the things Lyons was attempting to do was to become the caterers for the aircraft industry, and so they had devised a, they had taken an actual plane and made that the centre of entertaining clients as if one was in the first class compartment of an aeroplane and getting the absolutely first class dining experience there with Anthony Salmon acting as host, it was something of an affair. In particular, one of these kind of irrelevant things one recollects is Anthony Salmon showing how one should eat an apple turnover, one of those things, Lyons ones, which was perfectly cooked, then you had to use your fork to make a little hole in it and then pour cream into it, that was the way to do it.

[46:39]
Did you have to entertain clients often?

Yes, yes, yes. Yes, that was one of the things one did and one learned from people like IBM how important it was to do that kind of thing well.

How does one do it well?

One does it well by providing the facilities in as natural way as possible, not going, not saying, this is what I'm doing for you, but providing it in a very natural way. You come to us, you expect to eat well with us, you expect to be well treated by us. We are people who do things nicely and not, I've laid this on specially for you and I wouldn't lay it on for anybody else.

Was this catering all done by…

By Lyons, yes, yes, yes. And of course LEO then had to pay the catering, for these services. I don't think I remember going out other than to a Lyons establishment. Either it was done at Cadby Hall or if one was in Birmingham then it would be done in one of the Lyons' establishments in Birmingham. They owned one of the big hotels in the Bullring there.

[48:05]
Could you tell me a little bit more about one or two of these clients you had to deal with? Are there any who stick particularly in your mind?

I've mentioned earlier Renold Chains and the managing director, a very traditional firm, but with whom I had a particularly close relationship.

I think you mentioned this over dinner rather than on tape actually, so it might be…

Sorry?

I think you mentioned this over dinner rather than on tape so it might be good to go over it again.

Oh right, yes, yes, yes. One of the traditional things in traditional British companies that at lunch or dinner for the board of directors, the senior man, the chairman or the chief executive would carve the meat. He would be brought the tray of meat, chicken or whatever it is, by the butler, he would carve it and hand out the portions round the table. More modern companies didn't do that, but some of the companies had this tradition of doing that and the one I remember best is Renold Chains, because I went to a number of their lunches and this happened. But other companies where one was entertained royally were ICI.

How royally?

Royally? That one was… the whole set-up for dinner was of the highest quality in gourmet terms. Their chefs might have been Michelin chefs, but it was also done with a… in a kind of manner which said, we are the most important company in Britain, we are ICI and if you come to ICI you will be treated as if you are royalty. It was that kind of thing. Slightly different to the more traditional approach of Renold Chains where they treated you well, but that was part of the way they treated people, whereas with ICI it was much more, you come to us and we are the lords of creation. And some of that one perhaps notices in the chief executive of BP now and that's why he's being so slated, because there's something of that tradition still running through that company.

It all sounds very ostentatious and I'm getting the impression from you that the idea behind it is to impress.

The idea is to impress, no question about it. To say, we are ICI and we don't do things in halves. When we invite you to come to a dinner, then it's going to be a proper dinner.

And this is the case as well for you with your clients at LEO?

For us as well, but as I said, we tried to do it in a naturalistic way rather than a bombastic way.

Do important decisions get decided over lunch at these grand dinners, or is it all just social and for show?

No. It's part of a decision process. I don't think decisions are taken necessarily at that time, though they can be. It's part of the decision process. If you treat people like that then there is a kind of goodwill which can build up. But in the newer atmosphere, which was coming with the American companies, everybody did it. So perhaps people were competing in the way they were doing it.

What part does it actually play in the wider business process?

In the wider business process, only in the sense that one gets to know people. One gets to know, in particular, the senior decision makers. There's a kind of intimacy sometimes can build up. It did so with some companies, it didn't do so with others. It did so, two companies I particularly dealt with, Renold Chains, which I mentioned. One of their senior managers, a guy called Jackson, and I formed a very close relationship. In fact we understood each other. And with Smith & Nephew there was a man called Hargraves who was one of their directors and became I think their chief executive later. Again, one built up that kind of relationship. Though in fact Hargraves was a very shrewd man and quite hard. Similarly at companies like Kayser Bondor and British Oxygen, one built up relationships. The companies one worked with, one tended to build up relationships and these relationships were important in getting things done.

[53:38]
Could you give me an example?

I think so, yes. It's not easy to quote specific examples, but I had particular ideas at Renold Chains about how the business process should be and I had somebody in Jackson, somebody with whom I could share that view and because we had this reasonably good relationship, this kind of intimate relationship, he could then see that this was the way we would do it rather than an arm's-length relationship where he could take a sceptical look at it. With Hargraves at Smith & Nephew it was rather different, he took a much… he was much more inclined to ensure that any decision he took was in the interest, not of LEO, but in the interest of Smith & Nephew. There was a kind of, you are not part of us, attitude. Whereas in Renold Chains one didn't feel that. Yet the relationship with Hargraves was a very good one.

That sounds like a very busy period.

A very busy period, enormously busy period.

[55:15]
Is there still time for a social life outside work or…?

Yes. There was time for a social life. Certainly at the time we were bringing up a family and… there was time. One spent a lot of time away, but one… but not all the time. One was very close with other people, but yes, one came home and once again I made sure that the weekends were always home, I was home at weekends. In general both, mostly, both of us were – because Ailsa was working as well – we were at home in time to put the children to bed. We had a nanny, but we made sure that we were there alone to put the children to bed. She didn't put the children to bed, we put the children to bed. Not every single day, but the vast majority of time. We tried to ensure certainly that kind of family life and we had a social life going out and playing bridge, we talked about bridge at dinner. We weren't very good at it but we played a lot of it.

Who did you play bridge with?

Played bridge with some LEO people, played bridge with some LSE people. But I think Ailsa said, that diminished enormously once we had a family, because then much more of our time was taken up with the family and I think we went out much… we went out far less. Yes, that was true, we went out far less.

When are your other children born?

Richard is four years younger than Frances – I think four years younger than Frances – and Margi is two years younger than Richard. I think I've got that wrong. I think Richard is two years younger than Frances [laughs] and Margi is four years younger than Richard. Yeah. The gaps are slightly different. There was quite an interval between Richard and Margi. [The correct dates are: Frances 1955, Richard 1959, Margi 1961]

Do you talk to your wife much about work? I'm aware you both started off as economists.

One of the things, at our fiftieth wedding anniversary at the LSE I made a speech and I said, what's the secret of a happy marriage, and I said that I don't understand what she's doing and she doesn't understand what I'm doing. And I think there's been something of that. In academic temperament we're very different. Ailsa has the ability to focus on very narrowly, on a topic and if you're going to do algorithms you have to do it that way. I have always been far more interested in the broader aspects of a subject, though understanding that the devil is

in the detail. That I learned from LEO, that you can't ignore the detail, the detail is the most important thing. Nevertheless, I was interested in context and broader issues and where are we going. Ailsa's thing is, can we crack this particular problem. Why do I want to crack it, because it is an academic problem, it's a problem to be done, how can this be done. My questions would be different ones. What, by cracking this problem what do I get, what do we get out of that, why do we do that. So we are temperamentally academically very different. We were in the same department, and again, another difference is I, although she'd been in the department longer, I became head of the department and she could have become head of the department, but we chose somehow that she wouldn't be appointed, because I took it as a matter of course that that's the sort of thing that happens. So I became, I was convener of the statistics department. And the statistics department comprised – it was a very large department with lots of different themes running through it: mathematics, demography, statistics proper, computing, operational research, and each one had their own group which by and large didn't know what the other groups were doing. So it was in that way an unsatisfactory department. But I think… and that's one of the reasons why Ailsa didn't want to run it.

[1:00:51]
We've got about ten minutes left on this before I'm going to have to change the card, but I have one or two questions that have popped up into my mind.

Yes, right.

Looking over the whole course of this, there's an academic argument that British companies were quite slow on the uptake when it came to computer equipment and I'm wondering as someone who was in that position of selling it to them if you think there's any truth in it?

Over large parts of British industry there was reluctance to make changes of that kind. A suspicion of computers, but it was partly a suspicion of something which went beyond the tradition of the way we do things. I mentioned that we in LEO had this particular urge to see what is the business doing, how could we improve it. And we could go to a company, let's say Dunlop, one of the companies which bought our computer, and we'd see that they had a pricing system devised in the 1930s which was totally irrelevant to the 1960s and we'd try to talk them into it, but no, that was the way we do things. Now they did buy a computer

because they had one guy there who saw this won't do and who co-operated with us in trying to make changes. The Dunlop account was handled by the same guy who later went to British Airways and did the Boadicea system and he was really very good, he got a first in mathematics at Cambridge I think.

[closed between 01:02:54 – 01:03:31]

It sounds to me like what you're saying about this business about computers and industry is it wasn't so much the computer itself as the systematic change that was…

Yes, yes, very much so. And this is I suspect one of the reasons why British industry started to disappear. And these names I mentioned to you, you don't even know them – Guest, Keen and Nettlefolds, CAV. Lucas you probably know. CAV was part of Lucas. But the ones whose names… ICI, the premier company in the UK – where is it now? It still exists in the sense that Dulux is what used to be the paints division, but it's no longer part of a company called ICI. And ICI with IG Farben in Germany were the chemical giants. And I particularly witnessed the demise of ICI through this small part of their business, Lightning Fasteners, which I mentioned yesterday.

[1:04:51]
You mentioned amidst your reasons for wanting to back into academia a dissatisfaction with the way that the computer industry in Britain was developing. I wonder if you could unpackage that a little bit more for me – what were you dissatisfied about particularly, apart from that particular situation at EE/LEO?

Partly that the logic of merging and trying to go along a single path seemed to me short-sighted, that some kind of diversity in thinking was important and particularly where the industry is an innovative industry where innovation has to be there all the time, you can say okay, then you must put enough resources into it and you can only put the resources into it by being big. That's very true too. On the other hand, it tends to limit the range of possibilities and it seemed to me important that we maintained something of the diversity, though not the complete diversity we had because we had far too many companies and far too many companies who weren't doing at all well, so that some kind of co-operation and collaboration was necessary. But the second thing about it was the way it was imposed. It wasn't imposed,

in a way, through the companies wanting to co-operate and seeing ways of co-operating, but being told you will co-operate. Something which is not easy to do. Did it work? Where are these companies now? ICL did not survive. They were bought up by Fujitsu and Fujitsu in the end gave them away. So I suppose one could say the proof of the pudding is there. But part of the feelings are much more emotional and concerned with one's own position and the way one felt one was being betrayed, that this was not the way we could have gone, we didn't, by joining with others, we didn't make the most of what we had. We were sidelined and the particular skills which we felt we had and which we felt were superior to other skills counted for less.

Betrayed by who exactly?

Betrayed by, first of all by Lyons who sold us to English Electric, betrayed by the government in setting up ICL and ICT in effect became the boss.

[closed between 01:08:31 – 01:09:46]

And people like - I observed that by that time from outside – people like John Pinkerton, there was a fight for who was going to lead the new research, which direction, in terms of types of computers and computer technology, which direction to go in and somebody who was to us by far the most outstanding person in that area, John Pinkerton, was sidelined. He was made Head of Standards. Now, being John Pinkerton he did that job extremely well and his own modesty made him feel that's okay, but to people who knew him said, this is total waste.

[1:10:57]
I've one final question for this evening as it's getting quite late.

Yes.

I was just wondering – I actually have two questions – I was just going to ask you, could you describe John Pinkerton to me? He's someone I know is involved with LEO but hasn't really come up before.

Describe John Pinkerton?

Yeah, what sort of person was he?

John Pinkerton was really a great engineer, he had a particular capability of thinking in innovative terms. He thought how can we do this, finding ways of doing it, but always having his main eye on saying okay, if we're going to do these new things, it's not worth doing them unless they do something good, unless they do something worthwhile. And he had this particular skill in bringing in innovation into productive use, partly by himself personally monitoring how, what were we doing with this, does this really fit into the picture of what this company, what we're trying to do, into the bigger picture. He was outstanding, he worked very closely with a range of people and he himself had a personal modesty, lack of arrogance, which was extremely successful because he could work with lots of people and empower them and there was a feeling of trust between them. The IEE now runs an annual Pinkerton lecture on bringing innovation into practice. So this fitted extremely well into the kind of systems thinking of the LEO, so that was… he was highly successful, as I say, in addition to being a personally charming, modest man. One of our recent visitors here, incidentally, was his widow, Helen Pinkerton, who herself is a very, very bright person, she was a very senior civil servant.

[1:13:35]
My last question, and I'm aware we've only got two minutes left before I have to switch this off, do you feel that the British computer industry from your point of view got enough support from the government?

No. There was quite a lot of discussion on were we getting enough support from government and what can we do about it. And the answer was, no we felt the government departments, the civil service, wasn't ambitious enough in terms of how it was using computers itself. And the kind of support which one could have got through applications was missing. Later on there were a few departments, and particularly the Post Office, which led the way in turning to trying to use computers effectively and making people aware of the fact that they were doing so. And this is the Post Office which is nowadays derided for its lack of innovation. And the head of that died quite recently, he would have been a good person to interview – Murray Laver, who actually lived quite close to here.

I think that seems a good point to stop for the evening.

Okay.

[end of track 9]

[Track 10]

When we were talking last you'd just started at the LSE.

Yes.

How did you find the transition from industry back into academia?

In many ways I found it quite exciting, I got involved in a whole lot of different activities, but which were nevertheless related to what I'd done previously. It was no longer a question of having to justify oneself by actually selling computers, which became more and more a dominant feature of what we were doing, whereas first of all the dominance had been on understanding the system. Later on it became more and more on selling computers because the market no longer wanted to know what we knew, to a much greater extent. Yes, it was very different but of course I brought into LSE some specialist knowledge which didn't exist there and that gives one a feeling of strength in a way. And my first task was, as computer services manager, was to talk to all the senior academics on what they expected from a computer service and to tell those who had never even thought of using a computer service that there might be something in it for their particular department which they hadn't recognised. I came across all sorts of things. I found in the anthropology department I think, somebody who was interested in the development of Russian or something like that, and so one of the first things I did was to acquire a computerised dictionary, Anglo-Russian dictionary for him to work on. So all sorts of interesting little sidelines from departments which some of them wanted to use a computer but didn't have the facilities and now they had somebody to talk to who understood what it was about, whereas previously there had been very little of that kind of thing. It was the first really central service. At first the thought was that it was mainly going to be used by the statisticians, but in fact it began to be used very widely.

You mentioned that you asked academics what they wanted of a computer service, what sort of things did academics want of a computer service at this point?

An enormous amount was dealing with surveys. Statistical analysis of survey data. But there were also these things like the language man, the Russian man, but predominantly it was that.

There was also those in the statistics groups who were actually doing development work in statistics. So on the one hand there was development work on the statistics, algorithms and packages, on the other hand there was the users of the survey things. This was before the days of SPS and things like that. The amount of information which was available was restricted. But there was a two level system – we had our own small LSE computer and we had the university computing service. And the university computing service at about that time acquired an Atlas and one of my roles was to liaise with them, and in fact I was on their management committee, I came on to their management committee, to work with them for all the major jobs. So the smaller stuff was done and the pre-processing was often done on our own computer and then it would go on to, in batch mode of course, to the Atlas computer, to the central computing service.

[04:19]
Is this the University of London Atlas?

University of London computing service, yes. And the other thing is that there were several other colleges in the university who were thinking of the teaching side and in particular, Birkbeck College, and I was asked there to join, to give a part-time course there in their new computing degree. I don't know whether you've come across Dick Buckingham? Dick Buckingham was one of the fairly early pioneers in computing and he was the University of London head of their computing, but he also set up this group in Birkbeck College to teach computer science and they asked me to teach the systems analysis and more information systems side of that course. Some quite well known people were in that group, working in that group, people who subsequently made their reputation in computer science.

Such as?

Have you come across a man called Florentine? Some of the early… he was quite important. There was one particular person I'm trying to remember now his name, I can't remember it, who became very well known, but I can't remember his name. I know he became head of computing at University College.
[06:05]
How was your experience as an Atlas user?

How was…?

How was your experience as an Atlas user, user/manager?

Generally the system worked quite well. We had our grumbles. I don't remember any major upsets. Generally it worked quite well, the question was what could we do ourselves and what should we do ourselves and what should we offload on to the central service. It worked reasonably well. Users gradually became more or less independent in their use of the Atlas so it didn't come through our computer service, they went directly to the Atlas. We short-circuited that, we didn't want the red tape of having to do it through our system. So the user had in effect two systems they could use. But one of the things I introduced, which was of course quite common, is I established in our group, in our computer services group, specialists in each subject, for each main department, each department had its special subject expert in our group and this went very well so people had somebody they could talk to in computing terms who understood a little bit at least of their subject, of their discipline.

What computer facilities did you actually have within LSE?

We had a 1440, an IBM 1440, very small computer, don't know whether you know the 1440? It was the lowest of the 1400 series. You know of course the 360? Well, IBM initially thought they would build a pre-processor for what was going to be the 360 series and this was the 1400 and 1440, but they were sufficiently powerful that they became independent computers and a huge number were sold as independent computers to smaller companies who couldn't afford the bigger computers. Whereas it had originally been designed simply as a pre-processor.

How did it compare on a sort of computing power level to the LEO machines you'd been selling before?

Sorry, I'm not hearing – could you speak up a little bit?

How did it compare on a computer power level to the LEO machines you'd been selling before?

The LEO III was much more powerful than a 1400 series. It was on a par with the middling 360s. Much less powerful of course than the Atlas. It was a baby compared to the Atlas. But the other side of course was to establish teaching and research, which is what I was engaged for primarily, to establish teaching and research there and to build a team up. [09:29] So at first the team consisted of myself and the people who had been, who were already there who I mentioned yesterday: Mike Garside and the other man whose name I've forgotten. But they were supplemented by a person taking a PhD, one of the earliest PhD in information systems, a man called Losty. Oddly enough he and I did not see the work… we had very different views on how to do it, he was very much more computer science-y in his approach to information systems and he'd done his PhD at the LSE and therefore it was a lousy PhD. [Interviewee's note: it was indeed a lousy PhD, but not because it was an LSE PhD] Anyway, he soon left to take up a position in Cranfield. He was actually pretty good, I'm maligning him, he was pretty good, we just disagreed about certain things and he was I think rather jealous of me getting the senior position. Anyway, he went to Cranfield and did quite well there, but relatively soon after that got ill, I'm not sure what it was, cancer or something, and died. So he died rather young, which was rather tragic and I felt very guilty about that because he was actually quite good, even if we disagreed about certain things.

What did you disagree about?

I think I felt that he didn't really understand business processes and wasn't sufficiently concerned about the business process which we were trying to serve. He was looking at it much more from the point of view of a computer scientist and perhaps that the computer scientist knew better than the business person. There was a little element of that.

[11:41]
How would you define the difference between what you were doing and mainstream computer science?

Mainstream computer science was concerned with – there are so many different aspects of it of course – but they were concerned with on the one side with numerical methods, very strongly with numerical methods and algorithms, on the other side with software engineering of the type, compilers and operating systems. Well, that's not what we were there to teach at all, we wanted to teach how we can apply computers in the business world, in the commercial

world, in the world of administration. One of the interesting things is, almost as soon as I got to LSE, the outside world of computing, like the British Computer Society, the CNAA – do you know what the CNAA was? We had… a binary system, the universities and the polytechnics and the polytechnics were governed by the Council for National Academic Awards, the CNAA, and some of the earliest people to start teaching computing, and in particular the business computing side of it, were the polytechnics and the CNAA was trying to develop appropriate curriculums for that and they got to know about my coming to the LSE and they quickly asked me to join them and I became chairman of the committee which was working on the curriculums. Very similar situation at the British Computer Society. They were trying to develop what was the standard for joining BCS and the BCS examinations, and again they had their information systems side and they had a committee under a man called Peter Cloot, who was the head of computing at Barclays Bank, to work out the curriculum, do curriculum development for the British Computer Society. And when Peter Cloot – I was asked to join that as well – and when Peter Cloot I was asked to take over the chairmanship of that. So I became quite heavily involved. And the third one of a similar type was IFIP. IFIP, WC… they have… IFIP was divided into a number of committees covering different domains, so there was one committee, committee number two which dealt with education. And they had a committee for information systems – W… working group two point something, I've forgotten what it was. And they were trying to develop a curriculum for graduate studies in worldwide, as an international thing, and again the same topic and I was asked to join that. This was actually under the chairmanship of Dick Buckingham, who I mentioned earlier. Again, when he left I became chairman of that committee. And we produced an – we produced and published – a book which is still… I still get the odd royalty for, it's a curriculum for graduate studies in information systems. That curriculum was fairly widely used, but the team which built it was a truly international one with major inputs from Germany, from Sweden, from the US – not from the US, not from the USA, they had their own curriculum committee – and UK. And we met at the Royal College of… at the, Shrivenham, the Royal Military College of Science, that's where we tended to have our meetings to discuss it. I remember quite a few working conferences and meetings developing that. So I suddenly became involved in a kind of international grouping and began to know what was happening elsewhere.

