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AUDIO INTERVIEW TRANSCRIPT

Lord, Philip: transcript of an audio interview (21-Jul-2016)

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Date of publication: 24-May-2017

Date and place of interview: 21-Jul-2016; Queen Mary University of London

Publisher: Queen Mary University of London

Collection: History of Modern Biomedicine Interviews (Digital Collection)

Reference: e2017180

Number of pages: 25

DOI: 10.17636/01023307

Acknowledgments: The project management of Mr Adam Wilkinson and the technical support of Mr Alan Yabsley are gratefully acknowledged. The History of Modern Biomedicine Research Group is funded by the Wellcome Trust, which is a registered charity (no. 210183). The current interview has been funded by the Wellcome Trust Strategic Award entitled "Makers of modern biomedicine: testimonies and legacy" (2012-2017; awarded to Professor Tilli Tansey).

Citation: Tansey E M (intvr); Tansey E M (ed) (2017) *Lord, Philip: transcript of an audio interview (21-Jul-2016).* History of Modern Biomedicine Interviews (Digital Collection), item e2017180. London: Queen Mary University of London.

Note: Audio interviews are conducted following standard oral history methodology, and have received ethical approval (reference QMREC 0642). Related material has been deposited in the Wellcome Library.

Lord, Philip: transcript of an audio interview (21-Jul-2016)*

Biography: Mr Philip Lord MSc CMath FRSA (b. 1945) studied mathematics at Reading and London Universities, and also has a teaching certificate from the University of Sussex. He was a member of the MRC Air Pollution Unit's scientific staff between 1968 and 1978, after a brief spell teaching. In the MRC, he undertook research applying mathematics and computer techniques to the study of lung function, lung morphology, and respiratory flow dynamics. The research involved him in the development of techniques for the automation of lung function measurement. He went on to a post as Technical Manager for medical publishing at Elsevier Science Publishers in Amsterdam, where he later became closely involved in the development of new technologies for scientific publishing. Here he became Vice Chairman of the ISO and NISO committees, which determined the format standards for CD-ROM (ISO9660). In 1991 he joined the pharmaceuticals industry, first at SmithKline Beecham and then GlaxoSmithKline, in which companies he led projects for managing large-scale regulatory documentation and for archiving scientific data. As a leader in the developing science of digital archiving, he set up his own digital archiving consultancy in 2002, and worked internationally to promote best practice. He is now semi-retired, but still teaches digital archiving at the University of Dundee. He was elected a Fellow of the Royal Society of Arts (FRSA) in recognition of his contribution to archiving digital information.

TT: Tilli Tansey

PL: Philip Lord

TT: Philip, can we start off with your very early life, when and where you were born and early schooling?

PL: Well I was born just at the end of the Second World War. My mother describes looking out on sand bags at Dulwich Hospital as I was born. So yes, just at the end of the war, 21st June, in the middle of the year - which I'm very proud of [laughs]. The first five years I was brought up in East Dulwich, kind of working class, lower middle class background. My maternal grandfather was a very bright man, he was a lower civil servant, he was a sort of man when he did his accounts he could just go down a page, put the total at the bottom. When he came out of the war, the First World War, he took civil service exams and got 100% in arithmetic or mathematics. So my mother was also very good at mathematics. She was always correcting the checkout girls at the supermarket saying, 'No, that's wrong. I've added it up and that's wrong.' [Laughs]. Anyway, we moved about in South London to Forest Hill and then around about the age of 9 we moved out to Redhill in Surrey. One of the things I remember, and getting onto the scientific aspects, I remember going down Rye Lane - I could not have been about six, with my mother: it was an evening and it was a clear evening and I remember looking up into the blue sky, dark blue sky, and seeing stars and the moon. And it was then, I can very clearly remember thinking, 'What's that? What's going on up there?' and being curious about it, which was probably my first scientific thoughts, you know. What's up there?

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* Interview conducted by Professor Tilli Tansey, for the History of Modern Biomedicine Research Group, 21 July 2016, in the School of History, Queen Mary University of London. Transcribed by Mrs Debra Gee, and edited by Professor Tilli Tansey.

TT: What did you father do?

PL: He was a sheet metal worker. As I say, my mother's father was a minor civil servant in the post office. A characterful man, he would go up to work in the morning dressed in his bowler hat and the rest of it, as you had to do before the War. By three o'clock he'd finished all his work, cleared his desk and just walked out of the building and spent the rest of the afternoon enjoying himself or coming home, my grandparents lived next door.

TT: It's quite clear that your grandfather was quite an influence on you?

PL: He was. I think if I've got any brains he was probably the major contribution. But on the other hand my father's family, his parents were in a little shop in Sydenham and before that there was a little history of having tobacconist shops and so forth. And the reason they had these shops was that he'd been invalided out of the First World War, that is my other grandfather, he'd been blown up and he had shell shock and was incapacitated. In fact, it made him rather unstable from what I gather from talking to my uncles. Unfortunately, I never met him; he was bombed in the Second World War. So he had the tragedy of being invalided in the First World War, and then he had something like, I don't know, 15 years in hospital, and then when he was out of hospital they had this little tea shop and then café/tobacconists in South London, Sydenham. My dad said he went home one day and the house had disappeared from a V1. A Doodlebug had taken the house out, killed both his parents and two sisters. So that really coloured dad's life.

TT: What about your schooling?

PL: I've always described myself as a dreamy little boy at school. My mother was a very strong character, but never really pushed us. She said, 'You will do what you will do. If you succeed, that's fine, and if you want to do something else and just pootle along, that's fine too.' So she didn't try to really push us in any really overt sense. But I think there was always an expectation there. Anyway I dreamed my way through primary school, interested in motor cars and Dinky Toys and so forth. And was not really academic, read a bit. And then the 11+ came and it was probably the biggest impact on my whole life, was the 11+, because I failed it. And I took it again, that's because there was a second chance, and I failed it again, and I don't know why. Because I look at the kids that I know that got through and think, 'Yeah, they were probably coached a bit by their parents.' I do remember a kid in our class whose father was a doctor and I thought, 'Yeah…' It was at that point I was brought up short and, 'Ah, something's not gone right here.' So this sort of dream world that I'd been in came to an end.

TT: You were 11/12?

PL: Precisely, 11. I was also one of these people that's born very late in the school year, which I think also was a factor. I was very young in my class., which is maybe an excuse. So that was a big blow because it then affected my future schooling. My parents at that time had also taken on training to become publicans so we were being looked after by my grandparents for six months while they went through this training. We then moved up to London, again to live with my grandparents because they refused the pub that was offered them. And I went to a secondary modern school, a fairly rough one in the back end of Nunhead. And there I took what was then called the 13+ and went to a technical school. Life was a little bit more focused now. This school was a very special school, it was set up by Northampton Polytechnic, now City University, as a junior section for the watchmaking industry. So it was training instrument makers and watch makers. It was set in Clerkenwell, and you could just go outside then and walk into Clerkenwell and all these little shops selling bits for, tools for, watchmaking. At any rate, I started going there, my parents moved back to Surrey and it was decided rather than disrupt the education, I would travel 15 miles, 20 miles, from Redhill up to Bunhill Fields which is where the school was, every day. So at the age of 13 I became a commuter. And it was a very, very formative experience for me. I think it also informed a lot of attitudes in me. I may come back to that.

Anyway this school was a technical school, it was just a School Board for London kind of building. It had superb technical teaching, particularly for technical drawing and instrument workshop practice so I was using my hands for a good deal of the day. I do remember getting very high marks for mathematics and it's there that I began to get interested, really interested, in science. And I remember that the chemistry teacher took out a subscription for *New Scientist*, which was a rather new magazine then. And I bought this thing off him and learnt quite a lot from it. I still remember the first article I read on masers, microwave applications, precursor of the laser. Having said that, chemistry is still a complete closed book to me. I was good at maths, I was good at physics, I was good at the technical stuff, but chemistry it was just a whole mass of unrelated facts with nothing to unify it.

Anyway the next step in this, was after a couple of years of this school, commuting up and down and becoming a commuter on the train, taking my choice of newspaper in the morning, you know one day it would be *The Times,* then it would be the *Daily Herald*, then it might be the *Telegraph*, then it might be the *Daily Worker*. I would sit ostentatiously on the train reading stuff [laughs]. It also isolated me because everybody then dispersed throughout London at the end of the school day; I just went back to Surrey. I must say my best friend is my brother. Anyway after two years, I was about two years at this school, doing well in the school, the school was amalgamated into a new comprehensive school called Risinghill, which was just up from King's Cross Station. This school became notorious. Anybody of my age would understand, who was interested in education, this school was opened in 1960, comprehensive school, amalgamation of 4 secondary moderns basically and a couple of technical schools. The other technical school was a very small girls' school for corsetry, they don't do this sort of stuff now. Anyway all that technical teaching continued. It had the most amazing headmaster, Mr Michael Duane. And he was eased out by the London County Council. I left the school at the end of 1961, I suppose because they couldn't offer any A levels and I'd got a few O levels there. Later on the whole school became notorious and it dominated the press in around about 1966/1965 when it was closed, and then in 1968 a lady called Leila Berg wrote a Penguin Special about the school. It became the first non-fiction best seller in the UK. Recently I've been in touch with old school chums, though I didn't know any of these people at the time, and we've been writing a book about the history of this school and about how the headmaster was side-lined and eased out, his career was ruined, even though he was a first class teacher.

