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LEADERS OF NATIONAL LIFE

Lord Brian Flowers

Interviewed by Paul Thompson

C408/008

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**Tape 1 Side A [track 01]**

*11<sup>th</sup> November 1988. Could we perhaps start by talking about your family background. And first of all I wonder whether you remember your grandparents?*

Yes, indeed I do.

*Can you tell me something about them?*

My father's parents lived in the Midlands. In fact the whole of my family comes from the Midlands, a long way back. And my father's father was in insurance and suchlike things. I remember him as an old man with a white beard. Probably wasn't all that old. I can work it out, but that's too difficult. And he was an amiable character who, towards the end of his life, got a little simple minded about things. I remember he used to go off into the kitchen every morning and steal the cream off the milk, which was very bad for him. And he used to get some sort of hallucinations that I was going to be an important person. Why he should think that I don't know. It didn't very much please my two cousins, who eventually became doctors. The elder one of which was the senior amongst us and regarded himself as the important person. I'm talking about early teens you understand. I suppose by family standards my grandfather in his dotage turned out to be correct. On a relative basis anyway. So that was him. I wasn't very close to them. I was very fond of my grandmother. I didn't meet her all that often. My real relationship was with my mother's parents. With whom we regularly, I in particular, had holidays. I have two sisters and they tended to come with my parents. I used to set off as soon as school had broken up - I set off for Rugby where my grandparents lived. And my grandfather was almost a father to me in many ways, and he taught me woodwork and he taught me to - he ran - he'd begun his life as a carpenter, went into the Army for the First World War, rose to the rank of Major when he left and came back and started up first a motorbike business, and then it became the main garage in Rugby. And I learned some of the mechanical arts as a child in his garage. Which had an effect on me, undoubtedly. So I saw a lot of them. And the whole family always went off on summer holidays to

Skegness or Barmouth, usually Barmouth, with them and so on. So they were a big influence on my life in those early days.

*You were born in 1924 in Swansea?*

No, I was born in 1924 in Blackburn. But I left Blackburn, so I have been told, at the age of 5 weeks and - my father was a Parson and he had a church in Blackburn. A Baptist church. And he moved from Blackburn shortly after I was born. So I never really knew Blackburn at all. And went to join my mother's family in Rugby for about two years, until he got a church in Chorley Wood. And we remained there until I was almost 8. So it must have been 1932. Yes, that's right, 1932 we moved from Chorley Wood to Swansea. And there I remained until I went to Cambridge. And my mother remained there until some years after my father had died.

*Could you describe your father and say what sort of person he was?*

Well, he was about my build. He lost all his hair rather young. He was a very - he was more of a theologian than he was a Parson. In fact he - of course this is all a little before my time, so I have to say it was said that he was offered a professorship in South America shortly after he graduated. They certainly went - my mother and father went to New York essentially for their honeymoon and spent, I think, at Union Seminary. And I think it was as a result of that that he was offered a post somewhere or other, which was academic. And had he taken that I think his career would have been utterly different. He was never entirely at ease in his mind, I think, in the pastoral side of being a Parson. He was good at it in the sense that his parishioners undoubtedly loved him and respected him. There's no question about that. And in Swansea he was regarded as a considerable figure. If you see the newspaper comments at the time he died, for instance, he had undoubtedly become quite a person in and around Swansea. But we the family knew that he was much happier with his books and writing sermons and things like that, than he was going patting people on the head, which he did. But it wasn't really him. And he did a lot of private tuition too. And he - well, helped me with my homework is to put it too informally. I mean he tutored me at various times. Not very patiently I must say.

*Were you close to him in fact?*

It's a little sad in a way. I was not all that close to him until I grew up. I was much closer to my mother, who was an exceedingly demanding woman who, I suppose you could say, emotionally speaking, not otherwise, emotionally speaking, never quite grew up. She was a remarkable woman in many ways. With no formal background. She started - she started by taking - by taking what you would now call teaching diploma. And she took a year of it. And she did a bit of teaching in schools. I don't know why she didn't complete it, but it was fairly characteristic of her that she didn't. She had some sort of a breakdown, and she met my father, they were married, and so on. So she had no formal background at all. But she developed a gift which she discovered in mid-life, I can't remember quite how, for teaching mathematics of all things, to people who for some reason or other were backward in mathematics. Usually because they'd been appallingly badly taught. And she had a most remarkable gift for taking kids of any age you like, I mean right the way up to 'A' level, and putting them on the right course and getting mostly quite reasonable results out of them. Where undoubtedly they would have failed before. And how she did it, I don't know. But she did. And she went on doing this until she was 80. Quite extraordinary. And I well remember the time when the new maths came in all of a sudden, you know. And this was a total change for her, she'd never done anything like that at all. And I bought her all the new maths books, and I actually went through them a bit with her. So that I tried to explain what the differences were and so on. And I did that. But apart from that she did it all herself. And she was teaching new maths in no time. Which was quite astonishing.

*Was she doing this when you were younger though. Did she, for instance, work with you on your maths?*

No. No. She didn't. I don't remember, quite honestly, when she started doing it. I suspect it was after I'd left home and gone to Cambridge. I think it was roundabout that time. Which would have been during the war when, of course, part time teaching was not easy to find because people were away at the war or busy in war jobs or

something. And I think she started then, which was in the 40's. Anyway, I was much closer to my mother, who - I used to play the cello in those days and she used to accompany me at the piano and so on. Whereas my father was most unmusical, totally unmusical, I think he disliked music, and it was a great love of mine. So I mean I started saying was I close to my father. And I was saying regrettably, no, I wasn't, until I grew up. Emotionally so that's to say. And when I grew up and went away from home, came back, and saw that my mother was an extremely jealous person, extremely demanding person, who was damned if she was going to let my sisters go off and get married. She demanded, she was going to keep them. And she did. She did, they never married, either of them. And she did her best to stop me having serious girlfriends too. And did her best to frighten them off. And I began to realise, after I'd been away for a bit - because I was first at Cambridge and then I went to Canada for the war effort, and came back and saw things slightly differently, and I realised my father was a saintly person actually, who had put up with this for a large part of his life with total loyalty to her. And that my siding with my mother against him which, I regret to say, I did, was really quite the wrong way round. And he died a saint in my eyes. Anyway, that's a rather long-winded and introspective answer to your question.

*You had two sisters, no brothers?*

Two sisters, no brothers. Both my sisters are now retired. But they were nurses. And the elder one became Sister Tutor at the Ratcliffe in Oxford. Whatever that is now called. I mean the job. Probably called Superintendent of Teaching or something.

*And have they been important in your life?*

And the younger one became Deputy Matron of the - in midwifery in Banbury. And the elder one still lives in Headington and the younger one still lives just outside Banbury. I'm fairly close to my elder sister. We communicate most weekends and so on, and see each other from time to time. She was somebody with whom I had a quite close relationship when we were children. And after I had learnt to play the cello I remember teaching her to play the cello, and things like that. So we used to do things

together. My younger sister who was nearly 8 years younger than I, was still very young when I went off. When I went off to Cambridge. And that was her formative period when I was away. And I never really got to know her. And I don't - I mean it sounds rather harsh to say so, but I don't really know her now. My sister knows us both. My other sister knows us both. But the eldest in the family and the youngest don't have a great deal in common. Although we look alike and we sound alike in many ways. So everybody says.

*Could you describe the house. Perhaps the one in Swansea would be the easiest to talk about?*

I can describe both. I can't describe the house in Blackburn except that it was up on a hill. The house in - I can describe the house in Rugby, which was important to me because I went back there all the time after we'd - after we'd actually left it. The house in Rugby was a biggish, ugly house on a corner. A detached house. On the corner of a street. Two streets. With a large garden and a large old garage at the bottom. Which contained the car of the day plus an ancient French car which my grandfather had brought back. He probably stole it, I don't know. Brought back from France. In the First World War. And this contained apple trees and grew vegetables and all that, and very much a part of our lives that garden was. And more about that if you want. The house in Chorley Wood, where I lived from 2 til 8, roughly speaking, was called 'Pantiles'. I went to see it recently as a matter of fact. My wife had never seen it so - I think we were coming round the M25 one day and I said "Chorley Wood is just over there, let's go and see if we can find my house. Perhaps it's not standing anymore". But it was. And it looked almost exactly the same as I remembered it. Called 'Pantiles' because it had pantiles and it still has pantiles. Set very well back from the road. With a row of poplars down one side. And a garden that descended in a series of bumps down to the road.

*And how large would it be?*

Well, it was a detached house. In those days you came into a kitchen which had a black stove in it. I'm sure it's not like that now. And it was a sort of kitchen cum

dining room I think. No, there was another dining room. And there was a sitting room and we had an upright piano in the hallway I remember. And the rooms were largish. So, it was - if you asked me how many bedrooms it was, if you include my father's study, it must have been a 4 bedroomed house. Very modest but alright.