It sounds like a very busy time for committees?

It was a busy time, it was an interesting time.

[16:43]
Could we talk a bit more about each of these different committees in turn and what they did?

Yes, yes.

So starting with the CNAA – who else was on the committee with you?

Mainly teachers from the polytechnics. I can't remember a single name. It changed all the time, but we tried to establish what was the standard for a CNAA degree, for a polytechnic degree. Although I remember one man called Lucas. Quite a few… again, the polytechnics, rather than doing research, were setting down standards on curricula and writing textbooks, so whilst academics, whereas university academics were involved in research, the polytechnics had very little research per se, but they were writing textbooks and some of the textbooks were quite good and certainly our curriculum committee was very much involved in that activity. The people who were writing the textbooks were members of the committee. Yes, God I remember another guy from Wolverhampton Polytechnic who subsequently went to De Montfort and set up the very thriving computer department at De Montfort, what is now De Montfort University, was then Leicester Polytechnic. And from my position with the CNAA I became external examiner for a very large number of polytechnics. There are very few polytechnics at one time or another I wasn't an external examiner for.

What actually happens at these committee meetings?

At these committee meetings we would discuss and debate a particular topic, let's say evaluation of computer systems, how does one evaluate computer systems, what ought one to be teaching in terms of evaluating computer systems. You value them both technically and financially. So such a topic would be discussed and we would try to set down some ideas on that and it was quite a lively committee. And it would also assess what the polytechnics brought to us and said this is what we want to do and we would go over that. To get approval from the… it was necessary for a degree, it was necessary to get approval from the CNAA first. So a lot of these proposals came to us and the most exciting one came from Hong Kong, because Hong Kong had at that time a few polytechnics and as a body the Hong Kong

government or the Hong Kong authority, education authority, tried to get all of them approved and accepted by the CNAA. So a huge team was assembled in all the subject matters to go over to Hong Kong for a few weeks and to, I think for three weeks, and to evaluate each of the courses which were being offered and see whether they fitted the CNAA standards. We… the sort of thing one remembers is we were expected to fly first class but had the option of not flying first class and taking a member of our family, so I could take my wife. In fact I didn't, I took one of my daughters. Ailsa at that time couldn't come because she was involved at the LSE in courses, so I took my youngest daughter who was then a teenager. She had a marvellous time. But that was a wonderful time, going and doing that particular job in Hong Kong.

[21:54]
What else do you remember about that particular job, especially?

About the Hong Kong or about…

The Hong Kong job.

The Hong Kong job? Visiting the Chinese University in… the Chinese University was in Kowloon on the border of China. It was in Hong Kong, but it was a Chinese university, whereas the polytechnics were nearly all English speaking. And being provided with a banquet, a Chinese banquet, it was the first time I ate things, was offered things like sea cucumber and seaweed and things like that. Oh yes, and jellyfish. [laughs] Some of the more esoteric Chinese cuisine. One remembers not the important things sometimes, but the ones which are the… are different. The polytechnics were extremely good. We had no difficulty in our subject in giving them approval. I think by and large that was true of other subjects too. I don't know the full story, but those polytechnics were good, of course most of them are now universities. Hong Kong University was then a polytechnic. Altogether the higher education system in Hong Kong is very good, as it is in Singapore.

How did this job for the CNAA compare to say, the BCS?

It lasted much longer, it was a continuous activity because we were always monitoring what the polytechnics were offering and giving our approval. With the British Computer Society, it

was a more finite experience of setting down the curriculum, what was to be the BCS curriculum, but of course more and more of the universities were going for exemption from doing the examinations, so that at that time to become a BCS member you had to pass the examination, the BCS examination, but more and more people got membership through getting exemption from the examination through the courses they did at university and polytechnic, getting approval. And this committee was not engaged in giving approval. The CNAA did both jobs. At the British Computer Society that was a separate activity, which as far as I know is still ongoing.

[25:05]
Who else was on the BCS committee, do you remember?

The only person I remember is Peter Cloot, but there were about five or six people. It was in a sense a less memorable experience than the polytechnics because I got more closely involved with the polytechnics and for the BCS information systems at that time were more of a sideline. Maybe I'm wrong in that.

What gave you that impression?

Because the examinations were primarily centred on the more computer science-y subjects. You were expected to be a technical expert, not a business process expert. And I think that's been part of the… that's been characteristic of the BCS all along. I don't know if that matches your own experience. Are you a member of the BCS?

No, no.

Do you want to become a member of the BCS?

I've never thought about it.

It might be worth it.

What benefits does membership actually give you?

The BCS offers quite a number of things, but whether you want to take advantage of them or not. I mean it offers discounts on this, that and the other in a typical institutional way. In terms of computing it offers specialist groups which do interesting work and some of the specialist groups do very interesting work indeed, rather like IFIP. Some of them do good work, some of them just do very little. But if you're interested, I'm not sure whether they've got a history group. Tilly would know. I don't think they have a history specialist group. It would be a good idea to get one to work in liaison with the Computer Conservation Society. But the Computer Conservation Society has got a particular take on things as epitomised by the name of their journal, *Resurrection*. Did you know it was called *Resurrection*?

[27:44]
I did know, yes. What would you characterise as the typical Computer Conservation take on it then?

Re-engineer old machines. I mean they're famous for Colossus and Pegasus and all those things. Computer Conservation Society's main thing is the – people like Tony Sale – in rebuilding computers, providing perhaps, building emulators for old software and that sort of thing. So they're interested in the history of the technology as an object. That's a valid exercise, but it's slightly different from history which is a different, a different take on this. Yes, they're interested in that as well and they like to… it's interesting to see Colossus, but it's not as important. Much more interesting is how was Colossus developed, how did Colossus happen, who were the people who did it, how did they do it, rather than the object itself.

There are several questions I'd like to ask you later on computer heritage towards the end of this, so I'm going to come back to this. One thing that occurred to me though was what benefits did BCS committee membership gain you at the time, if any?

Certain activities which I quite enjoyed, like doing that. I have been an active member of a number of the specialist groups; two specialist groups in particular. I was involved in quite heavily, in fact I chaired one of them at one time, that was the Business Systems Specialist Group, which is now chaired by a good friend of mine, we worked together for a long time, Elizabeth Somogyi – I don't know whether the name rings a bell with you? It doesn't. Elizabeth Somogyi. She's quite a senior – she's retired now – and takes a very active part in

the BCS activities now and is quite a senior person in their committees, in their structure, Elizabeth Somogyi. But the Business Systems one I was heavily involved in for quite a long time and the other one which I'm involved in still is the Socio-Technical Group, specialist group. Again, I was… I've been chairman of that at one time or another.

Can we put some dates on these committee memberships please?

Yes. I became a member of the BCS… I was not a member of the BCS until I joined the LSE. I scarcely knew about the BCS. I did know a little bit about it because David Caminer had one of the *Computer Journal* papers in the early sixties. I think it's actually issue one, number one, I'm not sure. So I became a member of the British Computer Society almost immediately after joining the LSE and I became heavily involved in the early seventies and then throughout the seventies and eighties. Became involved, heavily involved in the Socio-Technical Group in the late seventies and early eighties. I'm still involved now, I'm still a member now, though I no longer… I'm no longer a member of the Business Systems Group under Elizabeth Somogyi. The chair of the Socio-Technical one is Chris Clegg from Leeds University. I don't know again, the name may not mean anything to you. Chris Clegg is not really a computer man, he's a psychologist, an industrial psychologist.

[32:04]
What's the purpose of the Socio-Technical Group in particular?

In particular, to… in particular to further the notion that information systems are socio-technical systems and that if you don't look at them as socio-technical systems, and that implies thinking about their socio-technical methodologies, and epistemologies, that this is an important attribute of systems and a socio-technical understanding is a requirement to make these systems work and I hold very strongly to that. And it's very much the basis of what we do at LSE, it nowadays has got the different versions, different names; actor network theory, various things like that, but they all derive from the notion of socio-technical and if a digression is in order, I can tell you something about socio-technical. Have you come across socio-technical?

I've come across actor network theory.

You've come across actor network theory, good, good. But socio-technical started, it started in the early 1950s, perhaps a little bit earlier even, when technology was being brought into industry on a large scale and the solution for Britain's problems, for example, was for her to be… to put more technology into manufacturing and one of the areas where this happened for example was the coalmines, the National Coal Board introduced advanced technology for the mines. And to their surprise, the productivity didn't rise as expected and people began to analyse that, particularly at Liverpool University, also a group in America, began to investigate that and they developed these socio-technical notions, that these systems of socio-technical, it's not the technical that you have to optimise or both the technical side and the human side, the social side. And that the relationship between the miners and the deputies is more important in terms of productivity than how good the technology is. The technology can only be used properly if the other side works as well. So that's really the underlying notion of socio-technical and it came from the industrial field where it was in, also very much a reaction to the, what was called the Taylorism of the assembly line, that in the end that kind of use of technology was stultifying and didn't yield results that one expected. The other thing for which socio-technical is noted is that it carries its values on its sleeve. On the whole values are limited to economic values when we're talking about systems, does it give us a… does it improve the bottom line. It shows you technical movements, that's only what we really… what we have to be after in designing a system is improving the quality of working life and it carries that value with it, so everything is examined, not only through does it add value to the shares, but does it enhance the quality of working life. And the theory is that you cannot get the prime objective of shareholder value unless you also get QWL first, get quality of working life right first. Nowadays people very often forget that strong value issue in the socio-technical movement. They think of it much more as an actor network theory, as a tool for getting… as a way of getting shareholder value, or whatever. Rather than focussing on quality of working life.

[37:03]
And you got involved with the socio-technical group in the late seventies, early eighties you say?

It was set up I think in the mid to late seventies. Come back to somebody I think I mentioned earlier, Enid Mumford, who had been educated at Liverpool University in psychology and had gone on to Manchester Business School to become the professor there of information systems.

Enid Mumford was one of the pioneers of the socio-technical movement. She worked actually in the coalmines. She was the kind of person who if she was doing research, she wouldn't accept that research unless she actually could go down to the face and work, see what happens at the coalface. When she worked at Liverpool docks, again a socio-technical system, she enrolled as a canteen assistant, incognito, to talk to the dockers themselves and understand the dockers. It became part of the socio-technical idea that the social side is not some abstraction, it's got to be… it's got to be as real to people as a piece of software is to a computer scientist. Now I started working with Enid Mumford in 1971 when the NCC set up a group to study, a working group, to study what value computers were adding to businesses, whether methods of doing this evaluation… at the time this was considered to be one of the major problems, if you asked the senior manager, what are the computers giving us, they said well we don't really know and we want to know. So this was quite a powerful committee which Enid Mumford was a member of and I was asked to join it and there were quite a few people from industry. The treasurer of Liverpool City Council was one of the members of it, it was a very lively committee and we produced a report which I suspect is still valid today.

[39:42]
What were your key findings?

Our key findings were… well, there were two aspects of it: were computers actually producing value and can we find a way of establishing what value is. On the first one we found that the findings were computers weren't adding value as expected, they were not delivering what was expected very often, nowadays a well known fact, but the productivity paradox became fairly clear, that there was little relationship between the amount invested in computers and the productivity of a company and we tried to establish why this was, although I don't think we did this fully. And the other was to say, well what are the components of value, how do we establish what these components are. What is it which adds to value and Enid Mumford very strongly came in with her socio-technical views and she and I formed a partnership, but there were three of us formed the partnership. John Hawgood from Durham University, Enid Mumford and myself, and the guy from the… Mike – God, I've forgotten his name – Mike something, from Liverpool. We formed a nucleus and we did most of the report writing and we produced a report which was very strong in terms of its socio-technical content, that we have to get that side right. It made certain waves. What was interesting is that the industrial people bought into this and the industrial people, there was the head of

computing at the pharmaceutical company, Pfizer, I think he was the chairman of the thing. I don't remember who the others were, but there was a person from ICI, can't remember who the others were. They played a much more passive role than the four: John Hawgood, Enid Mumford, myself and Mike Redwood I think it is. Mike Reddington, because of his job, dropped out of our group in a sense and John Hawgood, Enid and I continued to work together for a long time and produced a number of papers and books and so on, in this area. And if I have to say what is my contribution in general, I would say its roots lay in those days working with John Hawgood and Enid Mumford.

[42:56]
How did you work together? Were you all geographically separated and…

We were geographically separated. First of all we produced conference papers together, we met at conferences. We contrived one way or another to meet reasonably frequently. Partly through the NCC committee and funded by the NCC, partly through the conferences, partly through our own universities. I certainly went up to Durham and stayed there for a few days at one time. John Hawgood, quite an interesting person, he owned one of the oldest houses in Durham up on the wall. I don't know whether you know Durham? It's a sort of city with a wall. A fantastic place, which is regarded as something of a national treasure.

Who was the report sent to eventually?

It was published by the NCC.

Did it create much of an impact at the time?

I suspect not. These things, people don't read these kind of things. It produced some kind of impact in the companies who were part of the group, certainly it must have produced some impact but I don't think it was a great impact. Certainly the problem of evaluation, of economics of what computers were adding, the productivity paradox, were issues which came up again and again and again. There's an American group which produced an annual report of what are the major concerns of IT managers and business managers and top of the list, close to the top of the list for a long, long time, right up until certainly the nineties was are we getting value for money, are we getting value. Lots of literature on that subject and it's one of

the subjects I became very heavily involved in, later on formed another team with David Targett from the London Business School and Barbara Farbey and we published quite a lot of work in that area and I think probably gained quite a reputation in that area. [45:55] But in the end the paradox seemed to be solved, there wasn't a paradox, it was just that the values were not so easy to… were hidden, but if you could actually identify the values, then we were not investing enough in computers because the return apparently from these econometric, much more econometric studies by people from Carnegie Mellon University –Brynjofsson and Hitt– showed that the reason why there appeared to be a paradox were one, measurement problems and two, lags, that the time lag between the investment and the return on the investment was longer than expected. But it was also measurement problems and they showed fairly convincingly that there were major returns, that these returns were better than investment in alternative technologies or alternative investment decisions. And so we weren't actually investing enough in it.

Did this work in socio-technics become more important over the course of your time working in it from the early 1970s?

You mean in general?

Yes.

No, I don't think so. I have, I'm pretty sure that the influence of academia on business practice is very small. Academia produce a whole range of methodologies, accounting methodologies. On the whole industry didn't know. Other people like the British Computer Society, the Treasury produced ways of doing things, suggested ways of doing things, again they're hardly ever used. The Treasury systems are used because they have to be used, they're compulsory by departments. You don't get Treasury approval of projects unless you use their methods. But as we found out later, there was little follow-up to see that what these methods had predicted was actually coming out. So no, one of the disappointing things is that unlike in other areas, the information system area has produced good analysis of what happened, very poor predictions of basics for…. which became established business practice. There were a few things, but not many. So mostly academia, in terms of innovation, was lagging behind the real world. Analysing the innovation, yes, quite good, but actually innovating, not that good. In that early period there were the business users, there was

academia, there were the traditional consultancies like Price Waterhouse, who got more and more involved in this, and there were the specialist consultancies and in the early days the specialist consultancies were really very important and many of the innovations came from them. People like James Martin. You've come across the name James Martin? James Martin was one of the important people who got a worldwide reputation for understanding information systems and providing books on how to do it and industry was more inclined to read James Martin books than something coming from a strict academic. And James Martin is still regarded as a very important person. Have you come across a man called… the Jackson method? You've come across that one? Again, Jackson was not part of an academic set-up, he was not… he was an independent consultant developing his methodology and the Jackson methods became very well known and probably more used than, although it's more famous, Peter Checkland's methods. [51:14] You've come across soft systems methodology? Related in a way to socio-technical but coming from a different background is what is called soft systems methodology. This was developed by Peter Checkland at Lancaster University. Peter Checkland was an operational research man who started up in the conventional operational research style, which developed many tools and algorithms, but was firmly engineering based and he recognised that that wasn't good enough and he himself introduced the notion that there were the hard systems, the hard systems people, and those who noted that the importance of the human side, the social side, in other words socio-technical, although he didn't call it socio-technical. He hadn't worked from that side, he'd come from the other, simply noted it on his own, he developed probably the most influential UK development, the soft systems methodology. Very widely understood in academia worldwide, very widely practised, much more widely practised than others. His influence is very great, more than I think Jackson's, although Jackson was important. But as I say, there were these groups of people who were outside the academic environment who were probably producing more innovative ideas than the academics. The academics were primarily good at understanding what had been done, but very few of their ideas went on into practice.

[53:38]
Could we just put some dates on this - are we talking just about this early period?

No. I'm talking… my critique of the discipline is now and has been, and I've said it, that it's helped us in understanding what goes on, helped us to understand the computing and IS phenomenon, but it hasn't helped terribly in terms of new ideas and innovations. So actor

network theory, actor network can help you through, again, understanding your problem, it doesn't actually help you to build a system. And yes, there are a few areas where work's been done. One of the few, for example, is critical, the notion of a critical success system. That came from academia. Well I'm not sure it came from academia, but it was taken up by academia and strengthened particularly MIT, critical success factor. So it's… but that doesn't amount to a great deal. The other critique which I have had is, and I mentioned this, I think we discussed it yesterday over supper, that there are whole areas which we haven't tried to cover and where there is an enormous amount of innovation and from which we can learn a lot. One of them is the embedded system, the other one is the gaming area – computer games – and the third area is the black side of, the dark side, the side, the criminal side and so on where the amount of innovation which goes on, probably a hacker is more innovative than the person who writes the original programs. How do I get into the system, how do I get into the… American security system. To actually do that requires a lot of skill. So that's a whole area of entrepreneurship there which we need to study in order to defend ourselves against it, but on the whole the IS community, the computing community is reactive rather than proactive in this. This is not the universities, there are some proactive people, but by and large it's reactive. And I read a paper the other day that for the banks to – this was from the banks – for the banks to catch up with a new subversive thing takes nine months. But by that time they're already on their next one and a lot can happen in those nine months.

How much of these sort of concerns about how much industry is picking up on innovations did you have at the start of your career in academia, having come from that industrial background?

I've always been interested in that, though my first task was I think to set up teaching research which would concern itself with that. So what we built at the LSE, I hope is an appreciation and understanding of real systems, although I have to say that there's a kind of fight, a certain tension between those people who are primarily concerned with building theory and those people who are saying well, that's all very well, but what we really need to do is to work with industry, and I'll come back to that in a moment.

[end of track 10]

[Track 11]

When you started at the LSE, what were your earliest research interests there specifically?

I think I have to say that these grew rather than I came with particular research interests. What I came with is a feeling that one needed to reflect on what had gone on to try to put some more method into what we had been doing, or to understand the method we'd been using, what we had been doing, and to learn from that experience, see if it can be translated into something permanent rather than something just floating in my mind. Anyway, I joined LSE in 1968 as a research fellow in management and computer services manager. The object was to pass on the manager, the computer service managership as soon as possible, but first of all to establish the other side of it, the teaching and research. And we started building towards having an MSc in information systems. I think we probably ran our first cohort of students about 1970. But at that time the LSE, the statistics department, was becoming more and more interested in computing as a topic in its own right and they established a new chair in computational methods, and that chair was taken by Professor Sandy Douglas. I don't know whether the name means anything to you? Sandy Douglas, who died in April this year, and whose obituary is just going into *The Computer Journal* and which I have to check the proof, he and I between us really then worked quite closely together to establish this masters programme. Although he was professor of computational methods, it turned out that by this time, although he started his life very much as a numerical analyst, was becoming much more concerned with the wider horizons of computing and information systems. So we worked quite closely together in establishing a graduate course. There was a debate on whether we should do an undergraduate degree, but it was decided, possibly at a higher level, that that was not appropriate, though we did offer an elective course to undergraduates generally in computational and computers, a course which wasn't terribly successful. It was too bitty, it was too oddball for the… it didn't fit in particularly well. We continued to give it for some years and we always had some students, some very good students, but it was very much a minority interest, it never really established itself. But the masters degree, we built - we called it ADMIS – the Analysis, Design and Management of Information Systems. That grew from strength to strength. We started off, probably about 1970 as I say, with half a dozen students. By the time I left the LSE we had 180. It was one of the largest courses of its kind in the country, probably *the* largest. We started recruiting people to join us. We started first of all just, there was Sandy Douglas and myself and the two people who I mentioned earlier,

who didn't last for very long, there was Pat Losty for a time, who went to Cranfield, but I think we recruited really some very good people. Some directly from LSE: Tony Cornford, now a senior lecturer, and one of particular interest, Ronald Stamper. Does the name ring a bell? It doesn't ring a bell. It doesn't have to. [04:25] Ronald Stamper had been working with the British steel industry in their training college and had established a course in information systems and systems analysis for the iron and steel industry and he had at that time just published what is a seminal text in aspects of information systems. What he introduced to us is the notion of semiotics and he developed this over the years. We became very close and he became a very close ally of mine and that lasted for a few years, nevertheless he didn't get promotion to a chair or anything like that and he left to take up a chair at the University of Twente in Holland. He's now retired and back in London. But he developed a language, which he called LEGOL, for expressing the kind of problems which you might find in a legal system, but also in a business system. Ronald unfortunately kept things very close to his chest. He's the kind of person who would, if he did an overhead slide, would put a copyright mark on it. That's going over the top. So, as a result of which, what he needed to do was to build a team, as a result of that he never could build a team. In order to develop his ideas he needed to build a team. His ideas were outstanding; he's one of the cleverest and best – was interesting people in the field, but it fell short of success because he could not build a team, which was a great sadness. In the end we actually fell out; two of our colleagues published a book with his ideas and though they acknowledged him, they didn't pay him the kind of acknowledgement which he felt he should have received and he left… he was in total dudgeon about that. I mention it partly because it's a total contrast to my own view on things, in terms of anybody who takes up my ideas, lovely. I like that. [laughs] I want to share things, I want to take other people's ideas and incorporate them with mine. I believe thoroughly that's the way ahead, but he had to keep it to his, close to his chest. [07:27] Anyway we recruited people, we gradually grew in numbers from two or three to ultimately fifteen I think. I was relieved to give up the computer services manager job relatively quickly, I think I was doing it for perhaps eighteen months, two years, and then gave it up, handed over to my deputy and became a fulltime academic with a fulltime academic job, not just a Research Fellow in Management, which was my title.