TT: What was the reason for that? Was there a lot of politics going on?

PL: There were politics. Politics of the comprehensive school were going on and he was not, he was a, what would you call it? He was very child-centred and he wanted to give a child-centred education. He wasn't very interested in producing regimented, well-educated kids, he wanted fulfilled kids. And he did a lot of sterling work with the delinquents, of which there were very many in the school, with the immigrants that came in, because it was a time of big immigration. He was doing a lot of social work but he wasn't producing the right image for the London County Council, who wanted to present an image of the comprehensive school as a kind of alternative to the grammar school. In fact, the Labour Party I think was at fault here because it thought it could take basically non-grammar school kids and put them into these schools and produce grammar school results, which of course they couldn't. They didn't get rid of the grammar school and incorporate the grammar school streams into the comprehensive schools, they left them out. So he wasn't giving the right image for the school, they didn't like his politics, and I think, we think, basically they manipulated the figures and the entry into the school and eased him out in the end. It's quite a long story and it's quite complex as well.

TT: What did you think at the time? Did you have any recollection? Were you able to…

PL: There was quite a lot of gangsterism in the school at the time and one was a little bit scared of it. Travelling up and down from central London to Redhill, I went to a hugely working class area as Islington was then, and the whole area around Bunhill Fields, we were next to the Peabody buildings. Working class, radical background, I became highly radicalised around the age of about 15/16, because I would see the contrast between this and the rather comfortable middle-class area that I was exposed to at home. We had a nice garden, even though my father was only a sheet metal worker, it was sort of middle class. And my mother

had a wonderful eye for quality, which I've still got. She wouldn't buy any old thing. We were dressed in the best of clothes, good quality furniture and so forth. Rather than spend a lot on a lot of things, she would rather spend a lot on a small number of high quality things. And even now I can go into a clothes shop and pick out a suit and find out it's the most expensive in the shop. I've got that eye for quality. So I saw this contrast and I became radicalised partly by it, also by the ugliness I saw on the commuting between Redill and central London. You think to yourself, you know and I was reading the right stuff. I was reading H G Wells, I was reading William Morris and so forth.

So at the time as a kid, 14/15 in this school, I was not particularly thinking much about politics. I mean myself and another boy would go off to the library during the lunch hours and we'd look at either at the books full of beautiful watches, see how they worked, or we just admired them, or we looked at the books on flying saucers [laughs] and space travel. One of the things I do remember when the school had been amalgamated into Risinghill is I still had the same maths teacher and I remember this chap, Reggie Nunn, he started to teach us Euclidean geometry. And something clicked. And I really loved it and it was what really caught my imagination. You start with a few axioms, two or three basic laws, and on this you'd build a wonderful super-structure just by pure logic. And that in a sense has stayed with me for the rest of my life.

TT: At the school you'd done some O levels?

PL: So I got some O levels there. When I left the school I remember I wanted to be a metallurgist, and university seemed too far off, there was absolutely nothing in my background that gave me any indication that I could get there. I knew it existed and I think my mother might have been hoping it would happen because horizons were expanding, but I then went on to Croydon Technical College where I took maths and physics, a couple of different maths and physics A levels. And I began to realise that I could get into university, so rather than being a technician of some sort or a metallurgist, (I'd have been a hopeless metallurgist because of my chemistry when I think about it), I could perhaps study mathematics or physics. Again another, these little incidences stick in my mind, I remember sitting in the, (I must have been about 17-18 at the time), in the library in Croydon Technical College and we had some problem which involved heating rods of metal in the shape of a triangle, and I worked out what the co-efficients of expansion should be to maintain the shape, and I thought, 'I've got it!' Yes.

TT: So you decided to try for university? And your parents were encouraging?

PL: They saw it as an opportunity for me. So whereas previously they'd been, 'If you succeed, you succeed but you just do what you can do.' So they were not pushy overtly. But, so then between, during that period when I was between 15-18, 16-18, when I was doing my A levels, perhaps the fastest learning experience of my life, it was formative. I was interested in mathematics, politics, sex, beginning to be a bit interested in music. I had a girlfriend, I was going around radical organisations, we went to Labour Party meetings together, we joined the Young Socialists and they allowed us to use the cellar of their premises in Redhill and we'd run a little group there which, ostensibly we were the Young Socialists, but it was just our little group of young kids getting together and listening to talks. I remember all sorts of things we used to organise. We had a couple of witches in [laughs]. The Theobald Wolfe Tone Society came down and harangued us about Irish independence [laughs]. So I went to Fabian Society meetings, I went to Fabian meetings, folk music was beginning to interest me. So it was a great ferment at the time. And also this was the time of the CND marches, and I went on a CND march and I remember very clearly there was a conversion process that happened. I was looking for the right kind of politics that would suit me and I remember being invited to some guy's house, to talk about the Communist Party. It was obviously an attempt to recruit me into the Party. It was the usual thing in those days, you went into the front room and there were the collected works of Lenin up on the wall, and the collected works of Marx and Engels, all from the Soviet presses. And anyway, I resisted it because on the CND marches I met a whole variety of different opinions of various groups and there was this *Sunday Times Supplement* and it had a little article, I remember this clearly, it talked about the anarchists, and I began thinking about it. I remember taking the dog for a walk on Redhill Common, which was just at the back of our house and thinking about it, and I

became convinced. I think it was the closest I've come to religious conversion, and said, 'Yes, that makes sense.'

TT: You were how old?

PL: 17 or 18 at the time. And actually this libertarian socialism hasn't left me. It's slid back, sometimes been way in the background, but it came right back to me when Blair went to war in, whenever he went to war, in 2003, and I joined the march through London.

TT: I was there as well.

PL: So many people were there.

TT: I took my Russian nephew; he was astonished.

PL: I remember meeting my lute teacher there at the time. Anyway, interesting. That was a key point. Anyway I was one of the first people to go through the, what was it called, that process. I remember being interviewed at Imperial College to read mathematics there, which is really what I wanted to do. And then there was a clearing process, that was it. It was very new, it was the second year running or something like that, it was very early. This was 1963. And I went off with my girlfriend to the West Country and were tramping over Dartmoor, youth hostelling. I must have stayed at some youth hostel and I got a phone call from my mother who said, 'You've been offered a place at Reading. I think you should take it.' Do you know even then I had the insight to think to myself, 'I'm not quite sure if this is right. I need another year.' But she was then very insistent, 'I think you should do it. You should do it. This is your opportunity.' She had missed all these opportunities when she was younger so she really pushed me into taking the place at Reading. I think if I had studied for another year I might have got into Imperial or somewhere like that and been much more mature.

TT: Yes, I think that's often the problem, isn't it?

PL: So I went there and I got a bad degree. Again I was still interested in politics, sex, music, anything, and mathematics.

TT: You sound like a typical student.

PL: Yes, I was. I was one of the trendy students there in my cord trousers and highly coloured Sixties shirt and walked around with Dr Scholl sandals on or bare feet. It was marvellous and open to all these ideas which were floating around. Then my girlfriend came to live in Reading with me, or rather to live in the town, we didn't live together in those days. And she really persuaded me we should get married. So at the end of the second year at university in the summer I got married and it really took me a little bit out of the university and away from the university. So I'd wasted so much time I couldn't really get all the studying I needed to do in before the final exams so I got this third and that was another sort of blow to me. These are all intellectual blows: the first one was the 11+, the second one was not getting this degree right. So I went off to take a postgraduate course in education down in Sussex, which actually I rather enjoyed.

TT: With the intention of becoming a teacher?

PL: Yes, a teacher. And I related this back to my experience at school. I'd been to about five different, seven different schools, I think if I counted them up. So I had a hugely varied school experience and I was something of a follower of A S Neill and progressive teaching.

TT: Had that come about because of your experiences at Risinghill?

PL: Partly, yes, partly because of the politics that I'd been reading, partly because I think it's just part of me. I am somebody that doesn't like to be told what to do. But I hate being managed. That's one of the reasons why I so enjoyed the MRC. Anyway, after that we moved back to London and I spent a year teaching in some wretched school in North London, a boys' comprehensive school, so-called comprehensive school. It was a snooty kind of place. It was the Stationer's Company School. It was one of those Livery company schools. Presumably it was being absorbed into the State system because there was a rather rough secondary modern school which had been incorporated into it, and of course the staff didn't mix properly, the kids didn't mix properly and it was single sex. The girls' section was down the other way through a wire fence. The whole thing was unsatisfactory, and I really didn't like it. I have never been so tired in my whole life. Even though I was young, I was 21/22 at the time, I would just fall asleep on the bus going back to Dulwich.

TT: Simply because of the stress?

PL: The stress and it was tiring. You were on call the whole time. Anyway I decided to get out. I thought I would see this year through, I had a nice Sixth Form that I enjoyed teaching. There I discovered I liked being with and teaching intelligent people, I was not good at the people who were not willing to learn, which I think is a bit of a fault for me, but it's just me. I've been fortunate throughout my whole life, I've been really in contact with really interesting, intelligent people. So I decided to see that Sixth Form through and I looked around for a job. I was offered a job, I can't remember the process now but I didn't want to do anything really related to defence because that was against my politics, I couldn't do that. I wasn't really well qualified enough to go into an academic job but I did go into the MRC, I can't remember how, I must have seen an advert somewhere maybe, they wanted a technician to work on statistical help with Robert Waller. And I got in. I remember going to the interview and there was John Ellison, Robert Waller and Professor Lawther who interviewed me. I remember very little about the interview apart from John Ellison asking me what the difference was between correlation and regression, and of course I gave him the right answer [laughs].