*And in Swansea?*

Well, Swansea was a bit larger. That was on Glanmor Road, which is a steep hill, and the buses all changed gear just outside the house, which was a bit of a drawback. On the corner again of that busy road and a road called Eden Avenue. Which led onto Cwmdonkin Park, which is a place that occurs in Dylan Thomas's poetry. Where there is to this day, I presume - it was there last time I was there - a sort of commemoration tablet with a bit of one of his poems etched into it. This house was considerably higher than the road, because of a steep hill and it was terraced. A detached house again. And the garden was miles above the road. One could look over the wall and see the road a considerable distance below. We had lots of rosebeds. It was a sort of sunken garden. We found a sunken garden when we got there, which was all rosebeds. And part of this got converted into grass because we were kids. And there were always dogs and things like that. A larger back garden. No garage, we didn't have a car. Neither my father nor my mother drove.

*And did they have help in the house?*

Oh yes. Yes. In those days you know a Parson was paid £500 a year. I remember my father was paid £500 a year. And we had a - we had a living-in maid for part of the time. This was before the war of course. And - let me see - yes, my younger sister was born in - was my sister born in Swansea or was she born in Chorley Wood. I can't remember. Anyhow, when my sisters were born we had a nanny. And when my father had an operation - he had peritonitis - we had a living-in nurse. Nurse cum nanny. So, oh yes, but of course the war changed all that.

*Were these nannies actually important figures to you at all?*

No. Well yes. One was.

*Who was that then?*

The nanny we had when my younger sister was born. She was the old type of person. She forced me to eat Brussels sprouts. And I used to gag on it I remember. And I have never since been able to eat Brussels sprouts with enjoyment. Even my wife can't really get me to. It's funny these childhood reactions to things, they last a long time. Sometimes. So in that sense she was, but in no other sense. I mean no way did - they were only temporary you see. They didn't become family friends, which is something that lasts forever in many families. Nothing of that kind. No, they weren't important in that sense at all. No.

*But your mother was actively involved in bringing you up?*

Oh yes. Oh yes, certainly. Too active I now realise. But anyway ...

*And with this help did your father need to help in the house at all?*

Oh bless you, yes. Sure. Well, I mean - yes, because we weren't slave drivers and - and so, you know, the evening meals and things we would muck in, all of us. And after the war of course when the help that we had was only part time occasional, then we would all - we all did the washing up. I mean my father did the washing up. And whoever else was here did the drying up and put away. My father was an extremely untidy person. Was very vigorous, enormously vigorous, and he broke things. And he would sometimes decide that it was time that the sideboard was repainted, and he would do the most awful things. With the best will in the world, but with absolutely no sense of style whatsoever.

*And how would you describe their, perhaps I could use the phrase 'style', of child rearing?*

Well, my father was an intellectual, whatever that is. And he never pushed me. Never. But I always knew that I was expected to shine, academically speaking. That my father would be extremely disappointed if I didn't. And indeed this had not a very good effect on my sisters. Who, although not academically bad in any way at all, they did quite well, were not of that state of mind, nor as I was. They were fairly sure of the thing that they wanted to do from the beginning. They wanted to be nurses as it turned out. My sister toyed with the idea of becoming a doctor, but being a nurse was what they really wanted to do, both of them. And that's not an academic pursuit in that it's something for which you have to do academic work in order to get there, but that's all. And my father was disappointed. And they knew it. Well, that suited me, it didn't suit them, they were rather unhappy about it. My mother in no sense tried to oppose that. But she was much more the caring mum, and much too much so. I mean it was stifling actually.

*And what about their attitudes to discipline?*

Erratic. My mother would always funk the business of punishment by calling my father. My father would administer punishment, usually corporal. Well that's alright in a way, because that becomes a sort of formula, you know, and you understand that - My father also, I have to say, had what appeared to me then to be an uncontrollable temper. And I would sometimes get - beaten up is not quite right, but pretty severely chastised in a moment of temper, which I considered to be an outrageous thing for any parent to do. But he did. But I realised later in life that he was goaded into it by my mother. And he was really - what happened, I now realise was, that I unfortunately intervened, usually on the side of my mother, in a row that was going on between them, and I hadn't realised. And because I had intervened and because my father had restrained himself from hitting my mother, he hit me instead. And of course I hated my father. I remember the last time he tried to chastise me in a deliberate way. He made jokes about it many times afterwards. He found himself on the floor. I must have been about 13 at the time. It was the last time he tried to chastise me. I mean punish me. But it was much later that I realised that these bursts of temper were provoked entirely by my mother. But it had its affect on me undoubtedly.

*In what way. Do you mean bitterness or do you mean something else?*

Well, it - it - it always made me very conscious of - of my own anger, and the danger of letting it get out of hand.

*And it interests me that you had that relationship and yet you could take the positive side from your father of the academic ambitions. Or do you feel that you were self motivated in that way already?*

Well, you know, genetics must come into it. And I mean my mother was academically inclined. Not in a formal sense, but in the sense that she was always learning things. She was a great reader. And she would sit down and study something and persist at it for months. And she would try to write sometimes. She wrote awful stuff, but she did try to write. So I mean I was surrounded by intellectual activity. In the case of my mother, not of high level, but intense. In the case of my father, quite high level. But I also had it genetically of course. So it wasn't just - wasn't just seeing it going on I don't think. So I don't know. I said he never forced me on, he showed great interest, he never forced me on, he never stood over me complaining or something of the kind. I rather enjoyed coming top of the form. And mostly did. I think it might have been a very good thing if I'd had more - if I'd had to contend with more at school. It's a great shock you know to go from - it wasn't a small school and it wasn't a bad school either. My school life is a bit confused because of the war. I went to three secondary schools.

*Can I ask you one more thing about the family. Were there things that you did together which you think are significant. Holidays, leisure activities?*

Oh holidays. I mean yes, we did holidays together. With my grandparents. With my mother's parents. We spent holidays together and - My father was a great walker and I often went walking with him. And we used to talk about all sorts of things. We'd talk about politics and history and philosophy. I mean my father had books all over the place. And of course I'd read them, so I - Although he didn't actively

encourage me to read philosophy, there were always books around. And if I asked some question or other he would say "well you should look at what he has to say about it". So, you know, in my early teens I read Hobbs and Mill, Kant and so on and so forth.

*Entirely of your own interest?*

Oh yes. Oh yes. Well, interest, I mean these things came up at school. They came up, of course, not in the sense that you were expected to read the originals, but if the originals were there at home and your father says "well, you'll find it in there if you care to read it", you just did. And they provided me at a very early stage with a small room of my own that I could use as a study. And I used to retreat there and spend many hours reading.

[30:37]

*And the music you mentioned. Was that as a whole family, or with your mother only?*

Well, we were all - we all did something. My mother used to play the piano a bit and sing a bit. Apart from my father, he was, as I say, unmusical. All he could do was sing out of tune. I started off by learning the piano. And I played the piano. As far as I can remember, I've always remembered being able to read music before I could read ordinarily. So I took to it very early. Whether that is literally true or not I don't know. But it's the sensation I've always had. And certainly I was playing from music, playing the piano from music, at quite an early stage, in Chorley Wood. Certainly by the time I was 4 I was doing so. I suppose I must have been reading ordinarily by 4 or so. But, well, there we are. And when I went to Swansea I was put under a music teacher - can't remember her name now - who had the rather bad habit of pulling your fingers back. You know. Some people think you should play like that. She did anyhow, and if my fingers came like that, she would pull the fingers back like that. And so I finished playing the piano. I mean it's just a damned fool thing to do to somebody who actually is very musical as I was, and wanted to play the piano. And she absolutely switched me off, totally. So I gave it up, which is

something I've always regretted. Because it's extremely difficult to take to the piano and play it well if you haven't practiced assiduously as a child. It's to do with muscles and things. And co-ordination of course. Well, I mustn't blame her for all my deficiencies, but it put me off at crucial point anyhow. But fortunately I took to the cello when I moved to the first secondary school I went to. And there was a school cello and I borrowed it and so on, and learnt. And I became quite good at that. It's so long ago now I can say so. I became quite good at it and I played a lot. I played at Cambridge and I even played with Sadlers Wells on one extraordinary occasion, in Cambridge, when the Sadlers Wells cellist fell ill. And we did a recording of the Requiem Mass in Kings College Chapel. And I played. That was a great joy.

*Which Requiem Mass?*

The Mozart. Well, it's usually said to be by Mozart, but not very much of it's by Mozart. But anyway, it was a great joy. I don't quite remember how we got on to this subject.

*We were just talking about other aspects of the family life?*

Oh yes, well, my elder sister also played the cello. My younger sister started playing the violin and she also sang a bit, but did neither very well. But music has always meant something to us, you know. I don't think any of us could bear to be in a place where we couldn't at least hear music played. And I have quite a reasonable collection of records and things which my wife and I listen to. Which is a great solace and joy. And my sisters are the same. Indeed my mother used to listen to music a lot. In at least a passive way we are all very musical. In an active way I suppose I was the most active. But we all did something. Except my dear father.