Could I ask you one or two questions about the computer service aspect of this before we've moved away from it?

Yes, of course.

You mentioned that you sort of helped users, such as the Russian language interest.

Yes, that was a particular one.

I was just wondering, how did this relationship work so much – was it people coming to you wanting to use the computer or were you trying to sell them solutions?

No, it was people coming to… by that time it was people coming to me, to the computer services. And as I say, we'd established specialists in each of the disciplines within the computer services. And we kept, things I'd learnt at LEO; keeping open door policies, very much kept an open door policy so that we made ourselves available and I think the computer services became quite well known for being available and helpful.

Could you describe what the layout of the computer service was at the LSE at this point?

…I'm trying to recollect it. It changed over time considerably. It now occupies a vast amount of space, but no longer has computers doing jobs, it's got things which service the internet – what are they called?

Server?

Servers, it's got servers, yes. Forgot the name of them. No, we had a central area, a largish room which had I think all the staff in it. I had a separate office because I had the other job too, so I was slightly away from that. I was part of the statistics department, which was a huge department, as well as having that job. And we had a room in the basement I think where we had the computer and a small operating staff, just two or three people. We started off quite small with three or four people then grew to half a dozen. I don't know how many there are now in computer services, but it's a great many occupying large amounts of space.

[10:45]
Aside from yourself, who else was there?

My deputy, a man called Peter Wakeford, and two or three others to start with. I remember in particular Caroline Hewlett because she only retired last year and we went to her retirement party. Of course David Dolby. [laughs] I remember a few names. On the whole, pretty bright people, very good. Caroline Hewlett, Ailsa's particularly fond of Caroline Hewlett because she was so helpful with her stuff.

How would a user actually use the computer service?

The computer… there was a booking system for booking jobs in. That's right, you'd expect to have that of course. The computer jobs were handed over, booked in, people were told roughly what time they can expect the results. There was a separate booking service for… I said that people who went directly to the University of London centre, they didn't, they actually had to book it in through us and there was a van service between us and the university service. Though some people could go directly to the university service in Guildford Street and possibly handed in their jobs there, but by and large it was done through our system.

Would users be entering data themselves or would they hand it over to you to…

They'd hand over stacks of cards. They themselves had to, were responsible for their own cards and it was all punched cards. So they handed in stacks of cards and these had to be carefully handled of course, as cards have to be, and the occasional muck up did occur. But one tried to be careful so that it wasn't the responsibility of the computer department in getting the cards messed up.

What did you think that users wanted from a computer services department in the university?

Above all, reliability. If they were told that a job would be ready at *x*, it would be ready at *x*. They of course wanted the particular facilities, which were mainly provided by packages. More and more packages became available for things. Some people did their own programming and then they had to do their own debugging, but again, on a batch mode. They'd get printouts and go through that and…

[equipment failure]

[end of track 11]

[Track 12]

We were discussing the computer service aspect of this and you mentioned that very quickly most users started using packages…

They started using packages, yes, yes. Though, as I said, some people still wrote their own programs where packages were not available or where they didn't know about the packages. But one of the things the computer services did was to try to promote the use of the packages that were available, so it could tell people yes, these packages, you can do your calculations using these packages. Primarily statistical packages.

Where did these packages actually come from?

I don't know. They came from university departments, they came from… they were available from software houses. There were a number of packages – I can't recollect their names now – which were the prime packages which had most facilities and which are still widely in use today as PL, packages which are still widely available now, particularly for any kind of work related to survey work and econometrics, the two big areas where computers were used widely. Probably the econometricians did most of their own coding, but they would also have mainly used the Atlas, because they were dealing with models, complex models with a huge number of variables, a large amount of data from the economy. So the econometricians would be using, probably using Atlas much more than the survey people who would get away with our own local service, though again, the bigger surveys, they would go to the Atlas.

[02:11]
Could you give me some flavour of how many users you had and the sort of spread of interest amongst them?

I think we probably started with something like thirty or forty but this rose to, I seem to remember a count that we had something like 300 users, which for a social science university is quite a large number. I don't have any proper figures, it's just what is in my mind. Yeah, I would guess 300 was the sort of figure by the middle 1970s. And they would mainly be research assistants, research officers working on particular projects. Sometimes their

principle researchers would also be involved, obviously, but very often it was the research officers, research assistants making most use of it.

Who were the other staff who were there to help you in the computer service centre?

Mm?

Who were the other staff who were in the computer service centre apart from yourself?

They… I think I mentioned names like David Dolby, Peter Wakeford, Caroline Hewlett and a few others. We started off with perhaps four or five and it rose to a dozen or so. By the time I left my guess is it was about a dozen, but subsequently it grew enormously. They're now there in all sorts of capacities; advisory capacities, looking after your laptop and various packages, software and so on.

Was there any match up between your earlier systems work and your research interests and the sort of service that the computer centre ran?

Almost a total… no, no. A total no-no, there wasn't, there was very little. The work was primarily statistical analysis, it was various kinds, econometric work. There was very little of the kind of work which I was involved in. Perhaps some database work, but – record keeping, archives – but I don't recollect connecting those two strongly. My desire was to do that job, get it established, get that service established and get out as quickly as possible. [05:10] I wanted to get the proper fulltime academic job and to change from… made the change from research fellow in management to senior lecturer in a couple of years, I would guess. And then I became simply senior lecturer in the statistics department and was promoted to chair in 1982.

[05:38]
What did your initial duties consist of as a fulltime lecturer?

The usual mixture of academic and administrative work. One thing which was very different in those days is the emphasis, now your career is made on the basis of publication, although publications were important they didn't play the same role as they do now and many

academics who were highly valued weren't publishing a great deal. For example, Ailsa's PhD adviser, George Morton, was a huge sparker of ideas but he didn't publish much. And by modern standards he would have been totally unacceptable, yet he was an important component of an academic department because he was an ideas man and you could get other people to do, to generate it. And this is not counted nowadays, which is a great shame. Again, we're going into critique mode.

Where did you fit into your department?

Right. Initially the statistics department had a number of special interest groups. I mentioned earlier, mathematics, statistics, demography, operational research and computing. Sandy Douglas as chair in computational methods headed the small group of people who were in computing, but more and more, they turned from computer science and computation as such to information systems and business processes and he and I worked closely together in doing that. And the people we recruited were people we recruited on to the information systems site, people who were interested in information systems rather than computer science, though everybody had to have some computer science. They had to know programming, they had to understand computers, they had to be able to use them and interest varied from those who had a very strong interest through that to those who regarded it more as a tool which we could use, but the emphasis lay in the system and as a mixed system. I mentioned publications. In the early days, most of the publications I did were commissioned by – I talked about some of these outside consultants – people like the… what were they called? State of the Art Reports, produced by one of the consultancies, and I was commissioned to write a number of these State of the Art Reports. Now, they don't appear in the literature, but in fact there were some very important contributions in there and my own feeling is that some of my most important initial contributions came through these papers, but they're not cited in the literature and at that time it was regarded as a handicap. Some of those were subsequently republished elsewhere some two or three times, but most of my early work was disseminated in these State of the Art Reports.

Who was actually publishing these State of the Art Reports?

A moment ago I knew, but it's just slipped my mind at the moment. State of the Art Reports. There were a number of specialist consultancies who published that kind of thing and State of

the Art Reports were one of them. They were often international organisations, probably sited in America. The actual State of the Art Reports, gosh, what's… it may come back to me.

And these are being published by a consultancy?

They were being published as their, in a sense, one of their products - this is what we have to offer, the State of the Art Reports.

So you were doing consultancy work outside your normal…

No, I wasn't doing consultancy work per se, I was commissioned to write these reports. I've never done a great deal of consultancy because I always distrusted the notion of… put it another way, I wanted to do research and I didn't think consultancy and research were the same thing. Though for many people it's not quite like that.

[10:48]
Could you give me an idea of some of the topics of these reports?

Yes. There was a particular paper which I reported on, the way information primarily… the way information is used in organisations, and I devised a model of an information system and one of the things I brought to the scene I think – I'm not the only one who did this, but I very much emphasised – was the notion which we've discussed at various times, of the informal system, that there exist and co-exist formal systems for which there are rules which are usually in procedure manuals, and informal systems which are the systems which are not documented but which exist and on which organisations really run and that these informal systems are as much part of an information system as the other bits and if you don't understand the informal system and can live with the informal system and know it's there, then your computer system will never work, the formal system will never work. And I brought that into the domain quite early, having learnt about that from my experience at LEO, and some of the articles were on that kind of thing. One particular article I wrote in conjunction with a lecturer at City University, we coincided in our views and we wrote this article together. Though in practice I probably wrote ninety-five per cent of it.

Who was this?

The name is Marilyn Kennedy-McGregor at City University who subsequently left the field to become a lawyer and is now quite a distinguished barrister with chambers in Lincoln's Inn. So she shifted, shifted round considerably. But at one time we worked together on this sort of stuff. I wrote another one which was commissioned a little bit later on the role of artificial intelligence in expert systems and where I felt the limitations, what were the limitations of expert systems and that technology. Of course I wrote other journal articles as well, but as I say, the emphasis was different and it wasn't on a selected group of, these are the journals you're going to publish in, forget all the rest, that didn't exist at that time. One knew that there were some journals which were more important, but it was not so much important for your career but because you wanted to disseminate it in the right place. Now you have to do it because your career depends on it. A huge shift in emphasis.

[14:00]
Notice you mentioned you were writing reports with people from other universities as well – how did you come to know them?

Sorry?

How did you come to know the people in other universities you were writing reports with?

The IS people pretty well knew each other. We, probably mostly from conferences and things like that, from our writings. We certainly met and we knew who they were. Often I would be invited to give a lecture in one of the other information systems groups in the UK and I certainly became one of the figures which was known to be involved in that field and I established, for example, the first PhD consortium in the field. I was responsible, at least jointly responsible for setting up the first European conference on information systems. I was heavily involved in the IFIP group, 8.2, and became chairman of IFIP 8.2. 8.2 is one of the more important… in IFIP I said there were a number of committees, committee number two is in education, committee number eight is in information systems and it's got many sub-groups, but the two major sub-groups, the first two sub-groups was 8.1 which was concerned with software engineering primarily, the more technical side, and 8.2 which was regarded, which was much more concerned with business processes. And I became heavily involved in that and I became chairman of that for a time. My predecessor as chairman was Enid Mumford,

so I established a very close working relationship with Enid Mumford and John Hawgood, as I said earlier. So a lot of my work was done in conjunction with other people in other information systems groups and in many ways I took quite a leading part in that.

How do academics at this time actually sort of network in this way in a time before email – do you write letters, is it phone calls, conferences?

Phone calls, yes. Primarily phone calls and meeting at conferences and face-to-face meetings. We experimented actually with, we quite early on experimented with… conferencing, distance conference – what's the name for it?

Video conferencing?

Video conferencing, sorry. Video conferencing, yes.

What period?

Primarily working with the Manchester people, but with other groups, for example, we would have a meeting on, establishing a conference, making a conference, something like that. A working group which were doing some kind of work, probably more administrative work than academic work. So setting up a conference or arranging a PhD consortium. But as I say, I organised the first PhD consortium in information systems.

What's a PhD consortium?

A PhD consortium is usually an adjunct to a conference in which PhD students at various levels present their PhD proposals and work to an audience comprising facilitators, that is academics, and other PhD students. And if you've not been on one, if you haven't been on one you've missed something because they're very rewarding experiences. First of all the PhD students meet a variety of other PhD students more or less working in the same domain – different speciality – and they have the facility before they do their actual publication of their thesis of putting it, presenting it to a critical audience and the audience is expected to be critical. And these are reasonably good, fun occasions and usually they finish off with some

kind of joint event when they put on something akin to theatricals. Something to make it a community thing.

Did you go to many conferences?

Yes, I went to quite a few conferences. As I say, I was heavily involved with IFIP and in particular with the working group 8.2, and they had regular conferences, which again I was heavily involved in and partly organised, some of which I organised. And since IFIP was international they were held in a variety of places all over the place. One would have the chance to visit other places. I went fairly regularly to the main information systems conferences, the international information systems conferences. Yes, it gave one a great opportunity. And in 1975, '76 we both had sabbaticals and we went to the University of Pennsylvania, the Wharton School, and I was visiting professor in that for a year there, which was a great experience.

[20:22]
Could you tell me a bit more about it – how did American academic life compare to British?

First of all, the Wharton School was one of the first to establish teaching in the information systems side, but as part of the group called decision sciences, it wasn't a separate department, but they had some quite well known people in there and the professor, head of the information systems group was Professor Jim Emery – I don't know whether the name means again - probably it doesn't ring a bell – he is still active, well he's retired now, just retired, but still active and he went on a sabbatical and I'd already been working with him on - he was interested in the same topic as I was – economic evaluation of information systems, he was working on that in America, I was working in the UK and we had done some joint work and we'd in fact gone round giving seminars on that round the world in various places, joint seminars. I'd forgotten that incident, but we did that. Enid Mumford, myself, John Hawgood and Jim Emery did that. So when he went on a sabbatical he invited me to take his place for the year while he was away. Yes, there were considerable differences, obviously. In particular, the American students at the Wharton School were terribly, terribly grade conscious throughout their academic career in a way which I think our UK students weren't. Yes, they wanted to get their firsts or whatever it was, but they weren't as conscious of the day-to-day business of getting grades. I'm a moderately good teacher, I'm not an excellent

teacher. In the States the teachers get graded too, so you know how you're rated as a teacher and on a scale of one to five I would typically be about the 3.5 range, whereas the best would be 4, 4.5. And that… I've known it, I'm always somewhere in that moderately high but never highest range. Occasionally I can give a brilliant lecture but by and large I give a good lecture.

What makes you say that you're a moderately good teacher? How would you define that, you know, moderateness?

That I don't get the wow ratings which some people get. Yes, I'm sufficiently good to get attention and for people to like my presentations and lectures and to say they think they've learnt, but I know that I don't give that wow factor. And I know as a student myself the lecturers who could and those who couldn't, and you know it as well, don't you? There are those who have got it, who really have it.

Had you had to do much teaching in the UK?

I did a lot of teaching, yes. Yes, yes, quite a lot of teaching. Though LSE, as against polytechnics, the amount of teaching we had to do was relatively small. We were expected to do research, we were expected to do research. And as I say, most of my early years, in the 1970s and early eighties, my research was primarily working with some of our own people, but primarily with Mumford, Hawgood, and Hawgood. Subsquently with another group of people: David Targett from the London Business School and Barbara Farbey who was at the LSE. I also had a large number of PhD students. We started acquiring PhD students about 1969, already 1969/1970 were the first ones, and I accumulated a very large number of PhD students, too many. At one time I must have been supervising ten PhD students, which is more than one should do. Partly because students wanted to come and study with me. I suppose that was me, partly because perhaps I was greedy, I don't know. I didn't say no.

[25:30]
What do you think you gained out of your experience in America?

Sorry, what?

Do you think you gained anything out of your experience in America?

Undoubtedly. First of all, it was the first time I worked online to a computer, on a terminal. This was, at that time it was a dumb terminal, but I worked, I learned to work entirely on a computer, to do all my writing on a computer. Previously I had not written, used the computer for text processing. I started using it heavily for text processing. And during my stay in America I wrote – I told you about Ronald Stamper – and we were going to write jointly a book on code numbering, code numbers, and I wrote my portion of it while we were in the States and somehow or other Ronald didn't write his and we never got the book out, which I think is a great pity because I think there was quite a lot of good stuff in it. So that's in my hidden file somewhere or other. Nowadays it would be totally out of date.

[26:43]
In this earlier part of your career, I was wondering if you could just give me a flavour of what everyday life was like. What's a typical day like at the LSE, can you talk it through me? So you wake up in the morning and what happens then?

Quite a lot of meetings with my colleagues. If I, quite a lot of work preparing lectures, material for teaching. After a time that lessened because one repeated one's things and one may have added to it, but at first there was a great deal of preparation and there was a great deal of thinking about what do we actually want to teach. And the other things I've talked about, the curriculum exercises helped a great deal in saying what it is we want to teach. The two things fed on each other; my experience of trying to set down what the subject is about and teaching it at the LSE also helped in the development of these curricula and again, the other way round; I learned from the Swedish people in particular on my, in the IFIP group, in doing the IFIP curriculum, the work of Börje Langefors – I don't know whether you've come across the name? Börje Langefors was probably the first theoretician in information systems and his work is still valid now, though it's not very well known. But he wrote one of the seminal books in the early 1960s, in 1963 or '64 – this is before I joined LSE – and I didn't know anything about it until I met these Swedish people and the book was later translated into English, about '68 or so. So there was a learning process all the time from one's contacts. Had quite a lot of contacts in Germany. The Gesellschaft fur Mathematik und Datenverarbeitung, now, then a public concern. Rather like the NCC. It was rather like Germany's NCC and I worked a great deal with them and they published some of my stuff

and they translated some of my stuff into German. So what was the day? Certain amount of administration and preparation for lectures. Discussions on research with my colleagues, seeing PhD students – a great deal of seeing PhD students, as I say, I had a number. I think I was a reasonably good PhD supervisor. I certainly learnt a lot from doing PhD supervision, because the students who are doing the work are the greatest experts in that area at that time, so one learnt a great deal from that. One could give and one could take, so that was very important. And table tennis. As an undergraduate I had been with my brother responsible for running a table tennis club in the sports thing, working at the LSE there was a staff table tennis facility and certainly in the early years of LSE we played quite a lot of table tennis. That interfered with everything else, but that finally died, the staff no longer… I think the room was used for something else and we could no longer do it and it disappeared. I think probably my productivity rose quite a bit at that point.

[end of track 12]

[Track 13]

Now we should have lunch quite soon too.

Okay, just a few extra questions about the LSE I think.

Yes, yes, go on for a little bit. Go on for a little bit.

Where were you living by this point?

Mm?

Where were you living by this point in your career?

Sorry?

Where were you living by this point in your career?

We were living at that time in Woodford. We lived in Woodford – it's funny how one forgets dates – probably into the mid 1980s, certainly when the children grew up – no, it was probably a bit… yes, up to the middle 1980s – when the children grew up we moved into the centre of town, much closer to LSE. We moved into, actually in the Borough of Hackney, Manor House if you know it. Probably don't know it. It's just about north London, just the beginning of north London but relatively close to LSE and we lived just, very close to the underground station, the Piccadilly line, which would get us to Holborn station and LSE in fifteen minutes, so that was very convenient. One of the other things perhaps which was quite exciting and interesting is Sandy Douglas was at that time quite a prominent computer scientist, very well known with his… he had very broad interests, he was very widely known and he was picked to be an adviser to the Select Committee on Computing, at that time the government, the Conservative government, set up a Select Committee, specifically Sub-Committee D, to look into the computing industry.

At what time is this?

It was about 1973 I think and I think exactly 1973. The chairman of the Committee was a man called Airey Neave. Now Airey Neave is famous for two things: he was one of the few people who escaped from the prisoner of war camps in Germany during the war, so he's well known for that, and the second thing is that he was blown up by the IRA and killed at Brighton, at the famous Brighton conference. But Airey Neave was a good friend of Sandy Douglas, he was asked to join the Committee as an adviser and in turn I was then asked to join as an adviser, so the two of us were acting as advisers to the Select Committee, which really was rather a fascinating occupation. What the specialist advisers do is to brief the MPs on the subject. The MPs are generally totally ignorant of the subject; some know a little bit, some know less, but you provide as good a briefing as possible. And the Select Committee examines witnesses who ask questions, but the questions are largely provided by the specialist advisers. So before any meeting, the specialist advisers have come up with a list of the kind of topics which the MPs might want to take up. Then as the question goes on, the specialist advisers sit behind the Committee, on a table behind the Committee and if they spot that a question should be asked, they'll write it on a piece of paper and pass it to an MP, one of the MPs, or they whisper to the MP, why don't you do so-and-so. So they're very actively engaged in this. And then subsequently, after the meeting, there's a total transcript and the specialist advisers help the Clerk of the Committee writing the report. So that the report is very largely composed of the… comes from the specialist advisers. I imagine it varies from committee to committee to what extent the specialist advisers play a role, but in a special subject of computing we played a very big role. In the end the House of Commons took very little notice of our recommendation.