TT: It's quite a big step isn't it, from being a school teacher, going into medical research?

PL: Oh, there was another aspect to it. Now, you've just reminded me. At the school, it had a very dynamic maths Head of Department, and we had a little Olivetti computer machine called a Programma P101, which you could do some crude programming on. And I had spent some time with this machine and it must have been with some of the brighter kids, programming this thing, and the MRC also had the same machine. I think that also helped, now I think about it. I'd forgotten all about that. So I remember one of the things I did when I joined the MRC was I programmed this machine to do statistical analyses.

TT: What were your duties when you were employed by the MRC?

PL: I was working on the long-term studies, the data that was coming out of those, really under Robert Waller's guidance. But one thing I do remember was within about a year I had been promoted from technician, it was one of the fastest promotions apparently in the MRC, from technician to member of scientific staff. I can't remember, it's a long time ago now, they obviously saw something, and people at headquarters asked me to write an essay on the application of mathematics to medicine. I remember I sat down and wrote this thing - and I can remember a comment came back saying, 'Obviously the right material,' or words to that effect, so I got promoted up. I started almost on the same day as Chris Derrett, I think.

TT: He mentioned that in the Witness Seminar. And this is about 1969?

PL: We're talking about 1968/1969. So then I was on my own and I took over some of the studies that Robert was working on. And Chris was there and he wanted to do some work on the automation of lung function measurement. Chris and I really worked together, so I was working on more than one thing at the time. I was working on the statistical analyses and going down to Imperial College with all these punched cards with all the numbers. There was one card per person per day, I think, with all the lung function measurements on them.… They, the subjects, would come into the office, they had their FEV (forced expiratory volume) measured and all the rest of it, airways resistance, and then the measurements from Brian

Cummings about the pollution levels and various, and this was all put on punched cards and I used to take it off and process it at Imperial College.

TT: Can you explain a bit more about what you were actually doing?

PL: I can't remember the exact details now, but members of staff would come in in the morning having been exposed to pollution on the way in. They would have their lung function measured and this was recorded on punch cards. At the same time, we were also measuring levels of air pollution, mainly SO_2 (sulphur dioxide) and particulate, levels in terms in micrograms per cubic metre. That was recorded along with the lung function results, each day, and then we would try to correlate the two sets of measurements, the pollution with the lung function. That was basically what was going on. There may have been some other subsidiary studies going on. We had these huge data sets, long data sets, which lasted over years, and it was all transcribed onto punched cards and I would traipse off with these cards from St. Bartholomew's, which is where we were based, over to Imperial and put it through their counter sorter and try and do the analysis this way because you could set these machines up to count in sophisticated ways to work out averages per day, or the various parameters you were looking at. Then we moved to use the University of London Computer Centre, which was in Bloomsbury. Actually that institution is still there. It was behind Lambs Conduit Street. It's still there. It was in the University of London Senate House kind of area. And this was marvellous for me. I would just pack this stuff up in the morning and I'd decide what I was going to do. I'd been debugging these programmes, I'd been writing in Fortran; I was used to be known as Fortran Philip in the Unit [laughter]. That was probably from Brian Biles. Anyway, one would wander off down the road, walk to the Computer Centre, and do whatever programme I had to do, have a nice cup of coffee and a bun at the Computer Centre, and then wander back again. So I was free from any interference from anybody [laughs]. And then I did whatever I did when I got back. I was doing that statistical work, or that epidemiological work I suppose is more precise, with a certain amount of guidance from Robert Waller because he understood the measurements very well. And at the same time we were setting up a computer system inside the Unit and I was doing that alongside Chris Derrett. We were involved in selecting the right machines, studying what kind of computing we needed, getting trained in it, setting the whole thing up and of course in those days it was very, very hands on.

TT: So were you basically left to your own devices?

PL: I always felt there was top level direction, which really boiled down to 'Work on that,' or 'Can you write that paper up?' and then left on your own. I think that was probably true of Chris as well. I never really discussed it with him. And you would talk to colleagues in the department, but very freely, which I found congenial. I got absolutely hooked on programming at that point and I spent a huge amount of time setting up this computer that we'd bought, a Hewlett Packard machine, writing the software to drive display units and align the printer, to take the signals off the spirometer and plethysmograph and so forth, and getting it to do nicely documented reports.

TT: Were you involved in all the work that was going on in the Air Pollution Unit?

PL: It was such a small unit, that's a good question. It was such a small unit, most people knew what other people were doing. So it was basically Robert Waller doing the epidemiological work, me doing the computing with a hand in the statistical work, but that later changed. I'll come back to that. There was Brian doing the analyses, chemical analyses - Brian Cummings. Brian Biles was helping out in the sense that he was more on the physical side looking at particulate matter under the electron microscope and so forth. He also did all the diagrams we needed; he had photographic skills. And John Ellison, who I think in the Witness Seminar book is actually a little bit underplayed because I always thought he was one of the key-pins of the organisation, he was working on lung function and the physics of air pollution, supposedly. Whether he was doing anything effective I'm not quite sure. I always remember Professor Lawther described him as the laziest man to get a third from Cambridge [laughter].

TT: There's some competition for that probably.

PL: I imagine there is. But he was astonishing. He simply had never forgotten his school physics. You'd put some proposal to him and he'd say, 'No, you can't do that because of such and such a law.' And he'd remembered it. He and I later worked on a model of air flow in the lungs, which really didn't come to anything, although I do remember presenting it at some conference or other.

TT: At which point did you become involved in a project? Did somebody who was running a project say, 'We need some computing statistical help here,' or did you say, 'That's interesting, why don't you do such and such?'

PL: I think it's probably a combination of both. The very top level direction was given by Pat Lawther, who wanted various things looked at, so he would say, 'Can you work on this?' so you did. But I remember, maybe this is a trivial example, there was a need to do some graphics with this computer system so I thought, 'I'll write a graphics package' - so I did. I don't know how many months it took. Or I would help Chris out, because he had this mercury bra device that he'd developed and he was trying to push mercury through these tiny tubes. How he did it I'm not sure.

TT: What was that?

PL: The idea was you filled a silicon tube with mercury so that you got a flexible conductor, you can measure a resistance across it. If you stretched it the resistance went down. So you wound this around somebody's chest and monitored as they breathed in and out. The tube would expand and the resistance would change and you could look at that. And you could then use it as a continuous monitor for air flow. I don't think much came of it, it didn't really work properly. Maybe there were calibration problems, I don't know. That was Chris'; that's one thing I do remember Chris working on. But you asked about other projects, and I reminded you that it was a very small unit, but multidisciplinary. One of the things I remember was that we had some very interesting librarians and this was key to my development. There was one lady came in and she was a Canadian working in London and she was our librarian. That was a luxury for a tiny unit. She and I got talking about what she called SDI, Selective Dissemination of Information, and she said, 'Well, couldn't you set something up on the computer?' So I said, 'Oh, there's an idea.' So I set up a system where she would do this. We selected a package called Famulus that ran on the Computer Centre, the university's computer centre system, where we would have a method of disseminating information to the users around the laboratory on stuff that had been identified as relevant, chemistry and physics, maths blah, blah, blah.

TT: Would you be using things like Medline?

PL: This is pre-Medline. So she would type all these things up on punched cards, I suppose, it could have been paper tape, I can't remember. She would type the references up, I would get them through the system and at the end of the week we would produce an output for various people around the lab. So all the physics stuff would go to John, medical stuff to Pat, so it was a way of dissemination. So I learnt an awful lot there, all about indexing, classification, thesauri, references and so forth. This would have been in the early 70s.

TT: And that was just for a small Unit?

PL: The Unit could never have had much more than 15 people. How it was all paid for I have no idea [laughs].

TT: The MRC at the time.

PL: This was the time when they were beginning to look at the money because Lord Rothschild was coming through and there was lots of talk about marketization and all this stuff.

TT: One of the things you mentioned in the Witness Seminar was you actually got involved in doing work on lung morphology.

PL: This chap Bill Wimster, he became Professor Bill Wimster, joined the Unit as a pathologist and he was looking at possible effects of air pollution on the morphology and structure of the lungs. So he and I, probably with a bit of help from Lawther indirectly, started to work together on this. He was interested in the way the lung airways branched, the fine structure of the alveoli, and also there were some thoughts that the number of mucous glands, or distribution of mucous glands, might change in response to air pollution, both the mucous glands and the serous cells. And so we, he and I, worked together on some aspects of that. We had this most remarkable technician working with us, Nick Kollerstrom. He was a strange lad who had gone to Cambridge I think with five star-A levels, probably taken too many drugs while he was there, and had got out. In the background he was doing some PhD on the history of science. But actually I thought he was one of the least scientific people I'd ever met. Anyway we had this technician working with us who became the merciless butt of Brian's jokes, Brian Biles' jokes, because Brian and I both worked with him. We did some interesting stuff there looking at the branching structure of the lungs.

TT: What was your involvement with that project? What did you do?