*And obviously he was involved in the community. But were the rest of you?*

Well, my mother was involved in the local - in my father's church. Ladies Guild or whatever you called it. My sisters weren't really, but they were too young, up to wartime days. Just before the war - my father had been a pacifist. My father was a

pacifist in the First World War. And I believe only escaped by the skin of his teeth from being sent to prison for being a pacifist - because you were in those days. Something that came out, incidentally, when I was security interviewed. Yes. This is skipping a lot, but it's just an amusing little episode. You're supposed to declare all the - everything you know about your family on such an occasion. And I simply forgot. I mean I knew it of course, but it didn't seem relevant to whether or not I was a trustworthy person. And so I just didn't say. I didn't suppress it, but I just didn't think of it. And after we'd gone they started asking me questions about my father again. And I'd said, I think, that he was a pacifist. I made no bones about that. But they reminded me of this episode where he had somehow, in some ways, escaped arrest. I can't remember - it was during the First World War. By skiddadling across Regents Park or something like that. Anyhow, he was an active pacifist during the First World War. And as a Preacher in training, of course, approached pacifism. And this continued and my mother became a pacifist too under his wing I guess, because when they met her father was already at the Front. No, I'm sorry, that's wrong, he'd come back. It was after the war. It was after the war. He'd come back then. It must have been. Yes. And her brother had joined what later became the Royal Airforce. And so, you know, patriotic and all that. [I think they must have met during the war]. So she was switched by my father into pacifism. And you can imagine what happened when, just before the Second World War, they had been involved with the Peace Pledge Union and all that, and she had written a letter to Mussolini herself and got a reply what's more. I remember that. You can imagine what happened when my father came to the conclusion that although war was almost the worst thing you can conceive of, Hitler was even worse.

*When did he reach that conclusion then?*

It must have - well, he reached that conclusion roundabout the beginning of the war. I mean probably before. I can't remember precisely because it was something that didn't happen suddenly. But it blew up roundabout 1940 and became an extreme bone of contention between them, because my mother remained a pacifist throughout the war and quarrelled with my father essentially. And there was one ghastly episode when my father was preaching a sermon in his church, and my mother was up in the

gallery with the three children, myself and my two sisters, and she had told him that if he dared to say something she would walk out. And he dared to say and she did. In the gallery, wooden gallery, tramp, tramp, tramp, you know. What shame.

*What were your own political views then at that time?*

I was - I was, I guess, at least as much influenced by my grandfather, my mother's father. Who was conservative with a small 'c', most certainly. I mean these were the days when the Liberals were still strong and there was a strong Liberal tradition in my father's family. They were Liberals, my father was a Liberal. And when the Liberals sank without trace he at first became Labour, I think, but I mean he was never a Party member or anything, so he voted the way he felt like. But my grandfather once came out with the remarkable statement - I don't know whether I asked what a Communist was, or one of the other two things he mentioned - but anyhow, I asked at an early stage, I must have been 12 or 13 or something, what is a - something. And he said "Jews, nudists and Communists are all the same thing". A real sort of Uncle Matthew remark. So I think you can assume from that that he was, in spirit, a Tory. My own feelings I suppose were sort of Conservative, but I never felt any Party affiliation at all. After the war, of course, I - while I felt it was a tragedy that Churchill wasn't voted back in. My father, during the war, ceased to be an active - ceased to have his church, he resigned his position. Having by that time become very much involved in - you know - in talking to the troops and all that. He used to go round lecturing. Not conducting services for them, but lecturing. And one of the things he did, which caused a little bit of difficulty for me later on with the security people, was that immediately the Russians came into the war he thought well, alright, I don't like them, but they're our allies now, we've got to understand them and it's very important that the Army should understand them, they might actually meet them, so I'm going to learn all about Russia and teach the troops about the Russians. And he did. And of course the question was where did my father get his interests in the Soviet Union from. It was as simple as that.

*And what about religion to you as a child. Did it mean a lot then?*

Well, it meant different things at different times. This is where my parents had an influence over me which my mother wanted to have, my father really didn't. I knew that it was expected of me to be religious. It was an enormous let-down if I wasn't. And the school could be foolish about it you know. I mean they would say "you of all people", if I did something wrong. Which is an appalling thing to say, of course, to any child. And teachers of all people should know that. But it used to happen quite often. I once put sulphur on the Sunday School fire, not realising the significance quite of sulphur in - in Christian theology or whatever. And they protested, of course, to my father. And he said "I'm terribly sorry about that, but you know when he's at Sunday School he's your charge, not mine. If he put sulphur on my sitting room fire I'd know what to do about it, but I think you must handle it". Which was exactly right. No, I was very conscious that if I wasn't religious, or at least tried to seem as if I was, I would be letting the side down. And indeed it became too much eventually and I said I cannot go on with this anymore. My mother had tantrums. And my father found it extremely difficult, but accepted it once he realised I was serious. And later on said, in connection with the fact that I - well, I eventually, after I came back - I can't remember exactly when it was - after Cambridge certainly, after I came back from Canada I suppose. Yes, certainly, maybe even later than that. I said - I had been fully baptised into my father's church, by my father. You know, full immersion, being Baptist. I said "I really don't think I can stay a member of the church anymore, would you mind". And he said "it's not a question of whether I mind or not, it's a question of what you believe in and want". And I said "well, I don't - I feel that I'm pretending". And he said "look, the one thing I - I only want one promise from you, and that is if you do not feel something, do not pretend that you do". And that stayed with me for a very long time. Indeed when I went to Imperial College as Rector, the first thing I found myself having to do was to say grace before meals. And I refused. And a petition was drawn up about it, and some students came to see me and some staff spoke to me. And I took the line I don't force my lack of religion down your throats, why do you force your religion down my throat. They said "it's nothing to do with religion, it's a question of ceremony". I said "what do you mean, ceremony". They said "well, grace is a sign that we all sit down". So I said "would you be content if I read a couple of lines of Ovid or something, will that do". "Well, as long as it's in Latin, yes". So after that I said grace without any further protest, and do to this day.

[laughs] Yeah, that was difficult actually. Breaking away from – But I realised – and it was while I was in Cambridge that I realised that – that I – that I would never come to a peaceful – inwardly peaceful view of the nature of the universe as long as I tried to reconcile science and religion. I know others who have faced that problem and have found it possible, but I didn't and don't. And decided that one of them had to go.

*When do you feel that you first saw that particular conflict. Was that much earlier?*

I started to be dimly aware of it, I suppose, when I was in my early teens I suppose. But the pressure to conform in that respect was much too great. And I didn't - I didn't - I'm not conscious of actively questioning it, until wartime, when I was either in the sixth form or I had already gone to Cambridge, and there of course everybody questioned everything as a matter of course. And then I started questioning too but could not break away. It was a troubling couple of years for me. Most people go through it I suppose, one way or the other.

[End of Tape 1]

## **Tape 2 [Track 2]**

*So could I start by asking you how you became a scientist. What were the main influences do you think in making you into a scientist?*

Well, that goes back to my schooldays I suppose. I was intending to be a mathematician. This was soon before the war, of course. I was interested in physics too. Didn't much enjoy physics at school. But I was interested. And I used to read things like Jeans and Eddington. Which had just appeared in paperbacks. And was fascinated by all of that. Especially fascinated by what little of the quantum theory was revealed and such things. And I was also very interested in music and I was a very active performer, mainly cello, in those days. Bit of composition and so on too. And I was in that classical position where I was receiving contrary advice, that I should go into mathematics or I should go into music. And eventually at some stage I decided music was fine as a hobby, but I didn't want it as a profession. And then the war came and it was possible for me to do as I had wanted to do, namely go to Cambridge. If I took physics. But not to do mathematics. I could only do a year and then I would have to join the Army and all that, or do something. And this seemed to me better that I should do some sort of scientific work, so - and so I decided I would do physics. And I would do mathematics afterwards. Part II - eventually. And since what I wanted to become, in any case by this time, was a theoretical physicist, it didn't really matter which way round it was I thought. So that's what happened. And I continued my music with great pleasure. And went to Cambridge and did natural sciences. And after two years got drafted into what turned out to be the atomic energy project in Canada. And eventually came back intending to do my third year, and Part III is what I would have done I suppose. But I decided really that I was entitled to a wartime degree. And I thought I would - it would be more - it would be better for me if I continued to work at Harwell for a few years and then think about going back to Cambridge. Later on when I was a bit - you know, a bit further advanced. And that is what I did, except I never did go back to Cambridge. But years later I went to Birmingham and - with the intention of working with Peierls for a year. And then it got extended to two years and was going to do a PhD and then at the end of the two years Peierls said I'd done more work than was necessary for a PhD, which

I should have done because I was more mature anyway. So eventually I submitted for a D.Sc. and got it, so that's the history of my formal education.

*That was in 1950 to 1952 you were in Birmingham?*

That's right.