What was your recommendation?

I've forgotten exactly what they were, but they were certainly recommendations about the computer industry and providing new sources for the computer industry and for the government to be involved in the computer industry more. But as I say, they didn't take very much notice. Subsequently when the committee structure was changed so that each department, each department like Department of Trade, whatever it is, I was again asked to be an adviser to the Select Committee and we had an enquiry again to the computing industry and there I was adviser on my own. And really it is a fascinating experience.

[05:55]

Can you describe what one of these meetings actually looks like from…

Yes, absolutely. First of all there is the meeting at which you meet the Committee and brief the Committee. The Committee members sit in front of you, you talk to them about the subject and they ask you questions and you answer them and you make suggestions on what line one might follow and they suggest other lines one might follow and you comment on it and you critique it and an active role is also taken by the Clerk of the Committee. The Clerk of the Committee's a very important person and a very high grade person. The clerks of these committees, if they had been academics would be at the top of their profession. They are top, top intelligences.

And these are senior civil servants then?

These are senior, they are outside the civil service proper, they're employees of the House of Commons, of Parliament rather, because the House of Lords has its own. They are a separate group of people, but they're very high level people. I remember the one from the earliest Sub-Committee D was a man called Hastings, who subsequently rose to be something quite senior. So these clerks are very good and they play a very major role in drafting and they're very capable of drafting, that's their special skill; understanding and drafting. So they would respond to us and draft the actual report. But a meeting, then one would be advising and the Clerk would intervene. Some Committee members were extremely busy and active in this and learning and knew quite a lot and asked very bright questions. Some were totally out of it. They were members of the Committee but they weren't taking a great interest in it. Some would attend every meeting, others would come to the occasional meeting. Then you had the meeting itself, and these were interesting. You would have a witness perhaps from industry, he'd be asked to give evidence to the Committee and the general expectation is, here I've come out of the kindness of my heart to the Committee to give evidence and I want to help the Committee, and the Committee treated him as a hostile witness. There was, the Committees, the Select Committees tend to take an adversarial position in relation to the witnesses they see and this comes as a shock to many of the people who come there as witnesses. Now the people who know all about it are the civil servants who act as witnesses, come as witnesses. They know all about this and they know how to play this game, but the people from industry and other places, they don't and they're sometimes deeply hurt by this, the adversarial thing.

And you sit there, saying how can we get them. What question, what really probing question could there be, which will go behind the façade of what they're trying to say.

[09:14]
Can you actually describe what the set-up is like for one of these meetings?

Yes. You have a horseshoe in which the MPs sit, the chairman sits in the middle. Before the meeting a plan has already been made of the kind of questions that would be asked and who would be asking the questions, particular MPs are assigned to doing particular questions, say I volunteer to do this, or would you do this, kind of thing. Then there is a sort off, like an auditorium in which - quite a small auditorium – these are committee rooms, in which the audience sits. It's open to the public and they can come in and there'll be journalists, as well as a place for the press and journalists. Then there is a row of seats at the front facing the Committee where the witnesses sit. This might be an individual or it might be a group of people. And behind them and in front of the audience sit the note takers, transcribers. It's all transcribed, it's recorded but it's also transcribed by hand in shorthand, so they're very, very good people. So the chairman would make a graceful introduction before they realise that this is an adversarial session, would welcome them, thank them for coming, and then the questioning would start and the response of witnesses would vary. The Committee would meet after the witnesses have gone and go over the session and subsequently the Clerk of the Committee and the advisers would draft the report, which would then go to the MPs who would then make changes if they wanted to make it.

And you're sitting behind the MPs round this…

You're sitting behind the MPs.

So sort of on the outside of this horseshoe then?

On the outside of a horseshoe, exactly that. In the corner of the room, you're at a desk and you're busy making notes and busy going up to the MPs and handing them things. Or sometimes an MP would turn round and say, come and talk to me.

Are there any meetings you remember in particular?

I think Sub-Committee D, I think we probably had about eighteen to twenty meetings with the witnesses, the subsequent one probably rather more, where I was the sole adviser. But these advisers are often academics, so you find nearly every Select Committee. You don't hear about them, they're not mentioned, but they're there and they play an important role.

[12:24]
Do you think the MPs found your advice of value?

I don't think it could function without us. There are always, as I say, some MPs who are more knowledgeable and some of them pride themselves on their knowledge and by the time we came to the second sub-committee I was in charge of, they knew much more. And I went… the report is subsequently debated in the House of Commons and I went to the debate to listen to it and our report was heavily attacked by a Liberal MP called Emma Nicholson. Don't know whether that name rings a bell. Emma Nicholson was a quite powerful woman MP who had been a programmer, who'd known the computer industry and she tried to destroy our report. She was totally against what we were saying. I've forgotten why, but she was totally against it. I didn't think her reasons were particularly cogent and I think she was wrong in many things, but it was an interesting experience. I mention Emma Nicholson in particular because subsequently she lives in the West Country, I met her travelling down to London and we discussed those days, which was much later. I told her how much I had disagreed with what she had said.

How was the rest of the debate about your report?

It really went… it really didn't get anywhere. Many Select Committee reports didn't. They're sort of sidelined, and this was one which was sidelined. I think some notice was taken of it by the government in its subsequent policies, but you couldn't say, this was the outcome of that Committee. It was nothing that concrete. Nevertheless, I think it was one of these things which informed government, which informed policy makers about things they were very little aware of. Rather than directing a particular policy, it provided information, it provided information. It led to, I suspect, a greater understanding in general, even if particular issues would be controversial, and the particular issues would be what is the role of government in computing, how much should government support computing, and so on, this

was typical. And being a Conservative government there were many people on the Conservative side who wanted to do as little as possible. Labour members wanted to do rather more.

Do you think there is an important place, or otherwise, for technical experts such as yourself and their advice in government?

Yes, yes, yes. I think it's an important component of it. It's taken furthest I think in America where the Select Committees are very important indeed. And getting the Select Committee with a system of witnesses and its expert advisers do play I think an important role in broadening understanding of how this sector works, whether it's transport or computing or welfare, social welfare, they play an important role in understanding and also getting something from the kind of academic world to the political world.

Are there any of these meetings, the Select Committee meetings you remember in particular – are there any that stick in your mind?

Yes. A particular one where the civil servants, a particular department was heavily attacked and the civil servants, the subtle way they defended the department so that in the end one couldn't get any further. They really knew how to play the committee. Committees did their best to play the civil servants, but the civil servants were the masters. *Yes Minister*, you see *Yes Minister* there. And the civil servants know immediately that the committee's going to be adversarial, that's the huge difference there, they know it's adversarial, they know how to deal with it.

As an outsider in this process, are you on either side – are you with the MPs or with the civil servants, or there independently?

Well by this time you're working with the MPs. Let's say it, you're in a position where by now you're part of that team making the enquiry and you play a fairly important part in it. By and large you have a relationship with the MPs. It varies, there are some MPs who won't listen to you and there are some who are not capable of listening to you. There are always some who are really in relation to that topic, dumb, not necessarily dumb in other areas, but because they haven't got either the knowledge or the interest, they've got themselves on to a

Select Committee on trade perhaps, on trade, because they're interested in something else and they've somehow got themselves

[closed between 18:10 – 19:12]

At this point early in the 1970s, these meetings with MPs about the British computer industry, what were the key concerns?

In 1973 I think the principal concern was the role of the British computer industry and the effect of the merger which had come in two years earlier, the formation of ICL. This was a time, the Prime Minister was probably Heath at that time. Trying to think back, it was Conservative, I guess it was Heath who was Prime Minister, before he lost that election. But the concern was primarily how the computer industry was functioning and whether this merger was working and I think we asked some pretty hard questions about that. Subsequently ICL – I don't know to what extent we were involved in that – hired an American as their chief executive, Wilmot. I think also an ex-IBM person, I'm not sure, but a very prominent American. Certainly that industry was in some trouble. I think that was the main thing. The second time, by that time the computer industry had changed significantly. The second committee was in the eighties, not the seventies. By that time things had changed considerably. I'm trying to think what our main thrust was. I should know. I should immediately know, but at the moment I can't think exactly what our main thrust was. I remember these discussions with Emma Nicholson on the train. The, to my mind, the most important part in drafting our report was played by the Clerk of the Committee, whose name I've forgotten. We became quite good friends. But he insisted on calling it the Land Report, so I should know what it's about, but I don't. [laughs] I can't remember what our thrust was. What I do remember, it was a marvellous job to be involved like that. Very enjoyable.

And these meetings – were they actually held in Parliament?

The meetings were held in the House of Commons, yes. There's a whole range of committee rooms and you go there. So I had a pass to the House of Commons and regularly went to the House of Commons, all our meetings were in the House of Commons. So I got to know those corridors quite well. I also had… have you come across PITCOM? The Parliamentary Committee on Computers – PITCOM, which is not what one thinks of like a Select

Committee, a committee of Parliament, it's a committee of MPs who are interested in computing and computing industry with outside people, primarily trying to sell something really. People who are interested in getting to the Parliament, it's a lobby, it's a lobby. It's a lobby for the computer industry, but one which includes MPs and they meet regularly in the House of Commons that I gave a number of… I occasionally had meetings with them.

[23:55]
Talked quite a bit about how you dealt with government here and I've got a sense of your academic contacts, but I was wondering if you had any meetings with industry and anything to do with that side of it as well?

Yes. Yes, quite a lot of meetings with industry, though perhaps not as much as one should have done. Perhaps it's worth mentioning there's a huge distinction between academia in the United States and UK and on the Continent, in particular Germany. In Germany an academic makes his name by his contacts in this field, makes his name by his contacts with industry and the way industry regard that person. This counts for nothing in terms of academia here. What counts is publications and being recognised by your peers in the academic world, not by your peers in the industrial world. In Germany it's quite different; it's your peers in the industrial world who make or break you. And this gives you a totally different complexion to the way, for example, research is done. So in the UK, whereas I would have liked to have done more work with industry, my career depended on doing it rather differently. But we worked quite a lot with industry, particularly in our particular, various research projects.

[25:40]
What actually are you researching? What's the raw material that…

The raw material. The project which, the particular strand of research I spent most time on was the evaluation of what value does computing provide. And that involved spending a lot of time with industry, discussing with them how they did their evaluation, in some cases working with them to try to establish what the systems, what they were getting, how they were projecting costs, for example, a new project, how would they do that and perhaps trying to help them do that. And we worked certainly within the financial sector, with the City of… with the Stock Exchange, with Barings Bank, quite a nice project with Barings Bank, with financial investment houses, in industry. Less in manufacturing and retail industry than I'd

done on LEO, but to a certain extent. It turned out that mainly the financial industry and one explored with them and produced reports for them. But not on a scale, as I say, which would have been appropriate or which would have been in another country where one was judged in a different way. Much of our work was done in groups like the IFIP group, IFIP 8.2, with our own colleagues. I've totally forgotten, working with Enid Mumford I worked very closely with ICI. We had a joint project, Enid and myself, with one of the ICI divisions putting in a system. It's interesting the way one needs to have… to make that work you have to have on the other side, on the industrial side, somebody who's willing to think differently, to think out of the normal box. And in ICI we had that. Another company we worked with very closely was Digital Equipment Corporation with a man called David Skyrme. I keep forgetting, forget about these projects. Often working with Enid Mumford and that worked until she, probably near her time of retirement. She's a couple of years older than I was. Yes, Digital Equipment Corporation, ICI.

How do you get…

[29:05]
The ICI system, just remembering what it was, it was a system to… yes, introducing really things like word processing to the secretarial staff. The shifting of secretarial work from being fully manual, shorthand typing, to using word processors and the shift in occupation between managers and staff which this implied. And the thing which we did under, using Enid's ideas, was that the new way of working, the secretaries played a very, very major part in designing it. And a book came out called *Designing Secretaries*.

[30:03]
Can you tell me a bit more about this particular aspect of it – the writing a report on this. What were your key findings?

That book was almost entirely written by Enid Mumford and the person there. But in general one would try, one would write two kinds of things. One is a report which was designed for the company and one was a report which was designed to be an academic paper. So what a project like that yielded is academic papers and reports to the companies. So good example is, I mentioned earlier is when we were commissioned by the Treasury to look at the differences between what they had approved of, the basis of what they'd approved their

projects of and what actually the out turns were. That… so we wrote a report for internal consumption by the Treasury. And we wrote in this case we could only write a very limited report for public sector because they didn't want to widely disseminate it, what was happening or what was not happening. Though in fact they should have done because it was a great learning experience on the relationship between predictions and outcomes.

Are you making recommendations in these reports or observations or…

It depends. For the Treasury, these were observations, analysis of what had happened and observations. But for, on the evaluation, absolutely we made suggestions, this is how you should handle the evaluation, this is how you might do it, these are the variables you should be looking at and sometimes very specific, sometimes at a more general level. But as I say, we didn't do enough of that. I wish now that we had been in a position to do more. But that's not the way, that was not the thrust of academia. When I went to London Business School, the thing shifted and people who worked at the London Business School were expected to earn vastly more from consultancy than they did from the academic work. And they engaged in consultancy. So there was a very different framework and their careers depended on their consultancy as much as on their academic work. Now this is a game I never played. One of the reasons why I felt the London Business School was slightly alien to me. I was interested in research for the way one could spread knowledge. They were interested in research because it yielded a nice income. Not that I didn't have the occasional thing.

Can I ask…

My biggest earner in that way was when I was commissioned by BT. They run, every few years they run, there's a telecommunications conference, an international telecommunication conference in which BT take a major part and in which they invite their very top cadre of clients. And I was commissioned to spend a week giving, talking to them, giving them a lecture each day before they visited the conference, and I was paid the princely rate, which was then quite a lot, of £5,000 per day. I've never earned this much since. But we were put up in a chateau in France, it was really a splendid occasion.

When was this?

This was in 1988 or something like that, or 1990. Something like that. Not that long before I retired. I was working at the London Business School then, I was engaged on that. But that would be a typical London Business School thing, that's what London Business School people did. It was the one occasion where I could have really quoted big.

We're going to have to break off in a minute, but I…

Yes, I think we have to break off anyway for lunch.

[35:10]
Can I just ask two tiny clarification questions, if I may?

Yes.

I was just wondering, you were talking about these writing reports in the seventies while you were at the LSE, I was just wondering at what level in the organisation you were looking at. Are you talking to managing directors or people at the coalface or all levels in between?

Typically it would be people who were running the IT things, rather than the business as a whole, though one had contacts with those business people as well, but primarily it was the IT people. In particular on the evaluations because they felt they had to justify themselves. They were being questioned – what are you actually doing for us, what are you yielding for us.

How did they respond to that sort of questioning? Were they hostile at all or positive?

No, how did the IT, the IT managers said I will try to show you how. But they had their difficulties and that's why we were able to help them.

These contacts, how do you actually get involved with these companies? Are these contacts you had before from your earlier computer consultancy days or were they contacts you'd made since you started at the LSE?

Very often they would come to the LSE and say look, come and discuss this with us, maybe there is something there. We were always looking for something, but I don't think we, as I say, I wish we had done a little bit more of that.

[36:46]
Why do you say you wish you'd done a little bit more of it?

Because I feel there is too much of a gap between practice and academia and in our concentration on getting publications and our careers we neglect what we ought to be doing in terms of getting industry working better, doing things better in industry. In other words, at LEO we'd been taught that what we were there for was to improve efficiency, to improve effectiveness. It's one of the interesting things in that early LEO report written by Thompson and Standingford, one of the sentences says, we hope that what this will do will improve, will be to the benefit of Britain as a whole. And maybe we were imbued with that spirit. And in academia perhaps we are too selfish in looking after our interests. Of course we do it on the basis of yes, we have to understand the phenomenon before we can give advice. We have to have the theoretical apparatus which enables us to build that advice. But there is something to be said for the Continental and particularly the Germanic model. I say Germanic, because in Austria, Germany, Switzerland and so on.

[38:10]
Did you visit Germany much after the end of the war and…

Not much, but I did visit, particularly as we had a relationship with this German GMD – Gesellschaft für Mathematik und Datenverarbeitung. And there was a, again, one of the strongest information systems research units was at the University of Cologne, an outfit called BIFOA – B-I-F-O-A – and we did quite a lot of work with them. We had a quite good relationship with them, BIFOA.

No, I was thinking more for personal reasons as well, sort of going back…

No, personal reasons, absolutely not. No. I, if there's a football match between Germany and England, there's no question that Germany has to be beaten. [laughs] I've strong feelings that way.

[end of track 13]

[Track 14]

I was wondering if you could just give me a brief overview of your academic career, of the early part of it from when you started at the LSE.

Right, yes. As we mentioned earlier, I went to the LSE in 1968 with a specific task; to establish teaching research in information systems, what was called systems analysis. I had the subsidiary task of running the computer service, but that was really to meet my salary requirements, the grant wasn't big enough, and I left that as soon as possible. So my first job was to try to establish teaching, what do we teach, who should we teach it to, within the… had to get the approval of the LSE. LSE has a committee structure whereby proposals for new degrees are put forward to a large committee which then decides, is this something the LSE want to go ahead with. So it's not an executive decision by somebody at the top, it's a combined decision. Of course the ground had been prepared by Gordon Foster in applying for the grant and getting it, so that approval was already there for engaging me, then I had to persuade the school – again, which was not difficult – that what I was proposing was something which was reasonable and that they would provide the necessary resources in terms of staff. And indeed, that was the first task I had in 1968 and did that. Once we had the degree established it became a matter of consolidation and also for developing the research side. And we developed quite an active PhD school, furthering the kind of research we wanted to do and indeed, some of these PhD students have gone on to be some of the leaders in academia worldwide. Some of the names are quite well known. At the same time, getting an understanding of what was happening internationally, and this was done through conferences. By the mid 1970s I think the group had been established that was providing a masters degree which was accepted and getting an adequate number of recruits, in fact a lot of recruits, and we could be quite selective. We had established research with different people doing different things, but my own particular area being the socio-technical one, and this became in a sense the foundation of the way that group of ours operated, taking different aspects with the economic evaluation of computer systems being one of the fields I was particularly interested in. In having, it being known that I'd been a fairly senior person in LEO, this opened doors in some ways and in fact made people come to us so that I got invited to the various committees I talked about: curriculum development and IFIP. So my prior occupation supported the new one, not only in the fact that I had learnt a lot and could reflect on what we had actually been doing, but also in terms of opening doors. That was very

useful. My career also had the coming of Sandy Douglas a little while after I came and our collaboration in establishing the department. He of course at that time was senior to me, being the professor of computational methods, whereas I was a senior lecturer. [04:31] Our department, our group was getting a good reputation internationally, we were presenting papers at international conferences, we were publishing a reasonable amount, so that it became established as the leading group in the universities in this country at that time. We were very active in promoting things like the European Conference on Information Systems, the UKAIS, we were founder members of the UKAIS – that's United Kingdom Academy of Information Systems – which was the umbrella body for the academic community and has annual conferences. At one level the UKAIS has never been as influential as it might have been, partly it became the vehicle for the new universities to get together and many of the older universities, Cambridge in particular, Oxford, although being members of it, played no active role. LSE played a slightly more active role, but the older established places didn't quite take the same interest in the UKAIS as the newer universities and that I regret because in international terms it meant the UKAIS doesn't have quite the status which similar organisations have in other countries.

[06:22]
Did you have any personal involvement with the UKAIS?