PL: In a sense, it was a one-man effort really, work on measuring, - no it was collaborative now I think about it. One was the way the airways divided and their diameters and the angles at which they, the airways, divided and that sort of physical stuff. And then the other thing was trying to discover what the distribution of the mucous cells was, as you went down the airways, from the trachea downwards. The big study there was to take, a trachea and an airway and it was dissected out. The subject, we always called him the Kosher Butcher because we knew he was Jewish and we knew his profession was a butcher. This chap had died of some unrelated disease, unrelated to the lungs, so it was probably a fairly representative lung. And we sliced it from top to bottom and used this staining technique to identify the mucous glands in it and measure the areas on the slides as you went down. That was all published. I think is a reference to it in the Witness Seminar book. Now I think about, I was thinking about it later, I think it was deeply flawed. The think some of the methodology was particularly flawed from a statistical point of view.

TT: You were being presented with the sections or photographs or drawings?

PL: No, I wasn't. I did some work on how we measured these. I spent quite a lot of time looking down a microscope and looking at the accuracy with which we could measure an area. Nick was the chap that did the point counting. Nick did most of this, it was done by point counting and calibrating areas on the slide. And then there was the analysis of all of this as we went down the airway. There was a kind of graph showing areas. Again, I haven't looked at this paper for years and years and years.

TT: You mentioned one technician. What about the other technical staff who were in the Unit?

PL: There was Nick as technical staff. There was Brian of course, a technician.

TT: Brian Biles.

PL: Brian Biles. There was Alan Brookes who was in the physiology labs so when I was working on those physiological measurements I spent a lot of time with him. Leslie Hampton, who was a chemist, an interesting man. And there was, I'm just thinking, then there were some people under Alan, more junior technicians, and they came and went. Young girls, young boys, came in and out. I remember there was a nice chap called Fred that worked in the chemistry lab. And in fact I had people working for me on the computing because I handed over a lot of the computing work of the statistical analyses to these people. So there was this Scottish girl that came down from Edinburgh, very snooty and had studied maths and biology or something. And there was, what was her name? There was a girl who was into folk music, had studied maths at Oxford. There was a Jewish lady, also studied Maths at Oxford, no Cambridge. Nanette. They'd just pass through and I worked with them and they did whatever analysis I was directing them to do. Basically computer programming. Fortran.

TT: You mentioned earlier a distinction between the programming and computer work and the statistical analysis. But when did Alison MacFarlane come? And did you overlap with her in your working?

PL: I interviewed Alison. She came in afterwards, when we were looking for another statistician because my work had moved on with this modelling work and so forth, and I'd left a lot of the statistics behind, but there was still statistical stuff to do and helping Robert. And I remember I was one of the people that interviewed Alison because she came from working on maps. I noticed that she had a background in cartography and I do remember. I've a vague feeling there was also another lady, a statistician and she lived near us in, near St Albans, next rail stop up, and she was a keen birdwatcher, I do remember that. I can't remember her name now, she didn't stay very long. There were people who drifted in and out like that. There was some Indian chap, now I can't remember his name. Was he a physician? I think he was. I can't remember exactly what he was looking at now. I'm afraid poor old Brian Biles was a bit, not politically correct, and used to refer to him as Gunga Din [laughter].

TT: Mentioning the word politics, can I ask you about your politics at the time in the Air Pollution Unit, because there's quite a lot of politics involved in that.

PL: I was not really involved in scientific politics much. That was Professor Lawther because he, and to a certain extent probably Robert Waller, they were involved in the politics of air pollution and what was going on at the Department of Health and so forth. There were little vignettes that you picked up, for example, you know, he would go off to Eastern Europe for example and then we'd get the reverse, people coming over to our unit, and if they came from Eastern Europe they usually came with a minder. And we would always ask the minder the technical questions because they were instantly recognisable. Just as a game [laughs].

TT: I was actually meaning more broadly in terms of your radical politics.

PL: Yes, I became disillusioned and by the time I left I was ready to vote for Margaret Thatcher, I'm ashamed to say.

TT: Quite a transition then.

PL: In a sense. But there's a reason behind this, and it's also partly why I left the Unit. So going onto the politics, two things were also going on in the background because by then I had a family, the first born had been born and was going through primary school, but our wages were depressed. This was a time of high inflation, but public sector wages were under pressure so academic salaries were being awarded far below the rate of inflation, and this was very depressing you know because you were not catching up with your peers. Now I had a degree in mathematics, I knew a lot about computing, and I knew I could walk into the IT world and earn a lot more money and so I started to apply for jobs. I remember being interviewed by Hewlett Packard, and a number of these companies. Hewlett Packard asked me what my attitude to beards would be and it put me off the company. So that was rather depressing. The other thing is that I had this young kid and I can remember reading, you know because we got all this technical literature, and I remember reading *Nature* and there was this article about the Star Wars programme which was being mooted at the time in the States, and I became very depressed by that. And in fact I remember, it must have been some time in the early to mid-1970s, I had a nightmare and there was a nuclear war and I had to kill the boy.

TT: That's one hell of a nightmare.

PL: It's one hell of a nightmare. And I know that from just that one point I became clinically depressed or anxious, or yes, that's the right word, I was in an anxiety state. I knew exactly what had happened and I spoke to John Ellison about it in private and he was very helpful actually. He and I got on well together. I went to my GP who was fresh out of Medical School, and I said, 'Can you prescribe me some diazepam please? I've got clinical depression.' And he looked at me and said, 'Okay.' He wrote out a prescription and that was that. And actually it helped. And actually there were other things going on in the background.

TT: Which is called the triple critical, isn't it?

PL: Yes, and so also a feeling of lateness, getting into my late 20s, career wasn't going to go anywhere, wages were being depressed, I wasn't medically qualified, couldn't really come out of that and study medicine, which would have been an option like Chris did. Because I had dependents I couldn't do that. One thing I forgot to mention is that when I did get promotion in the MRC very early on I started, I took an evening class, to get my MSc in mathematics, so for about two, maybe three, years I would study in the evenings to get the MSc. And at the same time, because we were getting this computer in, the Prof decided that it would be useful for us to go to what was then the Institute of Computer Science, again somewhere near Senate House and sit in on the MSc lectures there for the IT students. So I was really doing two MSc courses together, though one of them I was never tested on, I just sat in on the lectures, fascinating stuff.

TT: All very valuable experience for you.

PL: Anyway, so certainly during the latter part of my time there I spent a lot of my time looking at jobs, searching around. I remember there were a lot of applications out to foreign places, particularly to Australia and New Zealand, most of which came to nothing. Into the IT sector, but of course the IT wanted commercial experience. So that was a difficulty. And I did actually land a job with the government in New Zealand, which I discussed it with my wife and she didn't want to go so I turned it down in the end. And then towards the end of my time there I was really, you know, what next? My parents had a book shop up in Hexham, Northumberland, in which they were coming up to retirement. I was well into, as a hobby, into music and instrument making. I used to come home from the MRC in the latter years, have my tea and so forth, and then I would go upstairs to a spare bedroom and I'd start making lutes.

TT: We haven't really mentioned your musical interest.

PL: I came very late to music. So to complete that bit, there was a lot going on. And then I saw an advert in, it must have been *New Scientist* for this job in Amsterdam working as an IT manager basically, on information retrieval and indexing systems. So all the bits came together. But going back to the music, when I first met my first wife, she's an historian, and she actually finished up in Cambridge teaching history. She was interested in Richard III and the Tudors and Shakespeare. And she had some Julian Bream records which I wasn't familiar with, of him playing lute music and also guitar music. I was actually bowled over by this, and so became very interested in that type of music. I tried to teach myself the guitar at one point but it was hopeless. I'd had no previous music, when my mother offered me music lessons as a kid I point blank refused because I was shy. Anyway during this period when I first joined the MRC, Evelyn was working at the British Museum and she worked with a colleague who was the cousin I think of the leading lutenist academic in the UK and said, 'Why don't you come and have a lesson?' So I borrowed this instrument off her, which now I think about it is quite a precious instrument because it was probably made by, what are those people called, a very well-known pioneer in instrument maker, old instrument making. And then I started having lessons with this lady on this borrowed instrument. So I got very wound-up in that, and then I went to evening classes for music and ensembles. This is a parallel life going on to the scientific one. And I started building these instruments and I actually sold two or three of them. But coming late to music it's a struggle to really play very well. I still have that problem. So round about the end of 1977/78 I was looking for jobs. I had some discussions with a lute maker that I knew, one of the academics in the area, very well-known chap, and we talked about my becoming a lute maker and setting myself up and so forth. And I had the right skills because I'd been to the right school, because I'd learnt how to use tools from a very early age. I could take over my parents' bookshop, which was a temptation, or I could take this job in Amsterdam with Elsevier and Elsevier won.

TT: Was there any particular reason for that?

PL: It was the glamour. The glamour of working abroad and going abroad.

TT: And Elsevier at the time was one of the premier scientific publishers?

PL: It was top, top academic publisher with Springer. So there was a lot of prestige attached to it. And it actually cured me of the depression I'd been under because of a fresh start, it just disappeared. I had an interview out in Amsterdam, got the job and that was it. By that time, at the time I left I think the MRC had changed the name of the Unit to the Environmental Hazards Unit and it was well on its way to becoming moved to the Toxicology Unit.

TT: I think there were a lot of changes going on.