*Perhaps we could go back then to the time in Canada. Could you talk a little about what you were doing there?*

Yes, my first year approximately I was in Montreal. In my second year - and there was an overlap period when I was in both places - the second year I was in Chalk River, where the Canadian project was and the reactors were being built and so on. And in my first year I tried to live like an Englishman and was very unhappy. And my second year I lived like a Canadian and enjoyed it immensely and have loved Canada ever since. I started straight away to work on uranium assemblies, which meant rods in heavy water, but - but soon after that I got on to the spontaneous fission of U233. Because U233 was fissile material which you can breed from thorium and therefore it was an alternative route to fissionable materials. It was never used for weapons. And as far as I know never has been. And it's never been used in a Civil nuclear system either. Except in a small experimental way, as far as I'm aware. And possibly never will be. Although it could be. But at that time it looked as if it might very well be of great interest. There was Uranium 235 and there was plutonium, we knew about those things. And 233 was the third possibility and following it up. And one of the things you have to do is to look at the spontaneous fission rate of these things because neutrons were omitted in spontaneous fission and that limits the extent to which you can use them in things like weapons. So that's why I did it. And I think it was the first measurement to the spontaneous lifetime of Uranium 233, which was incredibly long, I can't remember what it was now. So I worked on things like that. I worked on neutron detection instruments of one sort or another. I was not a good experimentalist. And I was much happier when I was working out how an ionization chamber actually worked, or something of the kind, on paper, than I was actually doing it. And when I came back to Harwell I did two years continuing to do

experimental work. And the joke that is told, and it's not entirely false, was that I had built a large glass apparatus, and it took me weeks and I finally finished it, and the next morning it was shattered. And I decided that the experimental physics was not for me. And changed to theory officially. And remained so ever after. That is the - you asked me about Canada and that's what I did in Canada. I worked with Bruno Pontecorvo in Canada. He was my boss. And working in the same lab as Alan Nunn May. And just in passing, one of the curious things was that I had borrowed the phial containing the whole North American supply of Uranium 233 from May, who had been using it before. And not long afterwards May was apprehended for having passed some 233 to the Russians out of that very phial. And I'd inherited the phial and therefore was formally under suspicion, at the age of 20, for a very serious crime indeed. Which was a fairly shattering experience. The Royal Mounted Police conducted the investigation. I must say they were very kind. But it left a mark. I've never liked security ever since.

*What did you think of May and Pontecorvo as people?*

Well, May was a rather curious sort of - a bit withdrawn sort of character. I was never close to him at all. Although I was barman at his farewell party, I remember. He worked on ionization chambers and things of that sort. And undoubtedly was a good physicist. But I hardly knew him as a person at all. Pontecorvo was quite different, I knew him well. And in later years - apparently the year before he disappeared, my wife and I went on holiday with him. And it was clear that was the year during which he was making preparations for his eventual bunk the following year, because on the second occasion he retraced his steps and so on and then made a quick switch and disappeared. Anyhow, that's a different story. I mean Bruno Pontecorvo was a brilliant physicist. A very excitable character. I mean he - he was very energetic. He played tennis and he did everything and he swam, and so on and so forth. And he was full of fun and laughter and - As I say, a very good physicist. And I owe quite a lot to him. And he was a friend of course, and it was shattering when what happened, happened.

*Had he not talked about politics then?*

In - in Canada not really at all. I mean there was no secret in the fact that he was an escapee from Mussolini. That he was part Jewish. And that when he arrived in France of course he was with Joliot and others and we all knew that they were left wing, but there was nothing peculiar about that in those days. If in Europe you were anti Fascist you had to be pro something. Nobody thought anything about it. But I mean apart from that, no, he wasn't - there was very little talk of politics. But I remember in Harwell when Fuchs got arrested. Fuchs was the third person I'd worked with, he also was my boss when it happened. I have a history of working with people like that. Bruno was - well, agitated, we were all agitated. And he was saying "but is this true, this is strange". And he couldn't believe it and so on and so forth. And I don't think it was entirely an act either. It may have been, but I don't think so. I don't believe Pontecorvo was a spy at all. He's never been accused of it and I don't believe he was. I think he did something silly, probably in his French time, and hid it and almost certainly told lies about it at some time, such as when Fuchs was arrested and when a lot of people had their security vetting re-done. For obvious reasons the Americans were making a fuss about that sort of thing. And I suspect he told a few fibs at that time to protect himself against something, not realising that the best protection is to be perfectly honest in such circumstances. I'm just guessing. But having got himself into some sort of jam - his brother-in-law was the Italian Communist. And so there were family connections. So perhaps he was trying to hide that. I don't know. Anyhow, he discovered that he was in some sort of danger and did a bunk.

*What sort of a person was Fuchs?*

Oh, very different character. Almost the opposite. Introspective. I have to say now that with the benefit of hindsight of course, totalitarian. I mean he was very authoratative, over all sorts of silly things that didn't matter, and he would say how it should be done. He also was a bit of a megalomaniac. And that's not with the benefit of hindsight. I thought it at the time. That's to say if any particular interesting problem arose in the department - division, he would take it upon himself, not because he thought he was better but because he - well, not because it was interesting

especially, because he really did think that he alone could do something. I mean he did think he was better, I'm sorry. And he alone could do it. And when he was arrested his remark was "but this will totally wreck the British Atomic Energy Project". Or whatever words he used. Which also showed in his megalomania I think. Because in fact although he was - he was undoubtedly technically competent and all that, he was not a great physicist and not a great visionary and not a great anything.

*And you were able to join the Anglo Canadian programme first without any particular vetting at all?*

I don't really remember what vetting there was. I don't think there was any vetting at all. Other than what we would nowadays call 'negative vetting'. That's to say no police record. I remember being interviewed by C.P. Snow and his sidekick who calls himself William Cooper when he's a novelist, in Cambridge. And they interviewed all the budding physicists. Either for that or for radar or for something or other. And it was the first time I'd met C.P. Snow. I got to know him extremely well later on in his life. But that was for selection purposes. I don't remember any vetting procedure at all. There may have been something or other.

*Did you see yourself as part of the war effort in Canada?*

Oh, it was war effort. And I had a fair hunch because there was a branch of the Atomic Energy Programme in Cambridge. Jimmy Cassels stayed in Cambridge and I went to Canada. It was a toss-up which way round it would be. And there was sufficient gossip in Cambridge that we were working on a uranium bomb. So I had a fair hunch that that's what it was all about. And at the time I'd heard nothing about nuclear reactors. But I was particularly interested in nuclear physics and even though only a second year undergraduate I was encouraged by Norman Feather in particular, to read a bit more about nuclear physics. And most students did. And I got fascinated by it. And no doubt that was reported to C.P. Snow and co. Who paid particular attention to me because of it. But no, no, it was definitely war effort that I assumed I was being sent over on.

*And at Harwell was that war effort?*

No. That was nuclear power. No, I mean it was in Canada that we designed. 'We' - I mean the lab as a whole, designed the Canadian heavy water reactors. In some respects much as they are today. And my only role in that really was to calibrate the water level in the calandria of the NRX reactor before it started and was inside the thing, with measuring devices. But we also designed, and I was in no way involved in this, the graphite reactors. Well, Gleep and Bepo in Canada. And I think the beginnings of the... No, no, Windscale as well.

*What are Gleep and Bepo?*

Gleep was the first very low power nuclear reactor in the U.K. And it produced, ooh, I've forgotten what it was, 100 watts or something. It was later put up to some enormous figure. I can't remember. Bepo was the first bigger one, which produced a few megawatts. But it was also an experimental reactor, intended to produce neutrons that you could use for experimental purposes. And the Windscale reactors, of course, were for plutonium production, so they were serious monsters. And designed to produce as much plutonium as possible. But I mean I was aware that that's what Harwell was all about, while I was still in Canada.

*And then you went back to Harwell. And what was the focus in the first four years of what you were doing there?*

Well, the first two years, as I say, I was struggling to do experimental work. And I realised one day that it was possible to do the photodisintegration of deuterium by looking at the - by using the proton to - by putting the heavy hydrogen inside an ionization chamber. And seeing the proton. And doing it that way. And I had to design and build a suitable instrument to do it in. And I devoted a lot of time to that. And it was - I finally gave it up because the techniques we were doing it with I found too difficult.

*But this was basic nuclear physics?*

This was basic nuclear physics. And I did a few other things too, like measuring the cross section of Helium 3. But it was basic nuclear physics. Of some interest to the nuclear programme, but not very closely connected with it. And then after two years, as I said, for various reasons I convinced myself I wasn't going to be a good experimenter and I turned theorist and stayed that ever since. And after a couple of years they took pity on me and sent me to work with Peierls for a year, and it turned out to be two years, and I came back and shortly afterwards became Head of Theoretical Physics Division.

*So the crucial period of research in your life was during those years. 1948 to 1952, would you say?*

Well, starting in a necessarily somewhat amateur way, in '48 yes. And I got going on my shell model work while still in Harwell. But not quite knowing where it was going to get to. And when I went to Birmingham I started it with gusto and Peierls didn't give me very much encouragement to do it, because he didn't see the point, saying that a shell model wasn't possible for a nucleus because of strong interactions, which everybody who understood things properly said at the time, "Vickie not having got into the act yet". [i.e. Victor Weisskopf]. But I started producing results. And Peierls, when faced with the results, is quite different. Peierls faced with an unlikely proposition. And was, of course, exceedingly helpful. And so I started my shell model work which was my serious contribution to the development of nuclear physics there. And continued it for - well, quite a number of years. I continued it while I was Head of the Theoretical Physics Division, although not able to devote all my time to it. But I suppose I devoted half my time with it. And it was there that I worked with Phil Elliott. I'm sure he did all the donkey-work. I mean that's putting it at its minimum. He did a lot more than donkey-work while he was working with me. Worked with me for, I don't know, a couple of years I suppose. And we did the first big computer calculations of nuclear structure. And then he went off and did his SU3 stuff, which you know all about. Which was entirely himself of course. And then

when I went to Manchester I also continued to do some further studies of particular nuclei.