Yes. I was one of the founder members, starter members, and initially I had quite a lot of involvement but I subsequently diminished my interest in it and came back again later and have only in fact just resigned as a board member, on the basis of old age. So I've been interested in it. And what I've been particularly interested in too is making the UKAIS part of the international community – I don't know whether you've come across it – the AIS, Association for Information Systems. The Association for Information Systems is primarily based in America but is an international organisation covering the whole of the globe with… divided into four groups: the American group, the European group, Pacific group and – what have I left out? There must be at least another one. African and so on. I think, yes. There are three or four groups. And they are, they publish some of the most important journals in the field, they are active in promoting the subject, they have a good archive and I've been trying very hard to get the UKAIS and the AIS to co-operate more closely, and now in fact the UKAIS is an associate member of the AIS, so there is a closer relationship. So I've been quite heavily involved in that side of things. Anyway, to continue the career. In the eighties,

by this time I was quite well established and quite well known and applied and with the help of Sandy Douglas was given a chair in 1982, became chairman. I had, around that same time I also became convener, the head of the statistics department, I think about 1983, '84. '83 I would guess. And shortly after – I was convener of the whole department – and very much on my recommendation the department was split into its separate groups because it made no sense any more to have a huge department where the statisticians didn't know what we were doing, we didn't know what the population studies people were doing, and so on. It wasn't a working proposition in that way, it had no cohesiveness. Originally the idea was that statistics was the underlying thing which we all shared, but this was no longer true. The mathematicians had very different ideas and they wanted, the mathematicians in particular wanted to work in econometrics, a very different kind of mathematics than statistics. So it was broken up into separate things and we became our own information systems department and ran our graduate courses – masters and PhD – very successfully so that we grew to have 180 students and were financially one of the most profitable departments at the LSE. We did extremely well, we were able to charge high fees to foreign students and things like that. But in about 1985, '86 we had a crisis. One of our lecturers who had been a PhD student, an American, and who had published really a very large amount both in terms of books and journals, was very active in research, applied for tenure and he was refused tenure. Now, at LSE, the decision on promotion at that level in tenure is done not by the department or again, by some executive above us, but is done by a committee appointed by the school comprising people from any department. And the particular committee which was established to look at his case was one which was totally incapable of understanding what we were doing, for whatever reason, and he didn't get his tenure, which in effect meant he got the sack. And at that point I decided this was too much and I said this won't do and gave reasons why not and I resigned and left in 1986. It was something of a *cause célèbre* at the LSE, this thing is. The guy went to, back to the States and is now one of the most eminent professors in the field.

Who is this, sorry?

Rudy Hirschheim. So I mean he had been a good friend anyway as well as, so on, but it wouldn't have… Anyway, I resigned and started applying for jobs and almost immediately a vacancy came up at the London Business School and I was welcomed there immediately. So there was hardly any interregnum between one thing and the next. So that's how I got into the London Business School, that's why I left LSE, I left in dudgeon because of that. And I was I

think absolutely right to do so. People agreed with me. [12:54] So then I changed tack from the LSE. At the LSE I had been responsible for a department which people came to because they were interested in my subject, it's the only reason they came to it. They wanted to study the subject. People came to the London Business School for very different reasons. They didn't want to come to listen about information systems. If they're interested in any subject it's things like finance and so on, but above all, they were career oriented, they wanted an MBA and they wanted the MBA from a good school and they would take the courses which were the most likely to lead them to an MBA, never mind whether the interest… So it was a totally different atmosphere, from having a body of students who were significantly interested in what you're doing and came because we are doing that, we have a body of students who you find some of them very, very interested and very interesting, but where the whole ambience is different, people come for different reasons. Where the teaching staff are different. They too are very career minded, they're very interested and we discussed who was the biggest earner, who gets the highest consultancy fees, not who does the best research. Again, a difference in the feeling, again not universal, there were colleagues who were absolutely as interested in research as I was, but the whole ambience of the place is different. So I thoroughly enjoyed myself there, but felt alien and above all, I was not able to establish the subject as a must-do subject in the MBA. It was always regarded as a sideline. Yes, some people are interested in it, some people think they'll happen to get this very good MBA they wanted, but it was never a mainline subject and it never became a compulsory subject. So I failed absolutely in making this. I have to say that my predecessor had equally failed. My predecessor was Peter Keen – the name ring a bell? Again, Peter Keen is one of the greats in the information systems area, now in America at MIT, but mainly an independent. Peter Keen's written some of the most important papers and books in the subject. He was my predecessor and he hadn't succeeded in doing that. But it was said he hadn't succeeded in doing it because half his mind was on other things. He was never fulltime. But my successor didn't succeed either, and my successor again was a very well known person, I was responsible for getting him into the Business School. He didn't succeed either. So the Business School – and this is true of many business schools – they have not accepted these subjects like computing, information systems as mainline subjects. Some of them do very good work in it, but over the past three, four years it's declined enormously and many of the departments have closed. There's been a retraction from that. I had a five year contract and at the end of the five year contract I left the – that was in 1991 – I left the Business School and thought it was time for me to retire, so I formally retired, but renewed by allegiance with

the LSE and became first of all the visiting professor there and renewed my… I was no longer head of department, but I renewed my acquaintance with it, was very active there and then, very gratefully, when I was given the title of Emeritus Professor. It's really most unusual for somebody who's left the place and comes back, they don't normally get the title of emeritus professor. So it shifted from being visiting Professor to being Emeritus Professor. And as I am now, I'm still a part of the department, though another major change has now taken place. The information systems department has been absorbed into a new department called the department of management. So it is a group within the department of management. And that's where we are now. And I'm still part of that group, I'm still involved. I, comparatively recently, suggested a research project for which we – and got the funding for that research project – on the role of IT and information systems in the credit crunch. A very, very interesting project. One doesn't hear very much about it, apart from one talks about the causes of the credit crunch. It was certainly not a cause of the credit crunch, but it was certainly there and certainly didn't prevent it and in my opinion in many ways enabled the credit crunch to happen. So that is an interesting exploratory project for one year which we hope will be extended for more. We've sort of just started that, and of course I'm no longer directly involved, but I'm there more as a sounding board and so on.

That's given us a lot… there's going to be a lot of things to ask questions about actually. So shall we take it from the early stage?

Yes.

[19:18]
I was wondering what departmental life was like at the LSE, who are your colleagues?

The first thing to know is that we were members of the statistics department and the statistics department had been pre-eminent in statistics, thirties, forties, fifties and so on, and had some of the most important statisticians, but for one reason or another in the seventies and eighties began to decline somewhat. So when I was there, got there, it still had some of the great names there. People like Maurice Kendall, Alan Stuart and so on, but as they left they weren't replaced by people of equal weight. So it lost its way slightly and its greatest blow came in the RAE when it got a ranking of four. That for the LSE is a disgrace, we expect to be fives, the statistics department. By that time the separate statistics department only got a

four, so there was something of a post mortem on that. I think it's back on its way up, they've recruited some more people. Anyway, the statistics department had, at the time I came into it, had… the most powerful section was the statistics section after which it was named, it had some of the leading statisticians in this country. Oh, Claus Moser was another one who became head of the government statistics service. He was another one there. These were some of my colleagues. Then the other side which I knew extremely well were of course the OR people, partly because the head of that group was my wife, we were in the same department, and knew a lot of people quite well, interacted with them, people like Jonathan Rosenhead in particular. What was departmental life like? Well we had this curious department which had its different sections which didn't know what each other were doing and I think most of us felt that we would prefer to be independent groups rather than part of this department, which didn't seem to be functionally efficient. And certainly not, it wasn't working in the wider community sense, it didn't feel like a community of people, it felt like separate groups. And one of the features of LSE over the years is the growing fragmentation. One of the original ideas was, this was going to be a university without departments. Everybody is equal, everybody is part of the same thing. We were a community of scholars in the social sciences. And of course this never worked. It worked for a time when we were very small, but as it grew it crystallised out into different groups and these groups became more inward looking, there was less inter-disciplinary work, inter-disciplinary work began to disappear, although the watchword was still inter-disciplinary work and we all work together, but it ceased to work. And this fragmentation continued so that the statistics department, as I say, broke up into its own separate groups and then these groups became independent departments and then that old idea of the 'no department' LSE had ceased. We'd grown far too big for it anyway. But what was lost in that was a great deal of community spirit which when I first came, certainly when I was a student, there was still a great deal of community spirit and people would come to the senior common room to meet people from other disciplines, to meet their fellows. By the time I left to go to the London Business School that had almost completely disappeared. The senior common room was far more deserted, people had their own, they were far more far-flung, rather than in a small group, far-flung. People had their own common room facilities within their own departments. And it's a matter of regret that this community spirit and inter-disciplinary notions were largely lost. In the context of that, the foundation of a department of management, that's another umbrella thing to have different things, is in my opinion not going to work. I think it's going to fragment

again. I don't think… I may be wrong. I may be wrong, but I think the secular trend is against it.

[24:55]
Did you have departmental seminars when you were staff there?

Yes. No, we had, yes we had a few departmental seminars poorly attended. Each group had its own seminars much more, much better attended. For one thing, we expected PhD students to come to it, whereas they would, on the whole wouldn't come to the departmental seminars. We had the departmental seminars. When I became convener of the department, I tried to overcome this, the group inertia and I tried to get a series of seminars where people would explain what they were about, what they were doing and why they were doing it and it really fizzled out again, didn't come to anything. There were always excuses for not attending that. So yes, people paid lip service to it, what a good idea, let's do that. But then the people who were expected to prepare papers didn't want to prepare papers which were for the generality, they wanted to prepare papers which could be published in journals and which would be for the specialist. The people who were supposed to attend said, of course I want to attend this, but in fact I've got to get on with this, that and the other. So it never really happened.

These group seminars, what would happen at these?

You mean within the inter-group seminars?

Yes.

The inter-group seminars, we would have one of the departments, maybe the department of demography give an account of demography, what it was about, what they were doing and so on, and the few people who were present would then ask questions and go away from the seminar somewhat enlightened, hopefully. But as I say, there was no enthusiasm for this, there was lip service to it but no enthusiasm.

You mentioned the smaller group seminars that you had within your own sections – were they better attended?

Yes, they were much better attended and they were more or less compulsory for the PhD students. They were in theory voluntary, but in fact they were told you ought to attend this. And indeed the PhD students performed, they gave their own seminars and they joined in. So that was much more useful, much more interesting, much more exciting, that worked. It would work, everybody expected it to.

Are there sort of social events connected with these seminars as well – do you go to the pub afterwards, for instance?

Yes, yes, yes. For the, some of the more formal seminars we went to dinner afterwards, for the less formal ones we went to the pub. Usually there was a dinner, not a formal dinner, a very casual dinner; we went to the local Chinese or the local Greek or the local - plenty around – Italian, in particular if you went to an Italian one. That was rather good.

Is this staff and PhD students as well?

These were primarily, the ones who went to dinner occasionally had PhD students, but they were generally the visiting staff who came to… these seminars would be attended by people from outside as well as from LSE and they went to have dinner and continue the discussions.

What sort of people from outside?

Mainly from other universities, mainly academics. Occasionally we could get somebody from industry, but very rarely. And generally speaking, seminars which we arranged for… if we wanted a man from industry to talk, generally didn't go down well.

Why?

Because there was, on the whole, the industry people had their own confidence and arrogance about what they were doing and were teaching these academics who didn't know anything about the real world, and the academics, but they were usually poorly structured because these people were not used to this and they had been talking to their own kind rather than our kind, which were different, had different expectations. We wanted things explained, we didn't

want a narrative description, we wanted explanation and analysis, but on the whole we didn't get that. So, relations with industry are not that straightforward.

[30:04]
No, no, no. This is going to sound like a mundane sort of question, but I was wondering where your departmental kitchen was or if you had one at all?

Departmental…?

Departmental kitchen.

Kitchen? No. We had a department kettle. But that didn't go further than that. Actually, if I talk of the whole of the time, this changed at various times. At this moment there are much more facilities and one of my successors was Claudio Ciborra – I don't know whether that name means anything to you. Claudio Ciborra is somebody you should know something about. An Italian who had also studied at Harvard, on the faculty at Harvard. He came to be the head of… he'd been a visiting professor with us for some time. He's one of the great seminal thinkers in the information systems area, very much an unorthodox thinker, but brilliant, has written some of the most important books. He became head of department, but he was also very much an Italian, a stylist and fashion conscious and one of the things he introduced is he turned our space into a studio, called it a studio, now the Studio Ciborra. [laughs] Because we were quite well funded, we were very successful, we were quite well funded, we were able to spend a little bit of money on decorating it in his style. And one of the things he also introduced was a notion of having some kind of kitchen, not for regular meals but for occasional meals, and one of his best friends was a chef, very well known chef, who'd come in and cook the occasional meal. So that was Claudio, a very special person, who unfortunately died of cancer three years ago, three, four years ago.

When is this, when does this kitchen facility come in?

This was in the late nineties or even in the noughties. Noughties, yes. Yes, I would guess it was in about 2002, around there. Yes, but Claudio, Claudio saw information systems development as a… he called it bricolage, that is tinkering, you go this way, you go that way. This notion of a deterministic direct line of doing things is not how things work in practice,

people tinker. They do this, they do that, they do this. And it's very close to my own thinking about this so I loved his stuff. He's very good.

Let's take a short…

[end of track 14]

[Track 15]

Did you have to go to conferences at all when you were in industry?

No. No. The only person who – there were one or two people who did go to conferences like John Gosden, I mentioned earlier that he knew much more about what was going on in the academic world than I did. No, I can't remember going to a conference. The things we did have is the annual exhibitions at Olympia, the Business Equipment Exhibition, and that was, I was very heavily involved in those exhibitions, making our stand - we had a stand, a LEO stand - and getting that ready, what were we going to do on the stand and then manning the stand, talking to people.

Could you describe what one of these stands would look like?

Yes, it would have a computer console on it, very often with the displays being faked rather than be real displays. At that time one couldn't have the whole computer there. But with areas sort of, areas with armchairs where little groups of people could sit together so one of our consultants could sit with two or three people from a particular industry, so that the basic stand was these cells where people could sit, plus the equipment, the computer console, the control desk where one could demonstrate things, and pictures showing more of the computing and more computing and some computing people. That was a typical stand and most of the stands at the Business Equipment Exhibition were of that sort. One of the amusing things is that most people made their display desks, their control desks with enormous numbers of winking lights which were non-functional but which were winking away and so on, to attract people and show this is busy, it's working. They were entirely non-functional.

Do you meet clients at these organised…

Yes, yes, yes. And we would bring clients to explain things to other people. That happened annually at Olympia, the Business Equipment thing. I don't whether they still run but I suspect they do, but it would be hugely different.

What did you actually do when you were there? What did you actually do with your display when you were there, what was its purpose?

I must say, I was mainly concerned with talking to clients and perhaps showing them, showing it to them and demonstrating that this is where you see what's going on in the computer, that kind of thing. It was never a centrepiece for me. It was there to attract people. They see the console and say, well let's go and see what's going on.

Do you actually make sales as a result of this being there or would there…

No. Well, we made, certainly – yes, the Business Equipment Exhibition certainly introduced us to some people who later bought computers, yeah, no question of that. Whether it paid for itself, I don't know. My guess is it just about paid for itself. It's quite an expensive thing to mount. But one had to do it because one's competition did it, one couldn't be not there.

Did you see the competition when you were there?

Oh yes, we went round and saw the competition. We saw everybody's stand. IBM's huge stand, our little stand. It wasn't that little but it was much smaller than IBM's. The big stands were the IBMs, the NCRs and so on. Ferranti, English Electric had relatively small stands. What was the other electric company, electricity company? English Electric… I've forgotten the name of it now, which subsequently was bought up by English Electric, but they had their computer and Standard Telephone and Cables had their computer. Did you know the Stantec Zebra?

I've heard of it.

[04:50]
You've heard of a Stantec Zebra. Stantec Zebra was a very different machine because you in a sense programmed the machine at a sub-instruction level, at below the instruction level, almost at the circuit level. You almost instructed a register rather than at the higher level. To them, the instruction set was a high level, so it was a very special machine. But one of the people, one of their people, my opposite number there, was a very outgoing character and this computer had its circuits round in a circle and he would hang it round his head and walk

around with this computer. Stantec Zebra. I don't think it caught on very much. The big machine, the machines which were successful were the Elliott, Ferranti. Probably the Elliott sold more machines than anybody else.

How did you get on with your rivals when you met them in this sort of social context?

Oh, we would sometimes go round as a group. That is to say, we would go to conferences, meetings as a group. Here we are, the British computer group, kind of thing. So yes, one went together. At other times there was considerable rivalry. In fact there was a lot of competition. It was friendly competition, but there was competition, particularly with computers which were aiming at the same market, many of them of course weren't. Mostly Elliott computers were aiming at process control, things like that, rather than business processes. So that there was great rivalry with Ferranti because they produced the Orion which was specified before the LEO III but was actually, they had a major hold-up in their production, they weren't able to deliver it, so they only sold in total about three or four Orions. But at the time, for a time, there was considerable rivalry between us.

[07:26]
Is this a general rivalry or do you know your opposite numbers in other companies?

We knew our opposite numbers fairly well, yes. There was a kind of general rivalry but we did know our opposite numbers. And as I say, at other times we hunted in packs, so that yes, I remember going with this guy with the Stantec Zebra round his head. There were three of us going round giving talks to potential clients and – well, maybe more to British Computer Society meeting types of things where people would come. That's right, it was more like that kind of thing. Probably was British Computer Society meetings. That's right, that's where the hunting in packs took place. We would come together there.

It's interesting that the computer is banding together there despite being rivals. Why did you do that?

I think we wanted to get over the message of computers partly and we left it to ourselves to see what we can get out of this ourselves, how we can get advantages over our rivals, but nevertheless we went together. Not the whole of the British industry, these were in twos or

threes. And so, what would you do, you get an invitation from, perhaps from the British Computer Society, would you come and talk about your computers, you do it.

Are there any other forums where you meet rivals and academics?

At conferences. Of course – I'm sorry, this was not conference time, I didn't know conferences then. I was jumping. Rivals yes, in the academic field. There are also rivals in the academic field, of course.

How so?

In some cases strictly rivals, there are departments which feel extremely competitive to other departments of a similar nature. This is not universal but quite a few do, there is that rivalry. So yes, there you meet at conferences. It's something I thoroughly disapproved of. I've always had the feeling much more that we get far more out of us behaving as a community than us behaving as competitors. Maybe competitiveness sharpens some things but I don't think it needs to, I think it's a ridiculous idea, basically. And there are some departments which were very, very strong, hotly competitive and jealous of us, and of course all that was heightened by the Research Assessment Exercise where getting your grade was so important, getting the number right. [10:37] And lots of gamesmanship going on. Probably know about some of the gamesmanship.

No.

As you know, RAE is based on what you published, so a department would recruit a Russian academic who'd come over once a year, but he was on the staff, he was on the roll and he brought with him his publications. Pure gamesmanship. He didn't add anything to that particular department, except those publications now counted as the department's publications.

Was the RAE something that was important when you went back in… or its equivalent back then, I'm not sure what that would have been in the late sixties when you went back to university.

No, we didn't have anything like that. We absolutely didn't. We didn't have such strict criteria for promotion, that one had to do it through publishing. One had to be a well regarded academic and one had to be seen to be doing good work, but that work was not necessarily through a limited set of publications and journals. Nowadays, for example, if you write something which is absolutely first rate in an encyclopaedia, it doesn't count. So you don't write for encyclopaedias any more. Absolutely absurd things. Some books which are written are far more important than journal articles and some people write books rather than journal articles, but they don't count. No, in the newest thing they don't count at all. For some of the RAEs they carry some weight, but not a lot.

When does this assessment exercise start impinging on your work?

Really after my retirement, so it never did. If it had, I would have done things in a different way. So I've published a great deal, I've published lots of papers, but I've never been terribly concerned whether it's a top-rated journal or not, I'm interested in being well refereed, but I'm interested in the refereeing, not in the journal and if journal *X* provides good feedback to me, fine. That's what one wants.

Were there any other forums for you to meet computer industry contacts when you were in industry?

When I was in industry, not a great deal. There may well have been, apart from these exhibitions, not a great deal. No, no. I'm wondering whether some of my colleagues were more involved, but I don't recollect that.

Did you read the computer press?

Yes.

Any publications in particular?

Yes. One read the computer press for… *Computer Weekly*, they would come and seek you out, you'd occasionally write an article for them, that kind of thing. It didn't amount to a great deal, but it was happening. And again, our lack of marketing experience meant that we

probably didn't make enough use of that channel. Other companies probably made much more use of that as a way of getting themselves known and appreciated.

Do you get any particular benefits from reading it?

Any particular benefits…?

From reading the computer press when you were in industry?

It kept you up to date with some things. Yes, yes, yes, it was certainly worth reading and you heard some things you didn't know about and could follow up. I mentioned earlier that we reckoned we knew our competitors' computers. Well one of the ways one learns about competitors' computers is some of their own propaganda pieces written in the press, their own things. Not advertisements, but papers they'd written about, for example, this CRAM device from NCR. For a time that was an important piece of equipment.

[15:32]
What sort of things do you have to write in the computer press?

Usually something about applications. Sometimes about, for example, at LEO I've mentioned Kimball tags earlier. Another device which we produced, we produced a document reader – I mentioned that earlier – interestingly enough Lyons started work on a document reader before they thought of computers, because they wanted… they had a huge number of pieces of paper to read from their transactions, usually of very low value, but they needed to read those and so they thought of document reading in the late 1930s and they hired an engineer, a man called Broido, who was another refugee and was a very good engineer, to design this and he subsequently joined LEO and became one of our engineers and he specialised in mark reading, in this mark reading. So we produced this as a, first of all, as a device which could read documents and produce paper tape which then when into the computer, and subsequently – called the Lektor – and subsequently the Auto-Lektor, which was directly linked to the computer and could read documents very fast. And companies who bought our computer like Shell-Mex and BP joint marketing company - Shell and BP had a joint marketing company called Shell-Mex and BP - and they bought I think a couple of LEO computers and they used

these, this Auto-Lektor very heavily, which was devised by this man Broido. Why am I talking about that?