PL: Chris had left, I'm not sure about Alison, whether she'd left at that point to work on neonatal medicine. Brian Commins went off to work in, I think he'd gone off early to work on water pollution at Wallingford. There was a lot going on. There was also something I made a note about, there was a sense towards the end that the thing had lost its direction, the Unit had lost its direction, and had to do something different. The problems weren't all about this lung function measurement and so forth, it was more medical in its essentials.

TT: Before we move into Elsevier, can I just ask you about some of the other studies in the Unit? Like the lead and the ozone studies.

PL: I was not involved in those. Only in the discussions, but I was not involved in those. I think Alison MacFarlane did a bit of work on those but I don't remember really getting involved in. I may have been an experimental subject [laughs].

TT: That leads me onto the next question really which is the idea of self-experimentation and the things you did to each other.

PL: It's just what we did. It's just what we did. It didn't seem anything extraordinary at the time. I can be cynical about current day practices sometimes though, just a little bit too careful. I suppose the really dangerous one was being put in this chamber, which was not that big, and having to do various psychological tests, whilst air pollution was being pumped into the chamber usually from the motor upstairs, there was a petrol engine. So I'd be getting the exhaust from the engine, mainly carbon monoxide, carbon dioxide would be in there. Whether it was diesel or petrol I can't remember. I probably got a dose of lead as well, and hydrocarbons.

TT: Did you pass out and were dragged out?

PL: No, you didn't pass out. I suppose if one felt woozy one would have knocked on the glass and be let out. Of course one was always testing bits of apparatus so you would blow into all the instruments and do it yourself or get the others to, and then there would be various studies where blood was taken out and they did whatever they did with them, it's possible I was measured for, one of them was, what was it? It was a hormone, stress hormone.

TT: Cortisol?

PL: Cortisol, it must have been that one. So one was just available to provide blood or urine.

TT: Let's leave the Air Pollution Unit and go to Elsevier. What were the main changes you noticed, apart from the fact that you suddenly feel much happier.

PL: Well, it was a complete change because it was a change of country, change of language, change of context. I was under much more supervision, though I did get on with the English guy that I was reporting to. So I became an IT manager there and we worked on some wretched system for getting the bibliographic articles into the electronic form, it was all done with paper tape then, and massaging it through the system into a point where we could produce magnetic tapes, which would then go to a typesetter, which would then

produce *Excerpta Medica* abstracting journals. So the whole thrust of what I was working on was abstracting journals. There was a whole system set up to extract the information, write abstracts, get it typed up into the computer, corrected, sorted, indexed, classified, and then published. So it was a fast learning curve, I suppose.

TT: And had it been particularly computerised/automated before then?

PL: Oh yes, there were systems there but we changed them, we were always changing them. And then we moved to another system which was online using a VAX computer so I got into that. I became the IT manager and stepped away from actually programming anything and had a team of contract programmers working for me, and then got involved in a higher level as it were, in what direction the company was taking in producing these things and what new products could we produce off the information and so forth, how would the indexing be done? I remember we ran an experiment automatically indexing of…

TT: Word recognition?

PL: That's right, picking out words in abstracts. We just didn't have the computing power to do this. In fact, that goes back to the MRC. I think it's true throughout the whole of those two decades in the MRC and in Elsevier where we just didn't have enough computing power to do what was really necessary. One of the things I missed out in talking about the MRC was I did a lot of work on visualisation and structures but we just didn't have the computing power or the storage capacity to store the information. I became immensely interested in medical imaging.

TT: So you were a bit before your time?

PL: Yes, it was all before the time stuff. I've still got a little loop of tape, of film, that I produced at the University of London Computer Centre, which shows a simulated shape of an alveoli rotating in space, which, it was just modelled. And then there were thoughts about automating lung slide section images and there was a lot of work going on at the time about automatic detection of cells.

TT: So this would be diagnostic?

PL: Diagnostic processes, yes. Or in our context it would be measuring cell areas and so forth. Or hypertrophy or whatever.

TT: When you went to Elsevier, did they run in Dutch or English? A lot of scientific companies run on English, don't they?

PL: The place was stuffed with English people or who could speak it, because all that we published was in English. So the company was staffed with a lot of English people, a lot from Cambridge. It was almost a training ground for Cambridge biology graduates. So there were a huge number of English people working in the company. A lot of Americans as well, wanted to get out of the States and work in Europe. For example, we had a poet working in there, an American girl, working in the proofreading department, just to get her money. There was a man called Bob Blanken who was working on thesauri, medical thesauri, but the business of the company was done in Dutch, so if they were talking about money it tended to be in Dutch. If you were talking about content it tended to be in English. Again I was also very quickly disillusioned, or rather sort of the romance of publishing was broken very quickly, because it very quickly became clear that the issue is not 'Is this an interesting thing that needs to be published, is it worth publishing from a scientific point of view.' But the question was 'Is there money in it? Can we sell it?' Every time you went to the managing director with a proposal he'd say 'Waar is de geld?' 'Where is the money?' But at the time, when I joined it, it was a very relaxed company and, I mean incredibly relaxed, a huge amounts of goings on in the building and all sorts.

TT: It was quite an innovative company as well, with some of the journals they started.

PL: Yes, and of course it's got quite a big section out in the States. So I worked basically as IT manager for a while, for about five years there, and then I was sent out to America to assess a project which was to work with the Oracle Corporation in Washington on putting text retrieval capacity into the Oracle database management system. This was very early work on text retrieval and Oracle. I got involved in this and I was going to be the link man between Washington and Amsterdam. So I remember it got as far, almost as far as choosing what car I was going to have when I moved to the States and live in Washington. So this was all very exciting stuff. Anyway the higher Elsevier board met and they pulled the plug on it, by which time I had recruited my second in command into my job, to take over from me, and I was basically without a job inside the company. Anyway I remember marching off to the managing director to have a discussion about it and they were ever so, ever so apologetic and he said, 'We'll find you a job.' And I became an internal consultant on what at the time was called electronic publishing or new media publishing, and it's perhaps one of the most satisfying periods in my career. I was working on CD-ROM which was then a new product, a new way of distributing information and other ways of producing information products. And I was right at the beginning of it all. I became vice chairman of the standardisation committee on compact discs out in the States, did quite a bit of travel in the States. We had some very innovative products that we were looking at. Again, a little bit advanced. There was one product, this is where I learned to play squash, I remember, because a chap that we were working with in one of the Philadelphia medical schools. He wanted to have a system for birth defects so it was a visual database related to birth defects so that physicians could use this compact disc and say, 'Yes, I think that kid has got this particular syndrome,' and to help them make a diagnosis.

TT: And was the intention that Elsevier would be marketing this?

PL: And they would market this thing. Again it was just a bit too in advance of its time. I imagine this sort of stuff is all out there now.

TT: What kind of freedom did you have there? Did you select the projects you are going to do?

PL: Well, I'd sort of moved up in the organisation, next level up inside Elsevier besides publishing and became part of the central IT department, so I had a boss there who I really got on with very well. Yes, I did have a lot of freedom. One had to write the odd report and so forth and report back. It was pretty free. I noticed at the end of my time at Elsevier that people were becoming a lot more, they were working a lot more like they work today. I remember when I first went to the States, talking to a man called Mari Pijnenborg who was a wonderful Dutchman. He said, talking about a trip to the States, and he said, 'Yes, well come in on Friday, but have a day off when you get back. You always need a day in your shorts before you start work again.' There was that. And by the time, at the end of my period there it was the done thing, the sort of natural thing to do, to land at Schiphol airport, come into the office and start work. I was talking about this with my brother the other day, it was the done thing to work late in the evenings rather than get out of the office at five o'clock, which was normal practice. So work practices changed, much more focused on profit, profit. So I saw the very beginning of that and it really intensified through the 1990s.

TT: But you were at Elsevier till late 1980s?

PL: Late 1988 or 1989. So I was working on all these projects and there was also, what was arising at that time was called multimedia, where you would be able to present text and graphics and sound and video all on the computer screen and all in one product. DVD was beginning to come in, storage capacity was increasing. I'd come to the point, literally the top of the pay scales, and I could go no further up the Elsevier salary scales, without becoming a director, and that would have had lots of other implications, having to speak better Dutch and so forth. So it was either staying there or getting another job. I started to look around for another job in this high tech area. The other thing that was coming at the time was XML and SGML, which I was somewhat involved in. And I went after a job at the European Patent Office, which I got, down in The Hague. I sat there and I thought about it and, 'No, I'm not sure I want to live and work in The Hague and have this golden nest that you work in,' because you know, you pay no taxes, high salary, very well

padded, but it was a golden cage I saw it as. So I decided not to take that job. By that time my wife had got her first in history from the Open University, had taken the youngest kid off aged about nine to Leicester to do her PhD, which she got, and didn't come back. My eldest son was doing his Baccalaureate at the European school, which was close by.

TT: In Amsterdam?

PL: No, no, we'd moved out to a little town in North Holland but there was a European Space Agency installation nearby and so there was a school for European Community people. So he went to that European school, got taught in French and German and Dutch and some in English. He's now Professor of Mathematics at Herriot-Watt and is bilingual at home with his French-speaking wife who comes from Madagascar. The last time I saw him physically was at Herriot-Watt and he was absolutely furious about the Brexit thing.

TT: I don't think he was the only one.