*I was wondering whether you could explain to a layman what you see as the crucial things that you worked out or discovered?*

Well, I would say that - two things really. Other people working on both of these things - it was a very vigorous time when people were first beginning to see how nuclei appeared to work. At least in a rough and ready way. And so lots of people were interested, of course, all over the world. And I don't think I ever published a paper that wasn't published by somebody else at almost exactly the same time, either slightly before or slightly afterwards. The two things were to see how to do calculations which reproduced remarkably well what the structure of atomic nuclei was. That is to say, what the various energy states were and what their properties were. On the one hand. And the other thing that was very interesting was that it became clear that certain nuclei behaved in different ways from others, it seemed at first sight. Some behaved as if they consisted of only a very few particles that mattered. And that you could calculate their properties by assuming there were only two or three particles in it, even though you knew there were many more. And some behaved as if there weren't any free particle motions at all. But the thing was a sort of a globular object which oscillated and vibrated and did odd things like that. And it seemed to be as if there were two kinds of nuclei, which was very alarming. And I helped to - to show that it was possible to have both kinds of motion in the same system and to understand the one in terms of the other, if you went about it the right way. Many people were involved in both of those things. And I had a few firsts and other people had a few firsts in doing this.

*This is your main scientific contribution?*

Oh yes. Undoubtedly. That I suppose - I didn't mention specifically, though could have done, that as an essential technique for the way we went around the work that we did, there was the introduction of group theory into nuclear structure calculations. And that enabled one to simplify the calculations very considerably. And to

understand what was going on much more easily. And that was something which other people had done too, but I happened to pick the right groups, I think, for the purpose. And I mean later on in exactly the same vein, of course Phil Elliott discovered the significance of the SU3 group, for understanding these collective motions. Which was extremely clever of him. So there was a lot of interesting group theory at the time. And that suited my essentially mathematical inclinations. It suited me very well.

*Was Peierls actually an influence on your work?*

Peierls was a very great influence on my general attitudes to scientific things, yes. He contributed very little to my actual problems.

*Can you explain his general influence and what sort of person he was?*

He would always insist upon getting down to the bottom of things. He was not happy with sloppy arguments. This was the problem I had with him working out the shell model when it seemed to be entirely the wrong approach to things, at the beginning. He was a fine teacher. He ran an old fashioned school. I, who hadn't been through the proper procedures, doing a PhD and all that, benefitted enormously, though belatedly, from the discipline of the Professor's seminar and all that. And he ran a proper German style Professor's seminar. Which you were supposed to get up in front of the whole department and explain in one hour, or it might go on for longer, what you were doing and why and where it was getting you, and so on. And everybody would criticise. And that was the sort of - it was really my first introduction to the really rigorous academic atmosphere.

*Were any of the people in your division at Harwell important in your own work?*

Some of whom were important to me. I mean Tony Lane had, in fact, done first - if I may call it 'modern'. I mean modern for me. Nuclear structure calculation with lithium 6 and lithium 7. A particularly easy case as one would see later. And had not got many results because there weren't many results to get. They could be checked

with the experiment, but what he got was obviously very significant. And what Phil and I did was to show that you could go to much more complicated systems and get similar results, and more of them because there was more information and all that. And use big computers, or what seemed big computers in those days. And really get results that put beyond any doubt the fact that we were doing something right even if we didn't understand why. So Tony Lane was a very important influence on the whole thing. But I mean there were other good people there too. John Bell was there.

*Can you describe some of these people. John Bell, Tony Lane, Walter Marshall?*

Walter Marshall. Yes, I taught Walter Marshall a bit in Birmingham, because he was a student in Birmingham when I was there. And I taught the quantum mechanics course which he attended. Walter was a very modest chap in those days. You wouldn't think so now. He was obviously good. But not obviously brilliant in the rather superficial way in which that word is used. But he turned out to be exceedingly good. And after an initial period of thinking he wasn't suited to research at all and trying to persuade the powers to let him stop. He was persuaded not to and finished his PhD in double quick time and got going into a number of quite important problems. And started what turned out to be his scientific career on neutron scattering by magnetic materials, and made a very considerable name for himself. He was very good. And he came to Harwell while I was Head of the Division. And it was clear when I left that the person who ought to be my successor was Walter Marshall. But he was simply too young. He really was too young. And it was generally understood that Mick Lomer, who actually succeeded me, should after a few years if things went on that way, contrive to hand it over to Walter Marshall, which is indeed what happened, as Mick went off to head a different division. The name of which I can't remember now.

*Mick Lomer?*

Oh, he was very good, but Walter was obviously exceptional. And it turned out to be so. John Bell was there. And John Bell's interests in those days - or rather his job in those days, was accelerator design. He worked with the contingent which had come

from Malvern. Because one was using waveguide technology and things like that, but were appropriate to radar. And it was just the thing we needed for thinking about accelerators. So he started in that way. But because we had - at least when I became Head of the Division - we started having a weekly seminar, the Professor's Seminars started in Harwell. And we used to meet for coffee every morning and that sort of thing. And ran it on very academic lines. And John Bell very soon started getting interested in problems which seemed philosophical at the time, rather than anything else. And although I didn't recognise where he was going to go to, he possibly did. But this sort of fascination with the most fundamental of questions in physics gradually developing. And of course he went to CERN and then it really started to get going. But he would look at you with piercing eyes and ask you about logical positivism or something. But would discuss a physical problem that somebody else was working on in a similarly piercing way, going for some fundamental point and not the frills. So he showed his - his capabilities and interests. The strangest person was undoubtedly Tony Skyrme. I mean there was no question that he was the cleverest amongst us. There was also no question that he could not explain what it was he was doing. Sometimes he could, because actually he was quite good at working at very mundane problems. And there are a number of experimentalists who will still remember Tony Skyrme sorting out some extremely mundane problem for them that had arisen in making corrections for the shape of the detector or something of the kind. And he was very willing to do that sort of thing. But he worked on quite a number of important problems which he simply suppressed. I mean he did his version of relativistic electrodynamics at the same time as Schwinger and so on. From quite a different standpoint. And simply put it in a drawer. And after I'd become Head of the Division and was getting to know people, I discovered that there was a drawer - how I found out I don't know, somebody must have told me - he had a whole drawer full of unpublished papers. And I persuaded him to publish some of these. And we had - I think it was Peierls who persuaded the Royal Society to publish his electrodynamics paper, in spite of the fact it was many years late - if I remember correctly. But of course later on he was working on this quite impossible business of generating fermions out of bosons.

*He told me about it in 1961 and I thought he was crazy?*

Everybody thought it was crazy. It was totally incomprehensible. He could not explain himself. And yet he was doing something that, whether it's right or wrong, was certainly possible. And in any case very significant because it now gives ideas about how one might handle things. And I don't think there's much doubt that if history had been a little bit different he would have been one of the names to be reckoned with. As it is, people are recognising him. But they started recognising him before it was posthumous because he got the Royal Medal of the Royal Society, which is very nice, but he never got elected in the Royal Society, there just wasn't time before he died. Yes, he was strange, and he was a difficult man to deal with. He felt himself to be a better physicist than anyone else in the division. And he undoubtedly was. It's just that one didn't understand him.

*It must have been very exciting to have been at Harwell. What did people feel they were doing there?*

Well, I think we felt, and I think we had justification for feeling, that we and one or two other places were really the revival of British physics after the war. Unlike the Americans, those who had joined the war effort - I mean Charles Frank and lots and lots of other people - after the war went back to their Universities with a great sigh of relief and got on with whatever they were doing before, in circumstances that were not conducive to a major scientific effort. And really only at Harwell and one or two other places in our fields, was an effort of sufficient size mounted to be competitive in any sense with the different way that things had gone in the States. The National Laboratories created for wartime effort remained as the main centres for a time, on American scientific effort. And Harwell was like that. And so we felt, all of us, that we were doing something that simply wasn't possible in the Universities anymore. But that was something that in a vague sort of way influenced me in not going back to Cambridge, incidentally, right at the beginning. I had that feeling. We all did. I don't think there's any doubt that although there was an awful lot of jealousy between those who had gone back to University. Philip Dee in Glasgow was perhaps the worst from this point of view. A lot of jealousy, a lot of back-biting. Unfairness, Harwell gets it all. We can't even afford a second oscilloscope, but they've got a dozen. And that

sort of talk. And nevertheless I'm in no doubt that things would not have got going as rapidly as they had, had we not had Harwell at that time.