Talking about writing for computer journals.

Oh yes. So that would be a typical thing one would write about.

Is there any particular spin you put on this?

I think one would say this is a new device for reading transactions, cut out your transcription people, your punch… you don't need a punch room. And what worse job could there be than punching transactions? You don't need that. You need one operator for the Lektor, Auto-Lektor. That kind of thing.

How important were peripherals to you when you were selling… peripheral availability when you were selling computers?

Because in business data processing they are important, they are important. And ultimately what people buy is the output from the machine and that has to be in a presentable form, it has to be produced fast, it's got to be easily distributed to users, so stacks of fan-folded paper aren't quite good enough, it's got to be better than that. Similarly, when you're dealing with hundreds and thousands of transactions, that transaction data's got to get into the computer, what's the best way of getting it in? Transcribing it by punching it on to paper tape or punched card is a very costly job and may cost more than the value of the output. In many cases this is actually so, the value of the output is… So, find ways of doing that. And we experimented in a variety of ways. We were one of the earliest people to experiment with using a telephone, using acoustic couplers. Long before that became such a widely available thing. I think we made it work but we never managed to sell any of that, it was too early. So we went into that, for example, quite early, having had the experience of the teashop job where the manageresses phoned in their orders and they were punched on to cards by the telephone operator. Well, we wanted an automatic method so we thought well, we can perhaps use acoustic couplers to get the things directly into the computer.

[20:00]

We started this particular session talking about conferences and you mentioned there weren't any on the industrial side beforehand, but…

No, but of course at the, in the academic side immediately and my very first conference, which I remember fairly clearly because it was the first conference I had to prepare a paper for in an academic sense. And it was a conference in Southampton and it was chaired by Sid Michaelson, I think it was an annual computer conference, I'm not sure. It might have been a BCS conference. A lot of the conferences then in the UK were sponsored by the BCS, and I gave a paper for a computer science conference on really what are information systems and what do we have to teach here. And one of the things, I prepared this paper and I gave it and it seemed to go down quite well and I was delighted subsequently when Sid Michaelson came up to me and said this was the first time he'd understood what that branch of computing was all about, which he'd really laughed at as being of no importance. Or rather, of being easy, was I think the word he used, something which was easy, not something which has got its own particular problems, it's very different from mathematical computing and numerical analysis.

How did you find your first academic conference, as opposed to your industry days, apart from that instance?

I suppose I can say like everything else I found in this new thing, I found that interesting, something to learn from and something which I was very happy to repeat, and from then on I attended quite a few conferences. I delivered papers, I was invited to give papers, and so on. And we gradually grew the information systems content of conferences. What had originally been mainly computer science conferences, we now began to have our own information system conferences.

Did you help arrange any of these?

Yes. Very much so. I was very much instrumental in the first of the European information systems conferences which was held, if I remember rightly, at Henley, at Henley College. No, I was heavily involved in quite a few conferences. Particularly IFIP conferences in the 8.2 group and by that time I was a member of 8.2 and quite an active member and subsequently became chairman of that group for a couple of years. Again, the usefulness of

that was meeting one's foreign, the foreign members of this community, community of practice, using the modern jargon. Community of practice.

Any individuals you remember in particular?

Yes, I was just going to say. Alex Veryn-Stuart from Holland, from the University of Leiden, who'd spent a lot of time in his previous life I think working for Shell, before he became an academic. So his career was not unlike mine. He's a couple of years older than I and we formed quite a strong allegiance and he became chairman of the IFIP committee 8, which had its 8.2, 8.1, 8.2 and so on, but he was most interested in 8.2, the group I was involved in.

Just remind me what this group does exactly?

Information… it is concerned with information systems, its attitude, its basic has always had a strong - since I suppose Enid Mumford and I joined it - socio-technical notions. And that's still true today. It's still the prime body where one looks at the wider thing, where one puts a very heavy weight on the social part of the system.

How often do these things meet up? How often do these committees happen?

They have annual meetings and they have additional workshops at various periods. So there's an annual 8.2 meeting. Some of the groups have meetings very rarely. I mentioned at one time, I think in talking about the IT history group, they meet only very occasionally. I think at one time they used to meet regularly but now they meet very occasionally and I don't see much coming out of them, but I may be maligning them. I'm a member so I should know. Then there's a group on – yes, that's another thing which I might say I introduced at LSE, a particular strand of interest in information systems in developing countries. And so we have a group of people who are particularly interested in doing research in that area, information systems in developing countries. That was something which at that time was novel but has been done elsewhere, for example, Kingston University and others. [26:05] Conferences, yes. I enjoyed conferences and it's one of the few differences between me and Ailsa; Ailsa doesn't like conferences, I like conferences.

Why?

So I occasionally drag her to conferences.

Why do you like conferences?

I like meeting my colleagues and I like to hear some of the papers. I like panel sessions particularly because when… no, panel sessions can be horrors but they can sometimes be good. A good panel session I think beats most things and I've chaired quite a few and organised quite a few. I was until recently quite active in conferences. At the last conference I was at St Anne's College Oxford, it was earlier this year – the UKAIS conference. But I go to many fewer conferences now. It's possible, I've been invited to the Annual International Conference which is being held in St Louis this year. I might… if LSE find the money for me I will go, but I've told them that I shouldn't be the first priority for giving money to, because money is now a problem.

Did you have any involvement with SRC initiatives?

I've been, yes, various SRC. We've had SRC and ESRC grants, various grants. My first contact with the ESRC was shortly after I joined the LSE, a particular issue had arisen with them. They had heard that in America there were a number of databanks which had data, which had archival data from surveys. It was felt that survey data did one survey, they did one analysis and then the information was lost. But that information could be useful and there could be a cumulative, accumulation of this, cumulative data would be better. You could then do meta analysis of several surveys. And so they became interested in the idea of that and they knew this had happened in America and they – because I was at the LSE and involved in social science computing – they asked me to go to America and have a look at these databanks and come back and write a report and suggest what the SRC should do, the SERC should do. And that was for me a very interesting experience, it was my first visit to America. I visited some three or four different universities, including Berkeley in California. So I saw quite a bit of the country in the couple of weeks I was there, even if it was a couple of weeks, and I subsequently wrote a report for the SERC which was accepted and the data, survey Data Archive was established at Essex University. Interestingly enough, they subsequently advertised for a chair to head this group and I applied for it and didn't get the job, having

made the report on which it was based, but I didn't get it. Delighted when I didn't get it. It wasn't really my kind of thing that much.

[30:25]
When did you actually get a chair?

In '82, in 1982. Ailsa got her chair two years earlier, so we were both up for chairs more or less at the same time and I got mine at the second time of asking. First time was the same time as Ailsa's and then a couple of years later I got it. Helped, I must say, encouraged very much by Sandy Douglas and again a very good referee for me was by that time Enid Mumford, who also by that time had her chair, she also got a couple of years earlier, so I got it anyway. So I got my chair and subsequently became head of the statistics department. That was done by rotation, incidentally. You had the job for two years and then gave it to somebody else.

How does one actually get a chair at this point? Is it just years served or is there some criteria that needs to be met?

The LSE has a very tight way of refereeing, of awarding chairs. It's not at all easy to get chairs. Again, a committee is appointed, not a committee of your own department or specialists - they are simply asked to advise - a committee of other academics, senior academics who review your case and then make a recommendation. And if that recommendation is accepted by the appointments committee, then you're offered the chair. And there are various different kinds of chairs; there are named chairs, there are personal chairs and so on. So when Sandy Douglas was appointed, a chair was created for him. But sometimes you step into a chair which exists. In my case again a chair was made for me. I didn't step into anybody's shoes.

[32:45]
Going to have to stop this in a second, but I was just wondering if you could tell me a bit more about Sandy Douglas. He's a person who's popped up into this story a few times. I was just wondering if you could tell me a bit about him as a person?

Sandy Douglas was a very outgoing person, willing to express an opinion on a wide variety of subjects, he was quite well learned. He had started life at Cambridge with EDSAC as a PhD student, he'd got a degree in mathematics first and then a PhD, and he developed the world's first interactive computer game. It was called OXO – don't know whether you've heard of it, OXO? It's no more than noughts and crosses, but he did it in order to explore the notion of interactive, how does the behaviour of the computer and the person working together interact. So the cathode ray display showing where he puts the crosses and then the person having to react, pressing a key to show where he puts his or her X and so on. So that was the first interactive game, OXO. He subsequently set up the computing service at Leeds University. It was doing both service and teaching, but teaching to people who wanted to know about computers rather than a degree course. And he stayed at Leeds for a number of years and then was headhunted by industry and joined – I mentioned that I was headhunted by CEIR, but he was headhunted by CEIR and joined them and subsequently worked for Leasco, another big American consultancy, and was then appointed professor of computational methods at LSE where he'd first come across information systems when he was at Leeds, but he became more and more interested in that side of things. As I say, he was a very outgoing person, a big personality. I can give you the obituary I've just written which is being published by… which is the thing I've got to proofread… show you. He was very active in the British Computer Society, he was chairman of the British Computer Society, one of the founder members of the British Computer Society. Very active in the Worshipful Company of Computer Technologists. Do you know that? The Worshipful Company of Computer Technologists. This was founded, I guess in the late nineties, I'm not quite sure when, as a City Guild Company of computer technologists doing good for the computer industry, it's a charitable company, and they offer annual prizes for this and they offer an apprenticeship. Sandy was very active in that. He tried to get me to join. I went to one of their meetings and said this is not for me. That characterises him; it's the kind of thing he liked. He was a freemason, another thing which indicates… became master of his particular lodge. So again, that sort of indicates something of his persona.

Why didn't you like the Worshipful Guild of Computer Technologists' meeting?

I thought a lot of dressing up and… can't think of the word at the moment, acting out things. Yes, it had a good purpose, but my goodness it was surrounded by a lot of guff. So I simply didn't like it and I didn't like the idea that to go to one of their dinners you had to be in full fig

and so on, I didn't… it wasn't my ideal at all. Which, having said that, it's interesting, my brother's very much the same as I am of course – this is off the record probably now?

Shall I turn it off?

Doesn't matter whether it's on or not, but he is currently the president of the London Rotary Club, which is exactly that kind of affair. In fact today he's giving his – it's an annual appointment – and today he's giving his final address. So yes, we can play that game too, but it's not our favourite game.

Shall we take a break?

Take a break, yes, yes.

[end of track 15]

[Track 16]

How did your duties change when you were awarded a chair?

Not significantly at all, until I became convener which I would not probably have… I would not have been convener without having had a chair, though it's not unknown for conveners to be senior lecturers or readers. But that I suspect was the principal thing. The most important thing is with a chair one is held in greater esteem, and that's very obvious, you're now a chair, that counts. It counts in the outside world, it counts at the LSE, so you're a mere something, now you've got a chair. And that's perhaps the most noticeable difference, not so much in terms of duties. In terms of duties there are one or two things on the administration side. You are a member of some senior committees, for example, the appointments committee which is professors and above. But maybe some other committees, you're more inclined to be asked to come on to committees and to act in an advisory capacity, for example, when somebody's been promoted. So there were a variety of little things like that, but day to day it doesn't really make much difference.

Did your research interests change at all at the start of the eighties?

No. Sorry, I shouldn't say that. Yes they did. I continued my interest in the evaluation, the economics of IT, but I became involved in the Alvey project. I don't know whether you remember, know anything. The Alvey project was set up by the government in order to put Britain on a firm course towards leadership in IT and it was a reaction to the Japanese Fifth Generation project. The Japanese Fifth Generation project at the time was *the* big thing, which was thought to be the big thing, and there were reactions in America, in France and UK, wherever you looked there were reactions to it. The Japanese were threatening to do to the computer industry what they have now done to the motor industry, or what they did until they had their latest disaster, to the computer industry. And in particular, the Fifth Generation project was a project to develop as the peak of IT application, artificial intelligence, and for one reason or another, everybody said well we have to do something about this and yes, we accept the Japanese artificial intelligence. Subsequently one learnt that, whether it's true or not is not quite clear, the Japanese had a number of projects. They put all the publicity on the Fifth Generation, but they put most resources into other projects and the biggest one was the Super Computer project, not the Fifth Generation, although the Fifth Generation was

important. Nevertheless, it was felt that this was important, the government allocated – I've forgotten the exact sum but this can be found from the records – to research in various aspects of computing and leading towards artificial intelligence as a peak, but it included, for example, case tools. Case tools. Case tools are automatic software generation tools, automatic. They were automising, making, turning software into a production process – case tools.

[04:32]
In what sense turning it into a production process?

That the whole process is computer facilitated and aided through a process of project management, project control, actually design aspects of it. And it ranged from very much artificial intelligence type of projects where the computer would think its way through on what development should be, to ones which invoked maybe artificial intelligence but used other methods, many other methods as well. And there were a number of major bidders for contracts on this, including Imperial College which produced a particular version. They had a particular notion of what a thing like this should be and one of the features behind it was, it was supposed to be based on a customer contractor basis. That is, there is a customer for whom the software was being developed and a contractor who included that system. Turned out that not all organisations which were developing software thought of themselves in that way. They didn't see themselves as, here is a contractor and here is a customer. They thought of themselves as a team working together in a different way. So many of these things which were based on this customer/contractor basis were not acceptable to many things. [06:18] Anyway, we also got a contract, but to look at the implementation of case tools and how they actually went down, how they actually worked in the real world. And we looked in particular at British Telecoms, at their research headquarters at – we discussed it earlier and I wasn't sure what the name of it – Marsham? [Martlesham] It's in Suffolk. I can't think of the one. It begins with 'M', that's all I know. Anyway, they had a group there working on it and we found them an extremely intelligent group working on it and we did an evaluation of that and we worked at another one in a commercial company, Barings Bank, which was very interesting. What was interesting there in particular was, the total split between the top management and the computing people. So this was something which was costing a lot of resources, but the management didn't know what was going on, and weren't interested, this was up to the techies whether this was a good thing or not. So this was something which one

would have thought top management would take some interest in, partly because of the resources used, but also because of the system behind it. What are we doing, is this something which is suitable for us? But the computer people were in the basement, they didn't talk to the top people, their system was most… it was really very unsuccessful, partly because of the way they staffed it, partly for the way they appointed one person to lead the project. Then that didn't work out very well so they appointed somebody else who knew nothing about this, and so on and so on, it wasn't very good and we reported on that. We looked at several others. So we looked at several industrial cases of that and there was our Alvey project, on Alvey scale, relatively small. But we also made a proposal for a very big project, which was really… one could take this as an exploratory project, a much bigger project, looking at software engineering, in conjunction with Dave Wastell – do you know Dave Wastell? He was at Manchester, he's now at Nottingham, he's now the professor at Nottingham, but he was at Manchester. And we had industrial partners – what's the name of the company? I've forgotten it. I'm getting bad on names. The boss of the company was Philip Hughes, who's quite well known. Logica. Logica. Logica were our partners and we came, I think we came within an ace of getting that contract, which would have been a million pound contract as a joint team, but we didn't get that. But Alvey was a major initiative to develop software, to develop systems, in particular leading towards artificial intelligence. There were several more artificial intelligence projects, a lot of projects. I think in retrospect Alvey did not deliver. Alvey himself was a civil servant who led the project. A guy Sandy Douglas knew quite well actually, perhaps helping us to get the contract, I don't know. I don't think so, no I don't think so, I think we got that contract anyway, the one we did. It was an exciting time because one knew this was… here we had at last a major government sponsorship for spending money on IT research and it was to my mind, and I think retrospectively justified, mismanaged, mis-themed. Instead of exploring what is needed in the IT world it took it for granted that that was the direction to go in.

[10:56]

So reacting purely to the Japanese development?

Reacting. As in fact did DARPA in America and did the French. There was also round that time the notion that the Europeans had to get together to defend themselves and there was going to be a European computer industry. And there were attempts to bring together the French company – what's its name?

Bull?

No. I've forgotten it. Doesn't help to forget names. The French company and other companies. Negotiations in the end broke down and nothing was formed, but there was going to be a huge conglomerate including ICL and the French companies and the German companies, but that broke down. But this was all reaction to what was happening elsewhere. The dominance of the American companies, the rise of the Japanese and the threat of, they felt threat of the Japanese. It was a time of curious excitement and also a feeling, yes, this is exciting and so on, but we're not doing it the right way. At least I felt very strongly we weren't doing it the right way. Subsequently the London Business School was commissioned to do a report on Alvey and how Alvey had gone, which I was not particularly involved in, although I knew the people who were doing it and got talking to them, but the… it became apparent from their report that Alvey had not delivered. Had done the wrong things and had done them the wrong way and that it spent too much money on things which weren't worth spending money on. It was too ideological, like this customer/contractor notion.

Ideological then in a customer/contractor sense relating to Tory ideology perhaps?

The ideology is that the way to do a project, the only way to be successful is to have a strong customer/contractor relationship based on setting down very clearly contractual rules, standards and that compliance to these rules and standards will make a project work. But of course it doesn't work like that. Above all, in my view, what you have to have is what is now called agility. You have to be responsive to the way things are moving, the way things are changing. Again, bricolage and Ciborra and much more a tinkering approach. You may have a goal in the long run, but you get there by short steps, not by saying to get to that goal we have to take these big steps. We have to feel our way to it rather than know it, partly because it's innovation and therefore we cannot know, there are limits to what we can know about the impact of it, partly because of complexity. Anyway, that was the Alvey project in which we played a small part, we might have played a bigger part, both in the actual doing of it and in the subsequent assessment of it.

[14:47]

What were Barings actually doing with computers when you investigated them?

Who?

Barings.

Yes, yes. Allowing Nick Leeson to get away with it. No, it was strictly bookkeeping, accounting kind of operations, not very much involved in the investment banking side of it to that extent. But all the records were kept, record keeping was the important thing. But as one could see from Leeson, one could utilise that to one's own advantage, partly because top management didn't see how these things actually worked together, how they hung together, that there were holes in the system.

Do you remember what your overall impression of the system was?

We didn't really look at their system, we looked at the way they were trying to introduce these case tools for building software and that was a giveaway in itself, because it wasn't well organised. But the whole atmosphere of the place was wrong in this. The gentlemen up the top and the people in the basement doing the work, and the gentlemen at the top, oh yes, they knew a lot about investments but they didn't know very much about systems.

[16:23]
What's a typical day's work like after you become a professor at this point? Do you still have lots of time for your own research or were these administrative responsibilities…

Administrative responsibilities take perhaps a little bit more time. Let's put it this way, at the time when I became a convener, then administrative responsibilities took a lot of time. At that point of time for those two years one's very heavily involved in administration. Otherwise one has a fair amount of time to do one's research and writing, always writing of course. So day to day, I suppose there was no set pattern, but one of the important changes which was taking place, the traditional relationship between the academic side and the administrative side was shifting. At the local level you started off by having personal secretaries who took notes from you and so on, and more and more you took that role over yourself as you were using word processors. I was in fact responsible for introducing word

processing into LSE, this is one of my, one of the jobs I headed some time in the eighties I suppose.

[17:48]
How did you introduce it? What did the job involve?

First of all, selecting the equipment, going round the manufacturers and seeing what equipment, then introducing departments to it, going to individual departments and telling them about it and suggesting that they explore it and try it and that we had some experimental machines to try it. By that time people were very ready for it, they'd heard about it from elsewhere of course and they wanted to use it. Nevertheless there were some departments which were very reluctant to use it and probably still are, because it shifted the burden of key depressions on to the principal and away from the secretary. We suggested, well, what you are doing is you are enhancing the role of the secretary. And indeed, secretaries, what used to be private secretaries are now called departmental managers. So the senior secretary would be – in the department – is now called departmental manager, in charge of administration. But in the larger sense administration was changing in that the bureaucracy grew and grew and the bureaucracy in most universities, as government requirements, as report requirements increased, so it required more people and the proportion, I believe that the proportion of administrators to academic staff has risen steadily. But the administrative load on the academic staff has also risen and it's risen partly because of demands placed on it by the administration. Instead of saving resources it does the opposite. And of course, once it's established it needs to maintain itself and it can only maintain itself by taking on more tasks. And it passes on these tasks very largely to the academics. So, Ailsa and I have often discussed this, the way when we started we had relatively few administrators who we worked with brilliantly and who did the jobs which needed doing, and now they are the ones who are in charge and tell us what we have to do, and why do we have to do them, because that's what the system demands.

Did you encounter any opposition to introducing word processors?

Not opposition so much as, introduce it there if you like, but this is not quite for us, rather than… And it was not compulsory. I think ultimately it probably became compulsory, but it was on a voluntary basis, departments taking it up, and very soon it was widespread.