PL: I went to Herriot-Watt the day after, maybe when we had a sandwich or something, and I saw these young kids there studying. I thought 'You poor people.' My son said, 'The department is like a funeral parlour and everybody knows where jobs are going; everybody knows where the jobs are.'

TT: Let's get back to you moving on from Elsevier.

PL: So I moved in to, actually I don't even think I put it on the CV, but I moved out to a company called Hyperdoc. We were talking to them in Elsevier and the guy said, 'Look, we're producing this software which might be a world beater.' And I thought, 'Well, why not?' This was late 1980s, 1990s, everything was possible. I knew my way around all of this stuff and so I joined them as a product manager, initially in Paris. It was a very strange period in my life. I commuted between Amsterdam and Paris and then Paris and London. They had a little operation in London which was actually sales work and I supported the sales work there and the development of their documentation, which was in a complete mess. Spent a little bit of time in America trying to sell it, but the owner guy was far too ambitious, the software was too immature and the whole thing folded up. I remember at the end of that period we were desperately trying to think about how we could generate money to get a salary in, so I was under a certain amount of pressure. This must have been about 1991, back in the UK, renting a flat in Richmond, nice part of the world. I had to find a job so I started looking around and I saw an advert from a pharmaceutical company, from SmithKlineBeecham as it was then, for working on document management systems; regulatory document management systems. I studied incredibly hard, I didn't know too much about it. I got the IBM Systems Journal and studied it [laughs] and obviously I gave the right impression at the interview and I got the job just as the other old job folded.

This was in Epsom. Actually the interview was in the old house at Epsom, there was a big facility there, and it was the old Colman's mustard building, and it was, in the big main building which was a wedding present from Colman of mustard to his son when he'd got married. So I joined the pharmaceuticals industry to work on setting up regulatory document management systems, electronic management systems, to get our INDs (Investigational New Drug application) and all the rest of it to the FDA (Food and Drug Administration, USA) and other regulators. It has never been such a fast learning curve. I got into the industry, I knew very little about it, but of course I had a background in medicine, IT and information management so it was a perfect combination, and I, within 5 years there, I was on top of it all. I knew all the lingo, I was well known in that particular circle and contributing quite a lot to that business.

TT: So was your main remit just to run the service as it was, or to develop it?

PL: No, I had to develop a system, design it and develop it so I spent a huge amount of time in the States, commuted to the States basically for a few years, in Philadelphia. Then, of course, SmithKlineBeecham was taken over and we became GlaxoSmithKline and had to absorb the Glaxo people and adjust to things. Of

course. In the industry they have all these family trees where they're all merging together and demerging. It's an absolutely fascinating industry. It is absolutely fascinating. Anyway I did alright at that and we produced a system.

TT: What did you have to do in terms of designing and creating a system?

PL: I've always been good at designing systems, coming up with ideas and designing. In fact, there's a theme here which I haven't really talked about. I think I'm good at design, whether it's an abstract design or physical design, so I was able to sort of put that down on paper for people to programme from and to develop.

TT: So you can see how all the component parts fit?

PL: Yes, how the components should fit together, and what should happen, what the functions of the system should be. I've always been good at that, both in Elsevier and back at the MRC.

TT: Yes, I could see that that would be very interesting, the same thing.

PL: It's because I played with Meccano when I was a kid, I guess [laughs].

TT: I nearly asked you earlier when you were talking about books and being a reader, whether you had a Meccano set. It's very interesting - who had Meccano sets, who in a later generation, who had Lego, and who had chemistry sets.

PL: I didn't have a chemistry set because I didn't really understand but I did do a lot of amateur photography so we used to go to the chemist, my brother and I, and get chemicals and develop our own film and print our own prints. It was, when I was very little, I had a building set which had little bricks and you could build houses and you stuck these things together with water soluble paste and they had plans of the houses and windows and all the rest, and I remember doing that. In fact, we actually designed things ourselves. I remember making a timber framed house out of balsa wood and plaster and putting in the windows and all the rest of it. I didn't really have a chemistry set, but made model airplanes, had Meccano. We were very keen on Meccano when we were sort of competing, my brother and I, with each other to build differential gears and proper steering systems and all the rest of it. We were too early for Lego. There was also this other thing, some kids used to make radios, but I wasn't really into that because I didn't understand how the electricity was flowing through this thing. But actually later on, now I do have quite a good grip on electricity and I've rewired my own house and all the rest of it.

TT: We've got to about halfway through your time at GlaxoSmithKline and I wondered if you could say a little bit more about the systems you'd introduced. This is all regulatory?

PL: It's all systems to keep huge amounts of information under control. One of the statistics that's in my head in relation to that is that there was once a submission or a marketing application that had to go down to the FDA from Philadelphia to Washington to be evaluated and it took a truck to take all the information. It was over a million pages long.

TT: And this was just on one drug?

PL: Yes, one chemical entity. And it was probably just for one indication. So huge quantities of information, more or less unmanageable. So I was involved in reducing that to electronic form so it could be more easily transported, and to a lesser extent in the standardisation of what that should look like and how it should be done. This was a time when there were some wars against a faction that wanted XML based information rather than PDF. This is all sort of technical feuding in the business. I was on the XML side because it gave you much more flexibility and allowed you to have definitive structures rather than ad hoc structures. So yes, I was all involved in that and very much in that world talking to other people, other companies and so forth. And of course the reason people were doing all of this at that time, and in fact still are, is the absolute

need to lengthen the period that you've got the drug under patent, you're selling the drug under patent. Sooner to market, cheaper to market, the longer the exclusive period of exploitation, so that was what it was all about. And if you could reduce the cost of producing all this information that was a bonus.

TT: What at that time did you see as the pleasures and the pitfalls of working for Glaxo and doing that kind of work?

PL: I wouldn't say there were pitfalls. I think the pleasures were working with interesting people, well informed people, the amount of travel you got, and we were paid well. The pitfalls or the downsides… having to produce every week some silly report for my boss and having to sit through endless meetings, which were unnecessary. I had a technique in the end where I would write a report, I had a format, write a weekly report, it had a certain format. When it came to the end of the week you had to say what you'd done and how you'd performed to that. So I changed the tense from future tense to past tense, just tweak it a little bit and then used my imagination and think of what I was going to do next week just to get the thing out of the way.

I mentioned colleagues. That's true for the most part. When I first joined the company I was teamed up with a pharmacokineticist. His background? He studied chemistry. He worked in pharmacovigilance or something like this, very bright lad. He had started life in Reckit and Colman with some interesting stories to tell, and he actually came from an area where my mother was still living, so we had that connection between us. Anyway Ray and I got on very, very well together. Ray, Raymond, Henson. He has almost certainly left now. He'd been with them quite a while. I think he was an Oxford man and been in the pharmaceuticals industry all his life in one form or another. I do remember him telling me about, and this is also of some historical interest, talking about the structure in Reckits when he first joined them and about the chap that knew when to spit in the vat to get the product to turn blue and that sort of thing [laughs]. He said when he first joined Reckit and Colman's there was, I think it was seven, eight, or nine levels of canteen in the organisation. At the bottom tier you sort of more or less got food flung at you and then as you went up the hierarchy you perhaps got a tray, then a tablecloth and [laughs] until it got to silver service at the top of the organisation. So it was quite bizarre.

TT: I've heard about that though in NHS and MRC.

PL: It could well be. Anyway, when I joined, when I went, this was certainly not the case in the Netherlands when I was there because the Managing Director used the same canteen as the cleaners. One was a little bit scared though that the chap might actually come and talk to you at lunch time [laughs]. Anyway, we've moved on from that. Yes, actually in retrospect the other thing about the company is that it's pension scheme is very good so the bulk of my pension now comes from my 10 years working in the pharmaceuticals industry.

So anyway I delivered this project on document management and there was some question about what I do next, and I got a call from the archivist of the company to say they needed to set up an electronic archiving system for the group as a whole for scientific information. A chap called Wayne Faulkner based in Philadelphia. So I moved from the IT department, as I was then in, and I went into, the archiving department.

TT: You say Philadelphia, where were you?

PL: He was based in Philadelphia. I moved into premises actually at the time it was still down in Epsom.

TT: I remember going to Glaxo archives in Greenford.

PL: Oh, yes, there would have been. Probably the corporate archives and not the R&D archives. I was in R&D. They were separate and possibly still are. So the problem was we had a huge amount of digital information coming from all this experimentation, the clinical trials, the drug discovery process, it all had to be kept for statutory reasons, for regulatory reasons and they didn't know how to do it. So I was asked to study this

problem and come up with a system for archiving all of this stuff. I grabbed this and I thought I was on an easy win because I thought it was just a storage problem. And I sat down and I started to think about it. And I sort of realised 'This is not going to work; it's not a storage problem, simply a storage problem, it's a more fundamental problem than that. Digital information is subject to very rapid technological change and it will rapidly go obsolete.' We've all had the problem of trying to open an old Excel file and it doesn't work because the software has moved on or you don't have the medium. You know that I've got a PC at the moment and it doesn't have a CD reader in it but plenty of CDs are still around. In fact, I've got an archive, my own archive of old media I've collected over the years and for my current students it's quite an eye opener. So I realised it wasn't quite as easy as I thought and I started to go to conferences on the issue, particularly within the European Union, because actually the European Union was very forward in thinking. There was an archivist there who started work on it and I got involved in what was called then the DLM process inside the European Commission. I must have made an impact at one of these conferences, coming in as a commercial person rather than someone who was working in National Archives or some other archive. It might have been a two way process actually because I was coming in with perhaps a wider viewpoint than they had, because we had for example gas chromatography data and stuff that came out of the labs, we had statistical data coming out of clinical trials as well as just documents. Just documents is the easy bit. So I had a much wider problem but by engaging in these forums I was able to see that also working in the pharmaceutical industry I had my own blinkers because I didn't realise some of the more philosophical issues which were also entailed in this issue, in this question, about what is the nature of information and what is the nature of memory and so on and so on, and issues of authenticity and so on, which are all central to the archive. So I got totally involved in this wonderful area which straddled both science and the humanities and administration and law.