*So you saw yourself as a scientific centre, not as a centre of work on specific problems?*

Well, both. But you have to remember if you cast your mind back to 1946, which is when I'm talking about, the beginning of Harwell. But that was the biggest problem around. And that most other fundamental problems – I mean like – well, and all that, was because of the time which it was discovered and the people who discovered it and the part that they played, either immediately afterwards or immediately before or simultaneously with the atomic energy programme, it all seemed part of the same parcel. Anything to do with nuclear physics was - I mean the task of Harwell's remit was to explore all aspects of atomic energy. And undoubtedly we gave the impression, as the Americans did, that high energy physics was part of the atomic energy programme. And there was some justification for feeling we'd got an unfair advantage there, which lasted for many years. Because high energy physics, which is so far of no use to anyone, was undoubtedly mounted on the back of something that was useful, and not entirely honestly. Although not with any evil intent. A case was made for it that wasn't really correct. And it took many years to change. So we really did feel that anything of great interest in physics, or things related to physics, something that we legitimately took an interest in, obviously we could legitimately take an interest in the whole of solid state physics, because as it turned out pretty soon, reactors depended more upon the properties of materials, especially fuel elements, than upon nuclear physics. And so this justified an enormous effort in solid state physics. And we went into things in a very fundamental way just as we had done in nuclear physics. And of course the whole fusion business started in the same sort of spirit. So almost anything in physics was - you could justify. And we did justify doing it. So it really was where things were happening most. And other people who were very active in University departments quite naturally gravitated, or at any rate visited, Harwell. We always had visitors there. We had summer visitors. We created a scheme of summer visiting fellowships and things. And it was a big academically significant effort. Enormous excitement and no holds barred.

*And your position was really like the Professor or a Head of Department. Or did you have another role as well?*

Well, in an academic way I was the equivalent, I suppose, of the Professor of Theoretical Physics in the University. It was a pretty big department compared with a University department. But it was that sort of a role, yes. But I also had a role which one would describe nowadays by saying that I was on the management board of the laboratory. And as such I was involved in all sorts of issues that were not theoretical physics. I mean in the reactor programme. My division, I may say, was responsible for the theoretical work on reactor calculations. All the basic things. We didn't do all the practical calculations for the Calderhall reactors or something. But what we did do was to establish methods by which these calculations were done. And so that - that made it necessary for us to know what was going on in the reactor programme, to see what sort of problems we should be working on. All aspects of it. So it wasn't all purely theoretically motivated work. Much of it arose out of practical need. And to that extent I was deeply involved in the atomic energy programme as a whole. And at that time I became a member of some group. I don't know what it was called. But it had the barons of atomic energy on it, John Cockcroft, Bill Penney and Christopher Hinton and suchlike characters, and a few bright young things of which I was one. There were one or two from each of the establishments. And we used to visit each other's establishment to see what was going on. And see whether we could co-ordinate some of the basic scientific work and - and, you know, get each other to solve each other's problems. That sort of thing. So I was very much involved in the scientific planning, one would say nowadays, but it was very loose, of the whole of the atomic energy programme. But the more basic scientific parts of it, that is to say.

*What sort of people were Cockcroft, Hinton and Penney. What did you think of them?*

They were very different kinds of people. Christopher Hinton was an absolutely...

### **Tape 3 [Track 3]**

[Christopher Hinton] was a brilliant engineer, who knew how to make things. Make factories. And get them going on time. And of course he built Risley and he built Windscale, brilliantly well. And he was a marvellous man. Intolerant of anyone who didn't share his views. I adored him I may say. Bill Penney one got to know less. Simply because he was in charge of the weapons programme and so one couldn't be quite so free and easy. Nevertheless, I remember we had a - we all of us went down to Aldemaston once to look at some of the basic stuff going on there. And we had a barbeque in his garden, of which G.I. Taylor and he were the cooks. G.I. got tangled up in this somehow or other. And I think he just turned up as a guest. And - well, he was - he was bluff. He was never really interested in modern physics. He was a classical physicist. He was interested in hydrodynamics and aerodynamics, things like that. And that's how he got involved in all of this. A bluff, cheerful man. Who I think probably would have been happier later on in life if he hadn't have been involved in all of this. Anyway, that is - that was much later on. Cockcroft, quite a different sort of character. There he is on my wall. He was a sort of - father figure - avuncular figure to me. He was very good and very kind towards younger, brighter people. I mean I was by no means the only one. He somehow had some way of spotting who were the people who were likely to come on, at a very early stage, and help them. He'd been a professor in Cambridge. He taught. He was an engineer by training, turned physicist. But he was always exceptionally good towards young people and I owe him a very considerable debt undoubtedly. Without him I wouldn't have got on. I suppose I wouldn't be sitting here talking to you probably without him. He was a visionary in the sense that he saw how things were going. He saw the potential of all these things. What he never saw, at least revealed, if he did see it, how big an effort it was going to take. How much it was going to cost and so on. I mean he used to talk about Harwell ultimately having perhaps 500 staff. And we would have a cyclotron and one or two little things. And of course people used to use this against him, sometimes as a joke, sometimes more seriously.

*You had how many in your department in fact?*

Well, I must have had about 50 equivalent to academic staff, I suppose. I mean that's a fair sized department for theoretical physics.

50?

Mmm, something like that. That includes people who were running the computer centre. Which provided work for the whole of Harwell and so on. It was something like that. So I mean Cockcroft, the avuncular figure as far as I was concerned. And I kept up with him right to the end of his life. Quite closely.

*I was wondering, in fact, whether this idea of a big department was something that you kept later with work, for instance, with the Science Research Council?*

Well, there is no doubt, at all, that working in the Atomic Energy Authority, as it eventually became, had a very significant effect on all of us who had that experience for any length of time. It gave us a totally different attitude towards how to do things, on a big scale. It - I would - I don't think I would ever have had the interest of being part of a project unless I'd been at Harwell. It's perfectly true, I was working on fundamental problems mostly nuclear structure and things in my own work. And I was very conscious of the effort of my division was very much part of this mighty project, and had to fit in with it and had to be responsive to it and had to be helpful to it, and so on. And that's something I wouldn't have got, I believe, from being in a - in a University department. And I think it's something that makes Universities intrinsically weak. There are other things that make them intrinsically strong. I mean the fact that you can follow your own nose for no reason other than your own curiosity, and that is the correct thing to do. But that does lead to a weakness as well. It's more difficult to get a co-ordinated effort onto something and make a definite breakthrough. It's more difficult to organise. It's more natural to organise it at a Harwell-like environment. And quite unjustified with most problems, of course, because they're not as big as that. But it did give us all who were involved in it a different attitude towards doing science. And many of us got involved in - naturally, into the bigger scientific efforts like what became CERN..... sprang out, very largely, of efforts like Harwell, in the various countries concerned. And were very much

influenced by the way things were organised at least at the beginning. And likewise those of us who later left and went into Universities or went into businesses or went into anything, carried many of the things that we had picked up and grown to like, grown to regard as natural, and put them into action in new environments. So - And certainly when I eventually went off to Manchester as a Professor, my attitude to physics was very much influenced by what I had done at Harwell.

*When you were at Harwell the whole atmosphere was one of excellence and getting the last job done. Were people then worried about the cost of the job.*

Tremendous excitement too. No - You must remember that - that - let me start again. I started this business at the age of slightly under 20. And I became Head of the Theoretical Physics Division of Harwell at the age of 28. And it was enormous excitement, tremendous pace, you got swept along by the excitement of it all. What is more, it was the war effort for the early part, and it was a great national priority immediately thereafter and really, to be frank about it, it was still the war effort. And one doesn't question the war effort. At least one doesn't at that sort of age. When one actually isn't responsible for the overall financing of it, and none of us really were. And we would have been, no doubt, had Cockcroft himself been conscious of what things cost, but he wasn't. I don't think he - he always assumed, looking back at it, he must have assumed, that whatever it cost, however many people it took and so on, they would be found. That's the way he behaved. And I'm sure that that is - I mean I knew him well enough now to be able to say I'm sure that he assumed that whatever he wanted would be found. And indeed it was so. So the idea of cost really didn't enter into it at Harwell. It must have done elsewhere because Hinton was already talking about - about being more efficient to do things at Risley than to have them done at Harwell and so on. That was not just irritation that it was something not under his direct control. I think it also was recognition that Harwell was a pretty expensive overhead to pay for the few things that he wanted from it. But it wasn't expressed in the modern day terms at all. But when Cockcroft stepped down as Director and Basil Schonland took his place, it had a profound effect. Because whereas you went into Cockcroft's office saying "I've had an idea, wouldn't it be nice if we could do so and so". Cockcroft said "don't quite understand what you're talking

about". Went to the blackboard with you. After half an hour's spirited conversation about it, at the end of which he'd say "OK, go and do it, that's fine". And you'd say "well yes, but this is going to cost something and we shall need some more people", and so on. He'd say "well, I don't know about that, you'll have to talk to Schonland about that. But you go ahead and do it". And you went away not knowing how the hell you were going to do it, but you'd got the great man's blessing. When Schonland took over - you should never appoint a deputy to run the show, to succeed the boss, it's a very bad thing to do. Deputies should always be there to hold their bosses back. They should never, never succeed. Anyway, he did succeed. And it was quite different. You went into him and he said "before you say a word, you can't have anymore money or anymore staff, now what do you want". So I left. And so did several people including Cottrell and Finniston.