[21:00]
Alvey's got me thinking of something else actually. Late 1970s, early 1980s there was a lot of concern in the air about the growing information society.

Yes.

How much of this actually impacted on your work, if any?

Quite a lot, in fact I wrote a paper on the information society and an encyclopaedia article on the information society, which I'm quite proud of. Which, if one could have submitted it to the RAE, kind of thing, I would have loved to do so. I also looked, refereed and reviewed other people's views on the information society so I was quite heavily involved in discussion and so on. I was personally interested about this notion of an information society.

What about it interested you in particular?

That, first of all, that the notion of an information society pretended to be something it wasn't. Civilisation is an information society, the hallmark of civilisation in a sense is information and the use of information, dissemination of information, and there's a continuity in that. And we see particular spurts and we see particular things and we see spurts with the computers, but the notion of information society is it's not something which is new. Though I've changed my mind slightly in the sense that the most… the social networking and so on have really made more… created transformations than the kind of information society which one was talking about in the eighties.

How would you characterise the sort of information society you were talking about in the eighties?

One in which there was a great deal of record keeping, information was available, information again, there was a bluster about this, a propaganda about this, that we can only run the more complex society we have now with the availability of information and my feeling was again, there was a continuity there, maybe we are stepping it up in some ways, but it has always been so and at no time more than, let's say, in wartime. The real information society exists in

a wartime… in a war situation like the Second World War or the First would. Sometimes misused, but the critical factors are information. And what is new about this information society, there's always been a need for information. Yes, we have more tools for providing information but we have also got more tools for suppressing information, so it works both ways. I've also always been interested in the way there is a symmetry between what one might call the benevolent side of it and the other side of it, the subversive side of it, and that the same information society can misuse information dreadfully and use it for the wrong purposes. And that's something which is based in history and civilisation, there's continuity in this too. So I've been suspicious of saying something is new here, we're an information society, the implication is we weren't an information society before. That's nonsense, of course we were. Yes, that's changed in degree, but not in the main thing and there have been periods when information has been absolutely essential. And the example I always quote is the agricultural revolution, the speed of the agricultural revolution in the UK. How quickly, how important it was for the information about new farming methods to spread, how quickly they spread. In a few decades agriculture in the UK was transformed. Okay, now it might take a few years less, but it's still basically the same thing. The Royal Society, the way the Royal Society set up a network and spread information very rapidly, maybe to a narrow cadre of people, but still essentially the same thing. I don't know whether you agree or disagree.

I was just wondering if you had any concerns at all during the 1980s?

I had concerns about some of the propaganda. On the other hand, in my paper I said there are transformations, and I gave an example of that, some event happens in Mexico, it's recorded immediately by somebody on a mobile computer or something, transmitted everywhere and the whole world knows about it in no time at all, whereas previously one wouldn't have known about it at all, or if one knew about it, two years later. So yes, there are these transformations which are taking place and they're important.

[27:10]
I noticed you used the word propaganda a moment ago and that's quite a powerful one in this context.

Yes, yes, yes. And perhaps it's excessive, but there is a kind of glorification of the technology as the instrument for propagating this new society and seeing it only as benevolent

and not seeing it as threatening as well and potentially threatening as well, and seeing it as part of a historical process which we've seen before. A particular area where it's been particularly interesting lately is knowledge management, and I don't know if you've looked at the knowledge management? It's a discipline in its own right now, it's got its own conferences, its own journals, its own thing, and is said to be within the context of the information society the great thing, we are now a knowledge society. We've changed from being an information society to being a knowledge society. And the resource we use is a computer to give us knowledge management. And again, I say, the papers talk about the huge benefits we get from this, and that's propaganda. There's a vast literature, but there are a couple of Japanese who published a book about the knowledge society and knowledge management and it seems to me they misused something which is much better understood than they suggest it is. And to me, knowledge management is advertising as well, but advertising doesn't come into it. Customer… which we now no… we don't talk about advertising, we talk about customer relations management. It includes a whole gamut of things including advertising, PR and all that. That's knowledge management and it's knowledge manipulation. And knowledge management is as much knowledge manipulation and disseminating falsehood as it's about disseminating truth. The relationship between knowledge and truth is not attempted. Maybe because truth is socially constructed there is no such thing as truth, there's only socially constructed truth. But that doesn't matter, we have to – if we're talking about knowledge – then we also have to talk about its relationship to truth. And the thing is, and one quotes Bacon, 'knowledge is power', to which one can add Acton's 'power corrupts'. But it's also the other way round; power gives legitimacy to knowledge. The Catholic Church could say the sun goes round the earth and because it had the power, that was a legitimate view and that was knowledge. And Galileo's view, that it went the other way is not knowledge, it's heresy.

[30:52]
This is quite interesting, talking about what basically scientific revolution is. It's quite a philosophical take on this. I was just thinking back to the fact you'd been taught by Popper in the forties – is this something that has an influence on your later work at all?

Yes, yes. Popper's always been an important, very important in thinking. And the notion of falsification is an important one. It's not verification which is important, but falsification. If something is not capable of being falsified, it's not science, it's metaphysics. And we find

that if we looked at, for example, in knowledge… there are lots of things which simply can't be verified, they can't be… They're not subject to falsifiability, they're not subject to it. We simply make an ex cathedra statement.

Do you think Popper's got any particular relevance for the work that you did, and if so, what?

I think he is a part of the way my thought processes work, that's what I can say. I'm afraid I have to break off for a moment here, if I may.

[end of track 16]

[Track 17]

We were talking about Popper.

Yes.

I was just wondering if he'd had any particular influence on you later on in your information systems work?

Both my wife and I sat at Popper's feet and we have, in our academic life we've been very different, but we have that in common, our regard for the notions of scientific method from Popper. I think, as I mentioned, he had an impact in two ways. One, on my own thinking, directly, the way I think about things, the way my thought processes go. At the back of my mind there's always something from that. The other one is when I'm reviewing papers from other people. I can put a kind of test to it which Popper might have put; how valid is this argument, can this be… is it subject to falsification. So it's been a strong influence. Now, Popper in a sense has been overtaken by his followers like Lakatos, but Lakatos, although I knew Lakatos, I never studied, so I never followed this really up. So I'm still talking of Popper as he provided the… as it came from him. Of course I've looked at other things like, most importantly, Kuhn, and the notion of science he puts. In fact, if I mention things which I found important in the more epistemological area, I've been impressed and like to use a hermeneutic approach. When I say hermeneutic, do you…

Can you explain it for the tape?

Yes. Hermeneutics was developed initially as I understand it for trying to make sense of documents which were fragmentary. And you try to make sense of them and come out with what might be an alternative way of reading these documents, and you try to make sense of that and then you find anomalies and you get the hermeneutic cycle, you go round it again to try it again. How do we now get rid of these anomalies, and the more you do of this, the more you learn about the thing. Now that approach works extremely well if you're doing an analysis of systems and so I've been very keen, for example in teaching, that people understand this kind of hermeneutic approach, which came from a very different field originally, but seems to be in many ways ideal for looking at something which you don't quite

understand, whether there are holes in it, whether there are difficulties in it and where you have to try to make sense of something. So that's a notion which I find, a way of thinking about things which I find very attractive. So that's an important influence in a sense.

When did you first encounter this way of thinking?

That I can't remember. Probably from a PhD student. I don't know. It's been there for some time. It was picked up – have you come across Gordon Davis? In the information systems area Gordon Davis is a very important person and at one level he's my opposite number in America. He founded the first MIS school at the University of Minnesota, he is regarded as one of the founding fathers and esteemed people there and he came across hermeneutics and wrote a paper explaining a system within the university and I was asked to referee that paper, as it happened. So that led me to further look at hermeneutics and studying it and found it of great interest.

[04:55]
To return back to your academic career progression – you're made a professor in 1982. We talked a bit about your duties after this, I was wondering, how happy were you at the LSE?

LSE has always been really the place I loved and I mean that, I really enormously like it. But I had that period when I was very dissatisfied with what happened with my colleague, Rudy Hirschheim and I had to make a stand on that, couldn't just accept that. But I was absolutely delighted to go from the Business School back to LSE. It is the place I love, I played a major part in establishing in what we're doing there in our area and some of the people are still around and I'm still well regarded there, so that makes it very good. And yes, LSE is there. Ailsa's been there since 1946, non-stop, so it's a long time. I've been there since 1947 and interrupted it twice – sixteen years in business, in LEO, and five years at London Business School. Nevertheless, it's my place.

Was Rudy Hirschheim's treatment the only reason you resigned, or were there other concerns there as well?

What's that?

Was Rudy Hirschheim's treatment the one and only reason you resigned or were there other concerns as well?

No, that was the principal concern. Otherwise yes, one has niggles about everything, anything one can have niggles about, but only niggles. Yeah, sure, I don't like this new umbrella organisation, the department of management, I don't think that in the context of LSE is going to work very well. It's an attempt in a sense to try to… it specifically says, we don't want to be a business school. At the same time it's trying to provide a kind of business school values there. I don't particularly like it, I don't think it'll work. But that's the sort of niggles you can have about everything. It doesn't destroy my relationship with LSE.

[07:27]
Can we talk a little more about your decision to resign? It seems a very big step to make for…

Well, yes. To my knowledge, Rudy Hirschheim, the particular person, was a first rate academic and he was as good as most people, many people who reached eminence at LSE, he was good. And it was, I felt, a totally unfair decision against which there was no appeal. And there was no way of what seemed to me to make them see reason, in fact one simply had to make a stand, one couldn't allow this not to pass unnoticed because other people might be in the same position and it needed to be known that the system had, ultimately the system has to change somewhat, one has to allow more flexibility, one has to allow the experts in the area, outside experts, their say to be more… come in. Incidentally, at that point his referees provided absolutely first class references for Rudy Hirschheim, and one of the foolish things they said is, I don't think anybody can write quite as much as that, he can't have done it properly, you know, without reading it. Or, not understanding it and reading it as if it was a different subject. He was in fact a typically American hard worker. We know that their productivity is high and their academic productivity is generally higher than equivalents elsewhere; they work bloody hard. What drives them is another matter, but they work hard. And he was typically that and he is now regarded as one of the eminent scholars in this area.

What did your colleagues make of your resignation?

There was quite a, as I say, it was something of a *cause célèbre*, it was quite a thing. There was a lot of regret, a lot of good wishes, and a number of people came over with me to the London Business School. So this included my secretary who came over with me to the Business School, but also two colleagues came over.

[10:11]
Who is this?

Tony Cornford, who then returned to the LSE because he really didn't take to the London Business School any more than the kind of different mores there than I did, and Barbara Farbey, Barbara Farbey who recently died. Interesting person, did a lot of work with Barbara Farbey, but she started with Ailsa, started with my wife as a student in operational research on the very first course they ran. But she subsequently worked with me and she was always a researcher, never on the staff properly, so all her jobs were temporary. She worked with me at the London Business School, at LSE, at the London Business School. She worked with Finkelstein at University College. Do you know him? He's head of the computing department at University College. Software engineering is his speciality. She worked in software engineering as well, trying to apply to software engineering some of the lessons we had learned from systems, from the systems side. Yes, so some people came across with me. There was general regret and of course a shake-up and a replacement had to be found for me and LSE, for some reason some of the people at LSE had a feeling that the subject should be a very technical one and the way we were going was making it a socio-technical one. And so they tried to recruit somebody they thought would be much more technical than me. Turned out to be completely different.

[12:17]
What did you actually do at the London Business School?

In the London Business School I headed a small group of information systems people and was primarily concerned with setting up information systems as a subject which the school would take seriously. Peter Keen had already started that, and as I say, I failed in that completely, I failed to get it accepted. I always had a decent body of students but they weren't there because I was there. I was involved in research; had a number of research projects, including one

which I ought to mention, under the European scheme, cross Europe project. There's a name for them, forgotten what the name…

Erasmus?

No, it wasn't Erasmus. It was like Erasmus. It was like Erasmus but it wasn't Erasmus. I think it might have been prior to Erasmus, but anyway, it was under the auspices of the European Commission scheme and it was working on a project to develop the computer using project management system and involved one of the big software companies in France, Schlumberger's – I think in France – some companies in Scandinavia, in Denmark, several universities. And the way these projects are operated, you have a defined delivery, you have to deliver something at stated intervals. Now, given that you have such a mixed team of people, cross national, given that you're dealing in innovation, this is simply not… this is not a way of running a system. You need deliveries, you need monitoring, but you don't have to… it mustn't be as precisely stated. If you don't meet your delivery date on this particular thing in this particular way, you've failed. So I was heavily involved in that project, but I said never again, I would never again go in for these kind of projects. I've talked to other people since then and many of them are in agreement with me. They do these things because they provide the money and they provide esteem, kudos, but they don't like it because you can't run a system like that. It doesn't work. It isn't born out of the mutual enthusiasm of a team, it's born out of something quite different and I don't think it works. Having said that, they probably gave me many examples – but so-and-so, but so-and-so, but so-and-so, it does work. I don't know. I wouldn't do it again. That was at, I did that project at the London Business School and that meant meetings all over Europe, conferences, conflabs on what we were going to do next. Very typically we would go to a meeting, we would have an apparent agreement on what the next steps are, each of the groups would interpret that differently, almost necessarily. These things, although one tries to fasten them down, there are ambiguities, large ambiguities sometimes, and so one group will, partly because they misunderstand it, partly because their inclination is to do it differently, will do something, go off in a direction. So one goes off at a tangent, then one comes together again at the next meeting, one tries to reconcile all these things. They don't really reconcile very well, but one papers over the cracks. It doesn't work.

[16:42]

Did you do any other outside jobs at your time at the LBS?

Yes, yes, yes, yes. One for Arthur Andersen, again on evaluation. They wanted, they commissioned me to write a piece on how do we evaluate information systems and I don't think they were very happy with my answer because they were looking, ah, I can now sell this package to people, and I wasn't providing them with a package because packages, you can't do a package for that kind of thing. It is so context dependent that you can't do it. So I don't think they were terribly happy. They paid me quite a lot of money, but I don't think they were very happy with the outcome. My views and their views differed. I have a problem with consultants. Consultants want, you know the word 'best practice', in my view best practice should not be used by academics, by scholars. How can we know, we can never know what best practice is, what works is context dependent. We don't know what somebody else has done which might be better than yours. There's no such thing as best practice, but consultants sell best practice because that's the way they make their money. What we have is best practice. Alright, you buy that from me, it's best practice. So best practice is consultants' jargon. I'm not saying consultants aren't good and do good things, but there's always a different motivation.

How else did the environment differ at the LBS compared to the LSE?

It was much closer to the consultants' view. [laughs] I think that's the principal things. And apart from a few people who were very scholarly, scholarship wasn't the thing which drove them. It drove some, but many were not driven by scholarship, they were using scholarship as a means to get consultancy. Perhaps I'm highlighting it and there were many, many exceptions, but the generality of the feeling about the place was that. And that's the way the principal operated, that's the way he saw things, that we can enhance the reputation of the Business School in terms of the careers of our MBAs.

[19:32]
Were you happy at the London Business School?

Yes. As I said earlier, I tend to make the best of things, enjoy what I have to do. Always challenges, always enjoyable things to do. And, I don't know whether… I tend to be sometimes against the mainstream and I enjoy sometimes being against the mainstream.

What do you enjoy about it?

Oh, my feeling of being right. [laughs] No, that the mainstream needs scepticism and without that scepticism we won't advance. We're looking for anomalies, again hermeneutically, we're looking for anomalies and in the mainstream often one discards anomalies. You look at any field, yes the anomalies are… we hide them under the carpet, we suppress them, we forget about them. And I think there is something perhaps exciting about doing it the other way. Maybe just contrariness. I don't think I'm a particularly contrary person, but in that sense, contrariness.

How did your career progress at the London Business School – were you doing the same sort of thing throughout your whole time there?

Yes, yes, but it didn't progress in the sense that I didn't achieve my main objective of getting the information, getting what we were doing accepted as a mainstream subject.

Why do you think you didn't succeed?

Partly I imagine personal failures in terms of being able to convince these slightly different mindset people, partly the nature of the subject in the business schools – this ran through other business schools. It's well established that in many business schools information systems have been completely dropped, no longer is a subject at all. And the reason is very often that the marketing person will say, I know about the marketing information system better than any information system person, because it's marketing. I know about the production control much better than they think because I'm a production control expert. So there is some truth in that. What is it which we bring to the field which is above what they can bring from their knowledge in their expert areas. That's a strong argument that okay, as Carr in his famous article in the *Harvard Business Review* said, computing has become a commodity. Okay, the marketer can use it, buys that commodity, it's a commodity, it's not a discipline. Well I think

it is a discipline. And that in fact we have to work with the marketing man or the production man, but we have something to give them which they don't have.

[23:15]
What was your life like outside work at this time in the eighties?

By that time family was growing up, but very much a family life, social life with friends, going out. [pause] And having a wife who was at the same place and having similar interests, although her approach was a very different one, meant that we had something, in that sense, very close in common. It was not that the wife was doing one thing and the husband was doing another and somehow the wife resents that the husband isn't there, we were there, together. So it worked very well, it's a good life. And the main issue was balancing it with family life, but we contrived to do that quite well, going on holidays, etc, etc, and so on.

Who were your friends at this time in your life?

First of all I suppose there were the local people who we were very friendly with. We formed a close group. Perhaps I should add that one of the social, I suppose social activities, I was heavily involved in politics as well, in the local Labour Party and was chairman of our local branch and was at various times a candidate for the… I don't think I was a Parliamentary candidate, I was only candidate for what was then the LCC and I got within a very tiny bit of actually becoming a London County Councillor. What happened is I sat for a constituency which had a relatively low probability and in the middle of the campaign somebody dropped out from a safe seat and I was offered that safe seat, but I didn't take it because I felt I'd already committed myself to this other one. If I'd taken the other decision, I would have gone, I would have been a councillor under Livingstone when he was in the GLC - not LCC - the GLC.

[26:02]
What interested you in politics?

I've always been interested in politics. What interested me, the things which interested me in society.

Such as?

Such as civil liberties, freedom, equality, the role or otherwise of the state. The kind of things which get discussed in political circles. I was always on the Left, on the progressive side. No, I'd better say simply on the Left, the other side might deny we were progressive – they would say we were backwards. And still felt very left, very much to the left of New Labour, which I felt was not… an inappropriate way to go, rightly or wrongly anyway, that was my view. So yes, I was quite heavily into local politics. We had a campaign locally which we played a very active part, and in fact we launched, Ailsa and I, with other people, on a campaign on schools. Attended political meetings, heckled the opposition, heckled the Conservatives – no, asked questions of the Conservatives. Yes.

Is this something that just developed… when did you join the Labour Party?

Joined the Labour Party probably in the early 1960s, that's when I guess I think we joined the Labour Party actively, and resigned from the Labour Party five or six years… at the time of Iraq, when the Iraq War started. And stayed resigned. Ailsa's just rejoined, but I won't yet. So yes, that's another aspect of life.

Were you politically active through that whole period then, so going along to meetings or…

Yes, pretty well, pretty well. We were always part of, wherever we lived, we were part of our local party and when we came here, as I say, we are – I think I mentioned – we are the very bottom of the local authority ladder, everything else is above us. We are a parish but we don't have a council, we have a meeting and when we came here we started attending those meetings and the chairman then had to resign for personal reasons; his wife had cancer and it was too much for him, and we were asked to take over. So I became the chairman and Ailsa became the clerk. And we ran it, we held these posts until we said, we would hold them until after eighty we won't carry on. But in fact we couldn't find replacements, so we found a replacement for Ailsa a couple of years ago and found a replacement for me a couple of months ago.

Thinking on this political strand again, was…

There's no politics involved, no politics in the traditional party sense here. There's none at all, none at all. One is concerned with parish pump issues at this lower level.

[30:05]
Actually I was just wondering if the LSE was a particularly political place to work at?

Political in, like all organisations of that kind, in the nastier sense. There is political in the sense there was kind of political manoeuvring of groups making, trying to gain at the expense of other groups. Political, not in the sense of politics, but in the sense of politicking.

Can you give me an example? I'm quite naïve where it comes to university politics.

Alright. Yes. Who was going to be the next Pro-Director, was it going to be somebody who believed in this kind of thing or somebody who believed in that kind of thing and there were strong views about that sort of thing. For example, the kind of thing is, should the LSE expand or should it try to be at one level. Should the LSE move, should the LSE become a business school – all sorts of things like that, and there are factions. LSE's a very factional place in that way, always has been ever since it was born and there were strong views being expressed. So there's a lot of that kind of politicking which goes on at the LSE. Yeah. But that's not political in terms of Right or Left, state versus private. It's quite different.

It's interesting that with these left wing views you then go and work for the LBS.

Yes.

Which I would imagine would be a more right wing Conservative organisation?