TT: Was that unusual in the drug industry at the time? Was GSK ahead of the curve?

PL: They were slightly ahead of the curve. Ultimately I reported through to the head of IT in the company who was a very urbane, American guy with the wonderful name of Ford Calhoun]. Southern name. And he I think understood that there were wider issues there. He may not have understood all the issues but he certainly understood that. So I started work on this and, you know, I wrote a report and a proposal to build a system. And I thought how it should work, at the same time being engaged in these other forums which were going on, thoroughly enjoying myself and learning a lot. I remember the staff meeting we had where this proposal came up, I'm not sure I was physically at it, it may have been a virtual meeting and I was at the end of a computer - but I could almost see him settling back in his chair and thinking, this guy settling back and saying, 'What's it worth to us? What's our information worth?' And he said, 'Before I give the go ahead to this and spend a few million pounds on developing this system, I want you to go away for a year and write a report on the value of our digital information and how we can value it.' So I was more or less given a sabbatical and allowed to go away and think about this problem. I was given one or two leads and I was hitched up with a chap from either IBM or Ernst&Young, one of the Big Five companies. Peter and I, this guy Peter and I, clicked. We were both sparking ideas off each other and spent hours together discussing how digital information can be valued. Quite frankly I don't think we got to the bottom of and it's still an unsolved issue. We got to the end and we spent time in the States talking to various people and all sorts, and we did come up with some kind of operational method of saying, 'Well, how much effort has gone in to creating this information.' But I think it really misses the point about how much is this intrinsically worth. But this raises some interesting questions in its own right. I mean what do we mean by the word value and how do we relate that to price? That was a confusion that we had.

TT: At that time, were you expected to think in forward terms? Were you expected to think what's it worth now, in 10 years' time, in 50 years' time?

PL: It really was focussed on the now but that's interesting, I'm sure we did talk about that because we were spreading ideas all over the place. I mean maybe value is not just a single valued thing, maybe it's a multi-valued concept, which it might be. And then there was a question of the context in which it's operating, say what's of value to me may not be of value to you.

TT: Because value systems change.

PL: Exactly. I've got photographs which are of value to me but may not be to anybody else.

TT: Drug companies having to keep data on drugs for the lifetime of a drug and the lifetime of the drug's use. GSK still have archives and records of notebooks from the 1880s.

PL: Exactly. They were sitting there in Harlow.

TT: Harlow, yes. I visited there.

PL: It was exactly where I was sitting. So I was on my own in a sense doing all of this. Anyway Peter and I came up with this method because time was running out and we produced this report and we were given the go ahead. So for the next five years I led this project and developed a system for archiving away digital information.

TT: What kind of budget were you given for that?

PL: I can't remember the exact budget. It was some millions. Five million maybe, I can't remember. It was quite a chunky sum of money.

TT: This almost goes back to when you were talking earlier about the Air Pollution Unit when you and Chris Derrett were trying to work out which computer system to buy, and finding out about different computer systems. There's a very similar sort of process, discovery, evaluation, interpretation and then implementation.

PL: Yes, yes. A kind of discovery process. And synthesis. I think the synthesis is the word, putting it all together in coherent form. During this process though I did meet some rather more forward thinking people in the drugs industry. There was a chap that was working in Astra Zeneca in Sweden who was also active in the European Commission and he wrote a very forward looking document on the subject, written in very classical terms. He was using almost Latin terminology to describe some aspects of the problem. I had a lot of respect for this chap. He was a very awkward man. I learnt later he was suffering from depression, but yes, so there was some forward thinking going on in Astra Zeneca in Sweden.

TT: Did you share this kind of information because you're talking about Astra Zeneca when you were working at GSK.

PL: Yes, but the sharing took place in I think fora outside of the pharmaceutical industry, at least initially. And I remember I was looking for people to build the system, system programmers, outside companies to build the system. One of the companies that was busy was in Abingdon, west of London, it's a specialist scientific software company. And I went down there and they had been talking to the people out in Sandwich in Kent.

TT: Pfizer?

PL: Yes, Pfizer. I looked at the stuff they were messing about with and I thought, 'Yes, that's more or less what I think.' So the people in Pfizer had also done the same work. And then I spoke to them; yes, we'd been moving along somewhat parallel lines with the same ideas, what metadata we had to store and how long and all the rest of it. It was interesting because a guy that worked for Pfizer subsequently left there and he's now the Queen's Archivist.

Actually that particular software company is now making a fortune out of the successor software. So, anyway, we didn't choose this particular company, but we did choose a Canadian company and they got

busy with it and produced a system in the end. There were various rocky patches along the way and some interesting encounters, but yes.

TT: And so how long did that take to implement?

PL: About five years from beginning to end, that period.

TT: So that really was the end of your period at GSK?

PL: So came to the end of that period and I was getting on, getting nearer to thinking about retirement and I decided to take early retirement. Because I was - yes - there were mergers in the air and it's now, we're talking about 2001/2002. The opportunity came up to get redundancy. There was a big package.

TT: Lucky you.

PL: So the redundancy came up and I grabbed it and I thought, 'Well, I've done this for GSK, Pfizer's in the business but most of the others aren't. There must be a market.' I left, I set myself up as an independent consultant and looked for business, and went on a short course about working alone, thought I'd make a fortune, which I didn't. And it had a really surprising sort of twist to it. There's a bit I've missed out here: during the latter part of my time with GSK, two things happened. One was, I blush to mention some of this, one was that the company moved, they got rid of the premises in Epson and shifted it all up to Harlow, which was very difficult for me to reach and meant driving around the M25 every day. So I decided not to do that and I asked them if I could work at home for three days a week. Much to my surprise they said yes. So for much of that period I was working, I was attached to Harlow, I used to go up there two or three times a week to keep in touch, and the rest of the time I would spend at home just communicating via the computer. And a lot of it was done with America so you'd have to wait until they got into work before you got in touch with them, so it suited everything. And at the same time my partner and I talked about this issue together, we decided there might be an opening to build our own software and put it on the market, build a business on digital archiving. And we actually got as far as talking to venture capitalists and all sorts. It's the only time I've been served by a butler is when we went to Rothschild to ask for money.

TT: So you had a good retirement package, a redundancy package?

PL: I had a redundancy package, I took early retirement, in fact if I hadn't taken early retirement my pension from them would be much higher. So there is a penalty. I thought I would work in the pharmaceuticals industry but my first contract was with an organisation which I was familiar with, which was the Digital Preservation Coalition, which was a kind of academic organisation set up in the UK to advise organisations about digital archiving issues. And I think, Tilli, you may even know about these people. It was then run by Neil Begrie, I think it was based at King's College. The first contract, which was about the commercial, progress on the subject. Then that led to one or two other bits and pieces and work with the British Library, but the big break was with JISC.

TT: Well, I think that's when we first me, at a JISC archiving conference.

PL: Yes, I remember. I know where it was. It was at the Wellcome. I did get back a little bit into the medical field because I spoke to a chap at the Medical Research Council who was responsible for this area and he was doing some work on consent and confidentiality of research information and that's where I met you, Tilli, because he had a seminar on the subject of some sort. A nice man, I liked him. Peter Dukes.

TT: He was at MRC Headquarters for quite a while I think?

PL: That was a little bit off key from what we really intended. But it was at that point I seriously considered, going on an ethics committee and I did consider it but I think one could get so wound up with it and also quite emotionally involved with it.

TT: Ethics of clinical data?

PL: I got quite irritated with some of the people I met who were so insistent on privacy, they were almost obstructive I think to the research process. I felt that very irritating. Just ease up a bit. If somebody knows my blood pressure I don't really care. If I've got HIV, not sure. I don't know. So I did get a little bit irritated with that and I thought I would get quite wound up with it.

TT: Where did the offer for ethics come from? Was that MRC?