*So that was in 1958 he succeeded?*

Well, I suppose he succeeded in '57 or something like that. I can't remember quite the dates. But within quite a short time some of us, the more visionary ones amongst us I suppose you would say, left because the climate was no longer conducive - and anyway the Universities were beginning to expand and - and opportunities and so on and so forth, and it all fitted in. But the change took place round about then in my view. And it would not be right, of course, as I have done to pin it on the personalities of Cockcroft and Schonland. I mean they were chosen for good reasons. And to represent the sort of feelings that were around no doubt. But it was round about then that the more realistic attitudes started to arrive and people started to talk about cost. But you know even quite a few years later the expensive - expensiveness of our activities was still very noticeable. Denys Wilkinson and I wrote a paper for the - I can't quite remember whether it was the Nuclear Physics Committee of DSIR or the Nuclear Physics Board of SRC, because one became the other in a very short period of time. But it was one or the other. At which we more or less, but quite seriously, predicted global disaster if the budget for the Nuclear Physics Board - this didn't include Harwell of course - ever rose at less than twenty percent per annum. I mean something one now regards as absolutely stupid. But that was a reflection of how things seemed in those days. And that must have been in the early 60's. But then

the expensiveness was in the Universities and Harwell was beginning to get pulled back. And we were talking about what Harwell should become in the future. And I remember writing a paper while I was Head of the Theoretical Physics Division, which was roundly sat upon, which proposed that Harwell should - after all it was the nearest we had to MIT and that sort of thing - why didn't we deliberately make it into a University, a post graduate University of science and technology. That paper must still exist somewhere. And it was discussed. Of course it was rejected. But not much later NIRNS was formed and that became the Rutherford Laboratory and that at least was something like what I had been talking about. And I suspect in the next few years Harwell is going to go down and the Rutherford Laboratory is going to be maintained. If not, take over, perhaps, some of the things that Harwell does. But I'm not saying that to illustrate my foresight, but merely to illustrate the fact that we were talking of changes that were going to happen, even in - well, that must have been in '56 or '57 I suppose.

*If we jump a few years, you were in contact with the Atomic Energy Authorities  
[inaud]*

Well, I mean there are two kinds of answer I can give to that. And they're quite different. It is true that before I left even - this adds to what I was saying before - we were beginning to get a bit concerned about the number of reactor types we were considering. We had the liquid metal cooled reactor and this, that and the other. We had about 6 different reactor types under study, of one sort or another. And it was obvious we couldn't go on with that for very much longer. You could do preliminary studies to see which were the promising types, but you couldn't get it very much further, or else you'd run into all sorts - I mean it would have been an impossible programme. That was also the beginning of the feeling that there had to be a limit somewhere. And that again was roundabout, I suppose, '57 or thereabouts. And Monty Finniston was at the centre of proposing some of these more metallurgically inclined devices, so he was there. So it must have been roundabout then. So there was the sense that we had to concentrate on a few things, even then, although we hadn't done it. But of course it was much later when I - when I started wondering

about fundamentals in all this, and this becomes - this takes me on much later to the Royal Commission. I'll talk about that if you like.

*Yes please?*

But it leaves quite a gap in-between.

*That is 1973 to '6. You were Chairman of the Royal Commission of Environmental Pollution?*

Well, how do I skip to then. Well, I think fairly easily like this. At some point or other I became a member of the Atomic Energy Authority. And as such was responsible for discussing the overall activities and so on. And - I'm very bad at dates, so you'll have to look them up in 'Who's Who' or somewhere. I had, in the meantime, become Chairman of the Science Research Council, as it then was called. And as such I got consulted about all sorts of things that were not my strict business. Like who would you ask to chair some committee or other, or something. And one day it was towards the end of my time at SRC, so it must have been in '72, I was told that Ashby, who was the first Chairman of the Royal Commission, was standing down or his appointment was over, and who would I suggest to take his place. And - I had a talk with somebody or other about that, a man from Whitehall, [John Jukes actually] and we talked about it and I said for some reason or other "and there's me too, I might be interested". I said it almost as a joke. But it is true that I had got interested in various environmental things. And this is the period - end of Harwell, and my period in Manchester got me interested in certain environmental things. The first, I suppose, was the proposal to build a high flux reactor. High density rather. High density, heavy water reactor, in the Thames Valley. And Boris Davison, who was - who ran the Nuclear Reactor Calculations Group in my division, got really worked up about this and I said "would you work it out for me". And we sat down and worked out what could happen. And we discovered - we discovered Chernobyl essentially.

*Wasn't the high flux reactor something like the one now operating in Grenoble?*

Well, Grenoble is sophisticated. This is a modern thing, but it would have been that sort of a thing.

*And when is this we are talking about?*

We're talking about - well, must be '56. '55 perhaps. Might even have been a bit earlier, might even have been '54. I can't remember quite what this was called either, the particular project. [Hippo]. It's written up in the records. Anyhow, we stopped it. We weren't very popular for doing so. But that was my first interest at all really, except that I had been interested in problems of radiation. I was interested in the - in the physics and, I suppose, the bio-physics of radiation and I had been handling radium. And we all were interested in everything in those days. So - I got a bit interested in that. But that was really the first thing. And then in Manchester there was an opportunity for setting up getting people going on - I managed to persuade people to start up a pollution studies unit in the University of Manchester. I was surrounded by pollution in Manchester. And I really thought that something should be done about studying it seriously. And we got that going after a while. So my mind was open to this and then at SRC there were a number of projects in Universities that touched on this and I'd helped to push along, and I'd managed to get all the five Research Councils to launch - to agree to a common committee, an inter-research council, the first ever, on pollution problems. So my mind was attuned to that. And that I suppose is why I said I might like to do it. And they went off and cogitated about that, and decided that I should, and invited me to do it, so I did. So that brings us up to '73 I think, which is when my Chairmanship actually started. And - we didn't quite know what we were going to do. We had worked on general survey of environmental scene the first year. And then decided that we wanted to look at the hazards of radiation really. That's all we were intending to look at. Because we weren't entirely satisfied that the National Radiological Protection Board was really doing its job properly. It had been captured by the Nuclear Power Programme, you could argue. Anyhow, we thought there was a legitimate doubt. And that's all we were going to look at. And the same time, I may say, having engaged upon that, the government asked us - we could choose what we did in the Royal Commission, but we had to do anything we were asked to do as well - and the government asked us to

do a study of air pollution control. And so I found myself running two Royal Commissions simultaneously. Something I do not recommend. I mean it was only one Royal Commission, but there was two lots of people. And the radioactivity thing, it rapidly became clear that we couldn't discuss it except in its entirety, and gradually it became - what it ended up as. Now it all went fine and we had a splendid time, except we got distinctly worried about the way certain things were done. We became extremely unhappy I shall never forget, going round Windscale seeing the arrangements for safeguarding - I don't mean in the security sense, I mean - I mean National security - I mean the physical security sense - safeguarding plutonium, in a way that nuclear wastes were handled, and things like that. We just thought it was a sloppily managed plant. Dirty. And we didn't believe you could safeguard things to the extent required unless it was all clean. And you could see where things were wrong. So we became very worried about the management of some of the activities. We also confirmed our worst impressions that although the various control agencies were undoubtedly doing a good technical job, they were also undoubtedly over-influenced, unwittingly, by the fact that they lived cheek and jowl by, and were inherited from, various parts of the nuclear power programme itself. And this introduced, in our view, the possibility of a bias. If not an actual bias. And so all of that. And then we were in the process of writing our report. Let me say I realised at the stage where we were sitting down to decide what we were going to say, that I had a conflict of interest problem, which I didn't realise when I started it, because it started in a much more modest way, I didn't realise I was going to have it. But it was clear that I was going to. And so I went to the Chairman of the Atomic Energy Authority, who was John Hill at the time. And said "look, I think I may have a conflict of interest problem, but I think we may say some things which you won't like". And he said - and we discussed the problem - and it became clear that if at the beginning of writing my report and not knowing yet really what I was going to say, I were to resign, that would convey the worst possible message at the very point when I - couldn't say what we were going to say, didn't even know really. So that didn't seem a tolerable thing. On the other hand I could not be bound by my membership of the Atomic Energy Authority as Chairman of the Royal Commission. It just wasn't on. So he simply said "well, look, we trust you not to say anything unjustifiable anyway". "So let's just leave it and see what happens". Which I did. And it was alright until

we really finalised what we were going to say. And some people have never understood. But we said there shouldn't be a large expansion of the nuclear power programme until the problem of nuclear waste disposal had been solved, in principle. And we also said and the fast reactor programme in particular shouldn't go ahead until those had been done. And in any case we were not satisfied yet that the safety of the fast reactor could be stated in the same terms as that of an ordinary reactor. Something which was factually correct. Now people some have never understood why we put so much emphasis on the fast reactor, which after all never came to pass and probably never will. The fact was that it was the most popular thing and to the Atomic Energy Authority was rapidly becoming the only thing that justified it. And - we may have given the impression, and we undoubtedly did to some people, that we thought that there was a particular waste problem associated with the fast reactor. If anything, since the fast reactor is capable of eating plutonium there's less of a waste problem with a fast reactor than otherwise. And we knew that of course. It was the biggest lever we had to force the government to take seriously our very serious concern about the fact that the problems of nuclear waste had not been solved in principle. And we used it for that reason. We didn't say anything illegitimate, but we did dress it up a bit to make it look as if we were saying "and until you've done that, no fast reactor". And that caused a hell of a fuss, of course. But the thing I wanted to say is since this is something to do with my role in this, is that for perhaps the only time in my life, certainly the first time in my life, I experienced what it was to agonise about something. Because I realised something like six months before the report actually appeared, that I was going to seem a traitor to those I had worked with all my life. To whom I indeed owed everything I'd got pretty well. And that they would see it like that. And quite a lot of them did, of course. And that was dreadful. It really was an awful period to go through. And I don't know whether you've seen the portrait of me that was painted by Kyffin Williams. It was painted of me - well, I had seen him at just that time, because one of the members of my working party was the Marchioness of Anglesey, on whose estate Kyffin lives. And we went up to Anglesey, and I stayed at Plas Newydd and Kyffin came to dinner. And he decided he wanted to paint me. And I decided I wanted to be painted by him, but we didn't say anything to each other. And he first met me therefore when I was agonising about this bloody report. Anyhow, five years later when all that was past and done with and