One would expect a more free market view, but in fact there were quite a few Labour supporters, including David Currie who became I think the head of – did he become the head of Ofsted [Interviewee note: he became the head of Ofcom]? One of the things. There were quite a few. The current… who was the Minister of Education, Ed Balls, he was at the

London Business School, economics professor at the London Business School. Before my time, he left just… but he had been there. So no, there were, perhaps the dominant view was free market view, but there were plenty, there were enough others. Yes. My guess is that there were a few avid Thatcherites, but some who were very much against that sort of thing, not necessarily from a Labour standpoint of view, much more perhaps from a Liberal standpoint. Why I left the Labour Party; Iraq is one thing, but also civil liberties, a whole lot of things where I disapproved of what they were doing.

[33:22]
Could we talk about towards the end of your career at LBS – did you think about continuing?

No, no. By that time I said LBS is not going to go in the direction I want it to go and it isn't appropriate. I was reaching, I hadn't reached full retirement age but I was old enough to be near it, sixty-three or thereabouts. So I thought that's it, I certainly don't want another five year contract. I'm not sure they wouldn't have given it to me, because as I say I had failed in bringing them round to my way of thinking and whereas my relations with the first principal had been very good, my relations with the second one were never as good, for very peculiar reasons. Arthur Andersen's consultants had been very much… they were very interested in London Business School and because of my contacts with them I had a meeting with them in which I was very positive about the London Business School, but at the same time our principal was having negotiations at a higher level and he had the view that I was totally interfering with what was going on and he really blew me up. [laughs] I thought this was really – although I was very cross about it – I thought it was really strange, funny because I was absolutely certain I was not trying to sabotage him or do anything of the sort. On the contrary, I was acting in a supportive role. But never mind. [laughs] Anyway, his speciality incidentally was industrial relations, which I felt was a great joke. So by the time – that was very close to the end – by that time I was really, don't think I wanted to stay with that principal. Nevertheless, when I left he threw a grand party for me.

How did it feel to be retiring?

As long as I could keep active I loved it, because what you lost is the things you didn't like, no administration. Your teaching limited to what you want to do, not this course has to be done… no, so absolutely fine. It gave me a freedom also to think, which I found most

constructive. I think in terms of my reflex thinking about the topic there's probably, we've probably done more in my retirement than previously. There's no grindstone to keep your nose attached to. But of course you miss some things. I enjoyed, for example, PhD students, having PhD students and I had some great PhD students.

[36:34]
Any in particular you enjoyed teaching?

Any…?

Were there any in particular you enjoyed supervising?

Yes, yes. Name half a dozen. Rudy Hirschheim for one, now an eminent professor. Another eminent professor, Richard Baskerville. Bob Galliers who is Provost at Bentley College in the States. Interesting one who quite recently died young, Sam Walters, dates back to the LEO days. He was an interesting guy, he was really a Cockney kid, very bright, who had got himself a masters in – gone to university – got himself a masters in… was it thermodynamics? Something like that. Quite an… Joined LEO, made a brilliant success there, when I went to the LSE he joined me at the LSE, he was one of my first colleagues. I'd totally forgotten about him. Very much on the technical side but with a good understanding of information systems and he did a PhD under me too at the LSE and he was a great guy. Totally different kind of thing and perhaps I didn't enjoy so much was a girl from Thailand who I had the unique experience for me, of examining her with her lying flat on her back on the floor because she had developed a bad back condition. But the PhD experience is quite interesting, you get such varied kind of people. From those you really regret taking on, perhaps because they are too fawning and subservient, often from another culture where that is expected. And it's not only, let's say Indian which is sometimes that, you can get that from Germany. I remember attending a seminar in Germany on a particular topic, I've forgotten what the topic is, it had some very eminent people there, but it also had a professor and his… where the subject expert was his assistant and we were having a discussion, and I knew that the assistant was the person who really knew about the subject, but he didn't say a word. I asked him subsequently, why didn't you have something to say? He said, my professor didn't ask me to. Now you couldn't get that in England. I couldn't conceive of that happening in England, but in Germany there was still this relationship, that Herr Professor is a professor.

When were you made an emeritus?

You know what emeritus professors… what the… a retired person who's been a professor gets the title emeritus almost automatically. Unusually I got it at the LSE and one of my colleagues wrote to the then director and said look, he's been here all the time, he went away but he's come back here and we value him, he should be an emeritus professor. And the director wrote back yes, sent me a letter to say I'm now emeritus. It was like that. I completely… I didn't expect that to happen. It's rare. I suspect the director at the time, which was Ralf Dahrendorf, didn't know the rules.

[41:14]
Have you won any other awards in your career?

Yes, I've got an honorary degree – only one. But the major award I've got - I've got an award from IFIP, which everybody who's worked for IFIP gets that award, that's neither here nor there - but the major one is the AIS has an award for service to the community and the subject, which is their top award, which is their equivalent, let's say, of a Nobel Prize in the subject and I got that in 1992, I think or '93 and it's called the LEO Award. It's called LEO Award because the AIS recognised LEO as the first business computer. That's… their groundbreaking work and therefore they give their top award, they call it the LEO Award, and so I got this LEO Award. I think I'm… I think only two people in the UK have got that.

Is that the one that means the most to you?

It means the most to me, it's my community, they awarded me, so yes. It's the international community and it's international recognition of that. I mentioned earlier Gordon Davis in America, he is the doyen of… in this area, and in a sense I'm recognised to be something like that in the UK. Not necessarily everybody recognises, but there's a sort of, thing is… So when Gordon Davis retired I was invited to the symposium in his honour to give the keynote speech and things like that.

I think we should take a short break at this point.

Yes, yes, yes. I think we're reaching the end anyway, aren't we?

I think chronologically speaking at least.

[end of track 17]

[Track 18]

How did you fill your time in retirement? Or how have you filled your time in retirement?

Largely in the parish here. I do a great deal of… I've spent a lot of time in the garden, but when I first came here...

Probably need…

When I first came here, to this place, about ten years ago.

So your house in Devon.

Yeah. We were in another place in Devon. Let me start again. I retired when I was in my mid sixties. I'm now eighty-one, so over that time there's been considerable shift in a variety of things including my physical ability. When we first retired we moved to Devon, but we were still doing a lot of travelling, for example, at the time we came here, at the same time simultaneously we were actually in Australia and the first people to go to the house we had here were our kids while we were in Australia, they had to do some negotiation too. We were in Australia probably attending a conference or I might have been a visiting professor – something I haven't mentioned, incidentally, visiting professorships. I've had visiting professorships in quite a few places; in America at the University of Pennsylvania, in Australia at the University of Sydney and at Bond University and at Curtin University, in India at the Ahmedabad Institute of Management, at Leeds University – sorry, Leeds Metropolitan University – in this country and a few others at various times, but they were the principal ones. So that gives one a great opportunity to travel. When I first retired we were still in a travelling mode, so we did quite a lot of travelling, both on holiday and for academic reasons. For example, going to the HICSS Conference in Hawaii which was rather pleasant. It's an annual conference in computer science: information systems, computer science, operational research, a variety of subjects, management subjects. And so I went to the conference in Hawaii. At that time we also had a dog and that dog occupied a great deal of… was very demanding. He was a lovely dog, but I went for great long walks and runs with him – at that time I was doing a lot of running, never much, never anything which went uphill, mainly flat and downhill but still quite a lot of running. Spent a lot of time - we had a large

garden - spent a lot of time in the garden. Obviously had the children and grandchildren visiting, so we lived quite an active social life that way, but also did academic work at the LSE. I was still doing the odd bit of teaching then at the LSE, which I stopped doing. But as I grew older – oh, one other thing is worth mentioning. When we moved to Devon we took my mother with us, she lived with us, and we had a house which also had our youngest daughter, her husband and children, so they lived all in this house on the other side of Dartmoor and that set-up occupied a fair amount of time. But I did do quite a lot of work with the LSE and went to the LSE on a fairly regular basis, so I would go to the LSE typically three, four, five times a month, which is down now to perhaps once a month, though it varies, it's irregular. Then, as one grew older, there was a certain amount of slowing down in physical condition. More walking, less running, till in later years running became impossible because of problems with knees and so on. Still quite a lot of walking and still having a very demanding dog - the dog which we inherited from my daughter who was living with us. When they left us, they left their dog behind. We also had some animals; we had lamas, sheep at that place, so it was quite an interesting… two lamas, all of which we inherited from our daughter and her husband. They left them there, they left us and left us behind to look after those animals. So that was the part of our life, but when they left the property was really getting too large for us but my mother was getting older, she was getting into her late nineties and she died when she was… just before her ninety-ninth birthday, a day or two before her ninety-ninth birthday. We knew the house was too big and we wanted to move, but we left it until she died because it seemed absurd to try to move her at that age, even though she was still quite compos mentis, she was declining by that time. And we looked for another house, took a long time finding one, but found it, we were looking something which was nearer our daughter. I have to say that our youngest daughter has MS and although she's got the very mildest form of MS, it's always a threat, it's always a sword dangling over her. She can have an episode at any time, so we wanted to be relatively close to her. So we moved from that side of Dartmoor to this side of Dartmoor. We've looked for a long time for a place and then my son-in-law rang us and said look, a property's just come up, I've seen today, for sale, why don't you look at it. And it was this place, and we immediately said this is the place for us, instantly made an offer on the spot. And the people who were selling it instantly accepted our offer, though it was a bit below the asking price, to the great annoyance of their estate agent who said this is ridiculous, you can't do that, this is the first day it's on the market, let's see what you can get. But they stuck to us, so that was very good and we moved to this place. [08:00] So occupation started shifting a little bit less LSE, a little bit more staying here, a

little bit more immobile in the sense moving, travelling less. Ailsa in particular found travelling more of a chore than I did so we did considerably less travelling, but we got involved with the local community and, as I mentioned earlier, became involved in the parish. Though that, because we only met twice a year, didn't involve such a great deal of work, though there were things happening all the time. We were responsible, for example, for planning permission. If a property, if somebody wanted to apply for planning permission, they applied to Dartmoor National Park Planning Authority and they would send a copy of this to us for the view of the parish on that particular development and someone had to deal with these things as they arose, one couldn't wait for meetings. A lot of time in the garden, a lot of time walking on Dartmoor, and that happened until we had to get rid of our very lovely dog, because although he was very lovely, he was also uncontrollable in the sense that he never wanted to stay where he was put, he insisted on moving. We had no control over it; he would break down anything we put in his… as a barrier and he would go into the village and because he's a lovely dog, people said, ah what a lovely dog, and fed him and he knew always that if he went away he'd find somewhere to get biscuits or something nice. So we always had a problem. In the end we decided it was too much and we got rid of him, although he was a particularly nice dog, we loved him greatly, but we had to get rid of him and that shifted my attention much more from walking to the garden. This was exacerbated by the fact that over the last years my knees began to get much worse and I couldn't do anything so that two or three years ago, two years ago, I had real trouble with my legs and I became, not immobile, but very much more restricted. And last year, I don't know whether due to taking supplements, glucosamine, or not the situation almost entirely cleared. I reverted to being pretty good, as you can see, I can still walk on the moors. Two years ago I wouldn't have been able to do that, it would have been impossible. Now I could do it again and do it with pleasure, so I'm delighted. On the other hand, Ailsa has had to have her knee replaced and she is less mobile than I am. She had her own car and drove it, but she no longer drives, so that restricts our combined mobility as well. So our pattern of life has changed to an extent, more sedentary.

[11:46]
What do your children do?

We have three children. Our eldest, Frances, is a solicitor living in Bristol with a husband and three children. One of her children graduated last year from Brighton University. The second

one is graduating now, she's waiting for her results, from Sussex University, also living in Brighton, and the third one is in her gap year, going up to university later. She specialises in… I've forgotten the word, I mentioned it earlier, where you bring people together to work things out rather than litigate. That's… I can't think of the word. Anyway, she is one of the leading exponents of that and also acts as tutor to other people in that. So occasionally we see her here because she's a tutor in the south west, but she lives in Bristol and we do see them quite often. And her husband is a guardian ad litem. Have you come across that? The guardian ad litem is the person who takes, when families have to go to court for some reason, then he takes responsibility making sure that the children are dealt with appropriately. So this is a judicial appointment. It's partly social services, partly judicial. Guardian ad litem.

What do your other two children do?

Now Richard, the second one, took architecture but then took a course at the Royal College of Arts and Design. The Royal College of Art's notion of design is that it can be, you can design an artefact or you can design a system, and he became much more interested in systems design and although he swore he'd never follow me into computers, that's exactly what he did and became a designer of particular computer systems. Particularly he did for the BBC, he produced two games: a Noddy game for very young children and one… he produced three things: he did one for… the, something about… some other story and another one for Nick Park, the man who does the animations. He ran his own company, quite successfully. But he isn't made to run companies, he prefers to do jobs rather than companies. Ailsa – what does Frances do? What is the name of the thing she does?

Ailsa Land: If you hadn't asked me…

FL: You would have known. [laughs] I can't think of the name.

AL: I know, it's silly. It'll come to me in a minute.

[short discussion about refreshments for TL]

[16:00]
What does your third daughter do – oh, second daughter, rather?

Our second daughter, she didn't go to university, the others did, and she married Kelvin who is a self-taught artist and they ran a number of businesses and somehow or other always things went wrong at the wrong time. They did some very clever designs – you see some of the mirrors around here, they produced those. Quite nice mirrors. He's an extremely clever designer, but it never quite worked out. They bought a barn in Suffolk and reconstructed it and they had it ready for sale at the time the market crashed. Typical. They did sell it, but not for the profit they expected to make. For their design work, oh yes, they went into perfumes and designed some perfumes very successfully, the important thing is not the fragrance but the container, and the container was taken up, Wilkinson Sword put it in their advertisements. And they got into discussions with Benetton and Benetton were literally on the point of signing what would have been a major contract to take over their business when Luciano Benetton said, no the time is not right. And overnight the thing vanished. It's typical of their luck. Anyway, they opened a shop in Totnes selling all sorts of artefacts like – quite successful – but by this time the marriage was breaking up and they separated. They now each have their own new partners. But they have two children: Izzy who graduated from Newport a couple of years ago, and Josh who graduated from… has just got, graduated from Birmingham with a first. I haven't mentioned Richard is married and has got twins aged seven, so very much younger than all the rest of the family who are all post-university or just coming up to university. So that's more or less the family. And we are a pretty close family and they are close with each other. They are on to each other all the time, so it's quite nice. Margi, the youngest daughter, lives quite close to us here, twenty minutes away at Ringmoor and she and her partner have got really a very nice place.

[19:20]
I'd like to just finish off this thing with a few questions about you and overarching questions about your whole career really. I was just wondering what you regard as the particular high points?

I've been wondering about that question because there have been high points of kinds all along and one can say in that respect, what were the high points. Probably if I think in terms of the contribution I made, it's the academic one, establishing this discipline which I'm very much one of the early people, one of the originators, and established it successfully at the LSE and elsewhere and got a reputation. I immensely enjoyed most of my experiences at LEO, but

they were in a sense much more inward looking towards getting this job working, my God this tea blending job is now working, we've got it working. Enormous amount of satisfaction. A complicated job working and then regularly working – that sort of thing. And that happened throughout my career at LEO, there were episodes like that. There were less good episodes when things didn't work out so well, but those are the highlights, getting things working, rather than saying yes, to an extent I worked with computers and this is a new thing, but one rather had to hide that. If one sat next to somebody in the plane and they asked you what do you do, and you say I work with computers, it shut the conversation up immediately. Nowadays it's totally different; the chances are the person sitting next to you is also working in computers, it happens so often. Travelling back from Paddington to… I see, as I said, one meets all sorts of people, but quite a few of them have strong computer connections or are computer managers or are computer people in one way or another. Like the person who runs the EDF computing for the energy company, runs their computer, or the people who've gone to London to consult on some computing issue which was going on here. So it's changed, change so significant to having to hide it because it was a conversation turn-off, discussing it.

[21:55]
What do you think of the way that the history of LEO computers in particular has been treated?

Oh the history has been treated extremely well. Over the last few years, having been almost forgotten with the various books which have come out, like Georgina Ferry and others, LEO has suddenly come into prominence and people know LEO, as witnessed by the fact that the AIS give their top award, the LEO Award. We are on the map. Another example, the… ITV did a programme on tea and in doing it they came across, the researchers came across Lyons, a tea company, and LEO, came across, somebody mentioned the tea blending job. Ah, they thought, this is really most interesting and they investigated it further and in making the programme they invited me to participate and I gave a little story about LEO and Lyons and LEO and tea. That sort of thing wouldn't have happened earlier. So yes, we are on the map and we have a very active LEO Society which originally started to be a reunion society for regular reunions, but has now became rather more, has got a web page which has got quite a lot of interesting stuff about LEO on it, and we have the LEO Foundation which was set up by David Caminer and myself and others to try to use the revenues from the book, which you've read, to try to promote LEO things. Now, our total bank balance is very small so we're not

able to do very much, but we did have a fiftieth anniversary conference on LEO held in the London Guildhall which was enormously successful, a large number of people there. Again, helping to promote the LEO idea. So yes, LEO is alive and well and I sit here and play a role in promoting LEO. I promote it through the IT History Society, I promote it through papers I write and so on and so on. It's one of my activities, one of my interests - keeping that name alive and promoting it. But I'm interested in history anyway, but as far as promotion is concerned, the LEO history. I'm enthusiastic about it.

[24:48]
We've talked a bit about the past of computers and information systems, so what do you think the immediate future holds over the next ten years or so?

It's one of the questions, I find forecasting, predicting very difficult, I'm wrong on most of my forecasts. For example, mobile computing. I thought well, that's just another version of what we've been doing, but different. The transformation it's brought, I didn't recognise and didn't foresee. So I can easily get things wrong. So I don't attempt to predict very much. All I can say is that there are transformations taking place through the network and social computing and mobile computing which are going to have fairly profound effects on society, though there are going to be always the people who exaggerate these effects, but they are going to be fairly profound effects and they are fairly profound effects here and now and the pace of change in that sense is accelerating.

What do you think the biggest changes you have seen over your career in information systems have been?

The way the technology is now pervasive, that I go into the library and I put the books into a machine. There are machines that I can use to access the internet and anybody can do it. It is pervasive, it is affecting the way people live. And some aspects like games dominate, can become totally dominating. The internet can become totally addictive and dominating, so it's got profound effects which can be adverse as well as good, and sometimes the adverse effects can swamp the other ones. After all, if you look at the content of the internet, the huge amount which is pornographic and which is subversive rather than good. So I always tend to like to pick up the stone and see what's underneath it and sometimes some nasty creepy crawlies come out. So the effect I foresee of computers is always this tension and dialogue –

not dialogue – action, reaction between the subversive and the benevolent, what's good and what is bad. And that'll go on and the technology in itself is neutral, and because the technology is neutral it can be used for good or bad and is used for good or bad. Whether one is talking about weapons of mass destruction and so on, it can always be misused in any number of ways. And I note that the academic community by and large takes a benevolent view and the forecasters and predictors take a benevolent view of what the technology will do, of the influence, though by no means a hundred per cent. There is a very large sceptical view. But if you look in the journals, the academic journals, you see far less of that, much more in terms of public discourse than scholarly discourse, though again, the other side comes up again and again but it's not nearly as dominant, it's not nearly as studied as it needs to be. And our studying of it is reactive not proactive, as I mentioned earlier. We have to look at this just as another App and as another set of entrepreneurial activities. Again, talking about knowledge management, a good example of knowledge management is the Mafia. They call it *omerta* and it means silence. That's knowledge management. As much as…

So not allowing knowledge rather than…

Yes. Yes, yes, yes. It's managing our knowledge but by being silent. So knowledge management is a much more varied and complex thing than what the – I call them propagandists and they are propagandists – try to say. And they have a profound belief that they're right, but that's because they don't look under the stone. They like the nice polished surface.

[29:50]
My last couple of questions are about this interview actually. I was wondering how you first felt when we approached you?
Oh, delighted. I have a certain enthusiasm for the topic and I may be in a sense quite boastful about it, but I love the idea – this is knowledge management again – of dissemination, of not locking things up. So yes, I want people to know and if I have anything to contribute I want people to know and take, see what that is.

Who have you told about this, if anyone?

Oh, my brother. No, I tell everybody I can in the family and so on. I haven't told people outside the family, though I might take the opportunity now that I've been interviewed. I did mention I think to you at one time perhaps on… did I mention it, on the telephone or otherwise? My brother was involved in an oral history project in Russia and it might be worth talking to him about that. That project has folded as far as I know, in St Petersburg.

That's certainly a link-up we should probably make.

Yes, yes, yes.

My last question – it is my last question – I was wondering how you've actually found the interview process itself?

Oh, tiring but brings up memories, even if one fails on some words and even one fails on some names, it brings up memories, it churns up things. I find it an exciting thing to do, I love doing it. But it's tiring. How have you found it?

[laughs]

I'm sitting here talking to you, talking at you.

[laughs] I've enjoyed it. I have very much enjoyed this interview and I will tell you that without a word of a lie now. Do you have any final words before I turn the tape off?

Thank you very much.

Thank you.

[end of track 18 – end of interview]