PL: MRC. That was an MRC sponsored because they were concerned about issues of keeping data and using it for research purposes. Of course this was when the big thing was on about building an NHS backbone and all the rest of it for research. So I did that bit of work and it was interesting. The big break consulting wise came with JISC me and my partner went to see Professor Tony Hay down in Southampton and he was heading up the UK eScience Initiative. And he commissioned us. Must have made an impression on the chap, he's a very awkward man but I still made some sort of impression on him, and he gave us a contract to create what was called the eScience report. That was to do a survey of eScience in the UK as was mid-2000s. We spent a fascinating time, more or less a year I think, putting this report together and meeting a huge number of influential people. So we had a number of case studies and I remember going to Oxford, Richard Doll's department, what had been Richard Doll's department, and meeting the guy who is now running Biobank, up to the Cambridge genomics people, etc. So all of that, and we produced this report and we also produced what's still quoted as the original definition of a phrase called "digital curation", curating digital information. And it keeps on being quoted but we're not particularly proud of it now because I think it's fraught with later thinking on top of it. But that was a real boost. We did a number of other projects for JISC related to it. Then one Christmas I think it must have been 2006, I was weeding out emails and I saw an email from the Middle East, from Abu Dhabi, some chap saying, 'Would we be interested in quoting for coming and doing an evaluation of the archives in the UAE, United Arab Emirates?' So, well, why not? So over Christmas Alison and I put together this proposal and pinged it off and didn't hear anything for about three months. But Alison had been invited to go to Dubai to give a talk and she wanted me to come with her because it was the first time she'd been out there and she wanted a friendly face and somebody to hold her hand. We booked into the hotel and got in touch with the chap in Abu Dhabi and two days later he said, 'I'll be in Dubai later in the afternoon, can we meet up?' And we met up in his hotel and something must have clicked and he said, 'Okay, let's go back to Abu Dhabi and we'll talk, I'll show you the archives we've got.' So this chap, we got in his car, raced up about 120 miles an hour on the motorway to Abu Dhabi, had a look around this palace they'd built for the National Archives of the UAE, and they contracted us to do a very thorough analysis of what they wanted. So for about three years we worked with them on two contracts telling them how to do it.

TT: Does this involved digitising the archives?

PL: It's whole spectrum archives from paper, film, digital stuff. We wrote a great tome of guidance for them in the end, specifications for their computer systems, all sorts. We did it by bringing in various subcontractors who had specialist knowledge in various areas. And that led - I think there was a break in it - where we did some work for European Commission. Oh yes, and then the other big thing was European Commission contract to work on, big data, the use of big data in Europe and that was hugely influential, the e-SciDR report.

TT: If you could talk to the young chap starting in the Air Pollution Unit what on earth would you say? You'd be very surprised at what you're doing now?

PL: Oh absolutely. If I'd have been told I'd work in Amsterdam in publishing, certainly as a kid if I'd been told that I would have been astonished. Worked in Amsterdam in publishing, worked in drug development in UK and America, and become an archivist, an expert on archives. I would have, said no, no, no, no [laughs].

TT: Well, you've always been flexible and taken opportunities.

PL: I suppose so. At the time it feels as if they're almost things you've got to do because otherwise you might starve.

TT: Yes, yes. But a lot of people would have said, 'I'll stay in the Air Pollution Unit. I'll go to Carshalton.'

PL: Well, I was getting bored. I do get bored quite quickly. And I'm now bored with archiving, it just brings in a bit of cash at the moment because I teach it still. Because I think that basically, although I do have views on it, I think we're presenting ourselves with an almost insoluble problem with digital information. There are three ways in which we can remember information: one is in our heads, it might be called the oral history paradigm; the other one is that we can put it on paper, and I'm looking at these books here in your office,, these will last hundreds of years if you put stuff on paper; and the other way is we can encode it in digital form. There's no other way we can store information. They are the only ways. Brain, analogue on paper or stone, papyrus or whatever it is, and in digital form. The digital form has a lot of advantages in its immediacy and it's searchability and all that, transmutability, but in terms of longevity it has some very huge downsides. It requires: take this from the very basics, it requires power. I don't need any power apart from my own food to read a book. You see we need electricity, not guaranteed. A digital file is not the information. Information itself is, if you look at something on a computer screen, it's the product of three things: it's the product of a digital file, a computer programme, and a piece of hardware. And if any one of those things is missing you don't have the information. We did some work very recently for the Royal College of Music, refurbishing their archives and we had to do this as, they want to get money from the Heritage Lottery Fund. So this is something we've done before, we did it for the Tate Gallery. We've been to some very interesting places with our archiving. And I came up with an analogy for the Royal College of Music: you need a musician, you need an instrument and you need a score. If one of these things is missing it's not going to work. So, because people equate digital information with a file, 'Here's my Excel file, here's my Word file,' it's an absolutely meaningless string of bits without some other way of interpreting them. And that way of interpreting them is a programme. And I've so often thought during my career, 'I should do a PhD at some point,' and whether to explore the three meanings of memory is one of the ideas at the back of my head.

TT: So you are including biological memory as well?

PL: Yes. Well, that was the memory that we had for most of the human lifetime. Because of my interest in history that's the memory that we had.

TT: I'm thinking of immunological memory.

PL: Now that's an interesting one. It's not a conscious one though.

TT: No, no, but is memory conscious.

PL: Hm, interesting thought. There's a lot to be said about it.

TT: The animal that a lot of work was done on memory: octopus.

PL: Did you work on memory?

TT: Well, when I worked on octopus.

PL: One of the reasons, I tell myself, I've studied mathematics rather than chemistry ,for example, is I've got an appalling memory.

TT: Looking back over your career, Philip, your career sort of fits into 10-year chunks where you've not quite reinvented yourself but you've sort of shaken yourself off and taken some good things with you, redeveloped them. And a lot of people don't do that.

PL: I can't imagine doing that. Think back: if I'd been a teacher the whole of my life I might be now a very good teacher. Or a very good researcher in air pollution. But I'd have missed quite a lot.

One of the things I don't think I brought through is, if I look at the science and my relationship to science, I don't think, I'm not interested in practical problems in science really. And it's one of the reasons I studied mathematics. I go back to that first thoughts, about looking up to the sky when I was a kid. And I'm always interested in the fundamental bits and really I'm suited to being a mathematician, pure mathematician, or a physicist, something like that. I'm always interested in the fundamentals. When I was studying mathematics I was lucky enough to be on a course which had quite a lot of pure mathematics in it, not practical mathematics and applied mathematics. For example, we did courses on the foundation of numbers and so forth, and issues around that. The part of mathematics I really enjoyed is called, not even the functional analysis, which is rather abstract, but abstract algebra and topology, which is very abstract.

TT: But that sounds quite odd looking at your career because actually you've been very practical hands on dealing with problems career.

PL: But it's not the bits I'm really interested in. I would really call myself a success if I'd have made some discovery in topology theory, or number theory or something like that, or I'd solved Fermat's theorem or something like that, or had made some fundamental discovery in atomic physics. And I keep looking at books on the fundamentals of physics and there's something going on there that needs to be sorted out and, because we haven't got to the bottom of things yet. We've got down to quarks but then I think we're 24 orders of magnitude off, down to the Planck length. What's happening in between the quark and the Planck length? There's something we don't know down there and there's 24 orders of magnitude, it is huge.

TT: But you must be driven. You do have a very technical, pragmatic, hands on approach as well I think.

PL: It may be arrogance. Maybe I'm just good at putting things together and designing things but I really would like to be up there.

TT: It's a bit like Gilbert and Sullivan, isn't it? Sullivan always despised those fripperies, he wanted to be a proper classical composer

PL: Well, that's the bit I do for my money [laughs]. There is a sense of that. I know I can do it. I also have an interesting attitude to research. My present partner, we argue a bit about this. She went into banking and is very, very bright. There she indulged in research and she does research now for the work we do with archiving. But research for her is going on the internet or going to a library and looking at stuff and collecting information. And I just think of that as collecting information. Research for me, and maybe it's because I studied mathematics, is sitting down with a blank piece of paper and thinking, and perhaps drawing a diagram or writing some notes. That's, the working in the Air Pollution Unit actually sort of approached because you were left alone. And I look at my students at Dundee and regulations they have about PhDs and they come up with all this stuff: you should spend the first year doing this and researching the literature. No, no, no, no, no, no, no [laughs]. Sit down and think. Sit down and think.

TT: You're not allowed to do that now.

PL: Come up with the structure. And as my brother, who is also an academic, said, last night I think, 'They almost want the conclusion of the research before they've done it.'

TT: Grant applications are like that now. You have to tell them what you're going to find.

PL: It's ludicrous. Absolutely ludicrous.

TT: Well, on that happy note why don't we finish? Thank you so much Philip.

[END OF TRANSCRIPT]

Further related resources:

1. Derrett C, Wilkinson A (intvrs); Yabsley A (ed) (2017) *Biles, Brian: transcript of a video interview (26-May-2016).* History of Modern Biomedicine Interviews (Digital Collection), item e2017012. London: Queen Mary University of London.
2. Jones E M, Overy C, Tansey E M (eds) (2016) *Air Pollution Research in Britain c.1955-c.2000.* Wellcome Witnesses to Contemporary Medicine, vol. 58. London: Queen Mary, University of London.
3. Tansey E M (intvr); Tansey E M, Wilkinson A (eds) (2016) *Derrett, Christopher: transcript of an audio interview (22-Mar-2016).* History of Modern Biomedicine Interviews (Digital Collection), item e2016110. London: Queen Mary University of London.
4. Tansey E M (intvr); Tansey E M, Wilkinson A (eds) (2016) *Derrett, Christopher: transcript of a video interview (22-Mar-2016).* History of Modern Biomedicine Interviews (Digital Collection), item e2016111. London: Queen Mary University of London.
5. Wilkinson A (intvr); Tansey E M (ed) (2017) *Lord, Philip: transcript of a video interview (21-Jul-2016).* History of Modern Biomedicine Interviews (Digital Collection), item e2017181. London: Queen Mary University of London.