I was an acceptable member of society again, Imperial College, because I was about to leave, wanted to have my portrait painted. And they said "who would you like". I said Kyffin. So I went up and he painted me. And he looked at me for ten minutes and he said "you don't look like you". Which wasn't a very propitious beginning for a portrait. And he had seen me several times in between. But then he produced this picture and it's, in my opinion, a marvellous painting. Absolutely superb. But what he did was, paint me as I was, as far as my clothes are concerned, or what he saw in front of him, but the look on my face is the look that he remembered when he first met me five years before. I was perfectly cheerful that day. But that's not what came out. And this was when he almost destroyed the painting, because it didn't look like me, he said. But he had made it look like what he had remembered. It's a nice little story of - of what influences a portrait painter. Anyhow, I don't know quite how we got onto that subject.

[31:30]

The transcripts for the rest of track 3 and tracks 4 and 5 are not yet available.

**Track 4 [tape 3A and 3B]**

To follow

**Track 5 [tape 3C]**

To follow

**Track 6 [tape 4A]**

*15<sup>th</sup> December 1988.*

*Perhaps it would be a good idea to start by talking about your wife's family and background?*

Yes, all right. Are we rolling? Well, I think I mentioned before that my wife and I got married in the - Registrars Office in Birmingham. Now pulled down. And lived together for one year in a large house containing flats. Now pulled down. In Edgbaston in Birmingham. No trace of our early life together therefore. I inherited, if that's the right word to use, two delightful stepsons, who were roundabout the age of 6 and 8 at the time. I had known them for some years before, of course, and - well, I mean to cut many years out, their relationship with their father is of a rather remote - fond, avuncular kind. Because I have played essentially the parental role since that time. A few awkwardnesses at the beginning, as always happens in these things, which are - regrettable, but unavoidable. And - he lives in California, it's a long way away, and they lived with us and, of course, went away to school to start with. But then when we went back to Harwell, which was shortly after Birmingham, they shortly after that went to Magdalene College School in Oxford, which was near to having them where we were living. And then when we went up to Manchester, the boys now were getting considerably older of course, were able to go to Manchester Grammar School which, well, anybody who has the opportunity to send their children to Manchester Grammar School is very lucky and should do so. And so they had that good fortune. The only thing that I would particularly refer to has something to do with the quality of teaching, even in - a good school. I discovered - I had mumps - I can't remember precisely what year it was. It was very painful, I was about 32, so you could work out roughly when it was from that. And it was a very painful experience I can assure you. And I had to stay in bed and the children had to be quarantined. And - I discovered that Peter, the elder boy, for whom it was getting serious, simply did not understand mathematics at all. Not at all. If you mixed two bags of tea at two different prices a pound, what is the price of the product, and so on and so forth. Didn't know whether to add up, subtract, divide, multiply or whatever. Not a clue. And it was manifest that he had been subjected to the most appalling mathematical

teaching. And, well, I spent our quarantine teaching him the elements of mathematics, and I'm delighted to say a few years later he won a major mathematics scholarship to Cambridge. And, well, is now Professor of Computing Science in Penn. Where he is highly reliant upon mathematics. Where he occasionally gets his own back on me when I get stuck with some problem.

*Where did you say he was Professor?*

At the University of Pennsylvania. In computing. So that was him. And he married eventually an American girl, who is a Professor of English at Temple University, which is in Philadelphia also. They met in Edinburgh where he was working at the time and where she was on leave. And they married and have lived happily ever after. So that's them settled. The younger one, Micky, who is 2 years younger - they're both in their forties now -

*How old were they when you first got to know them?*

Oh, about 4 and 6. Or something like that.

*Very small anyway?*

Yes, yes. Yes. I don't suppose they remember meeting me for the first time, I'm sure they don't. The elder one might if he thought hard enough about it I suppose. The younger one got married to a Cornish girl. They had - they have two children. Unfortunately, their marriage has broken up about 18 months ago. They were both living together with the family in Darien, Connecticut, because he - in international finance, he started off in merchant banking, and then went into - into international finance. And their marriage split up, he moved to Paris, where he is setting up a branch of Moodys in France. And his wife has moved with her new chap to Brussels. The grandchildren are at school near Banbury, at a Quaker school, near Banbury, because it looks after people as persons, and that is what they needed after that break-up. And we are very active grandparents as a result. Having thought we'd got rid of all that years and years and years ago we suddenly find the parental role thrust upon

us in our dotage. And it's not as easy as it seemed the first time round. However, we enjoy it of course and - and wouldn't be without them. So - that's all of that - really. My wife is a very - strong support to me and always has been. I'm sure that all our friends say, behind our backs, if not in front of them sometimes, that without her I would never have got anywhere. And I would be the first to admit that that is true. That doesn't mean that she's pushy and ambitious, not at all. Not at all, she never has been. But she's a tremendous support. And knows my weaknesses and knows how to support me where I need it. And I will get hurt behind the scenes, you know, by things that go on, and we mustn't show it. And she knows all about that sort of thing and how to cope with it. Her parents - her father was in the rag trade in Manchester. That is to say he - he ran a business which had been started by his grandfather.

*He was Sir Leonard Behrens?*

Sir Leonard Behrens, yes that's right. And he was, for his allotted period of whatever it was, a couple of years, President of the Liberal Party. And so he was, and still is, extremely well known amongst dyed in the wool Liberals. And - well then he died and his widow came to live with us, at Imperial College, for the last few years of her life. And she lasted rather less than a year in fact. She was very old. She was 92, I think, when she died. And they were a great old pair.

*Was he a sort of influence in your life then?*

No. No. He possibly convinced me, if I had needed convincing, that I didn't want to be a Liberal. I don't mean that in any unkind way actually. He did not understand, and I found that most of his Liberal colleagues did not understand, that real politics consists of doing things, not just talking about them. And - they were - they were and I think are, still, most of them, because they have never been in government, I mean it's so long ago now that the Liberals were in government. They've not even been sensibly in opposition except for a very short period of the Lib/Lab pact. And they just are not realistic about the process of being in power. Or - or being in a position where you have to be decisive and influence things. They can talk about electioneering and they can talk endlessly about the philosophy of this, that and the

other. But it's all - somehow or other it's all - it's not really connected with this world. This is how it always seems to me at any rate. And if I needed any further convincing then he and his friends provided - provided the conviction.

*He must have been quite a shrewd businessman at any rate?*

No, he wasn't. Not really. He was born into a business family. It was a family business. He was - he had - he had one very thrusting brother. He had one perfectly competent brother. He had one brother who wasn't competent at all and didn't take part in the business, and would even ask you to post a letter for him because the responsibility of going to the letterbox himself was too much, is literally true. And he was neither of these extremes. He used - I mean if one wanted to be unkind about him, which I probably would be if I'd been in the family business, but I wasn't. It would be to say that he used his position, as a director of the company, to further his own interests. And didn't really put his back into the company at all. He thought he did. He was - he really was a Liberal. He thought he was doing the right things, but he was in fact only talking about them. But he did - he did - the things that people - like to do. He became - he was chairman or president or whatever it was called, of the Manchester Chamber of Commerce. He stood for parliament, for Withinshaw. Or Withington. Can't remember.

*Withington?*

Withington. Withington. It must have been. Must have been, yes, Withington. He was a governor of a school or two. He was on the Council of the University. He chaired some committee or other of the University. He did good works. Above all - he became Chairman of the Halle Concert Society, and therefore was responsible for the financial side of the great Halle Orchestra. Like his - father before him, Gustav Behrens, who had rescued the Halle from financial extinction more or less on at least one, if not two, occasions. Well, Leonard didn't do that, but Leonard did chair the committee and was devoted to the Halle, and every Sunday he and his wife would go and sit in the same seats in the front of the - of the gallery - And sometimes we would go with them - for a Halle concert. So that was a very important part of his life. And

he was also very much involved in the Northern School of Music, and so on. So he was very much a highly respected, much loved, Manchester businessman. But his brothers would say that he used his position in the firm to further his other interests. And he did. But not dishonourably.

*Now your wife's name was Mary, wasn't it?*

Is, I hope.

*Yes, is Mary?*

Last time I saw her it was anyway.

*And did she have a career at all of her own?*

No, she - she attended Manchester University and read economics, but it didn't last for long and - the war was on and - she - married somebody who was working there, who was a refugee. Her first husband. Whose name was Oscar Buneman.

*Was working where?*

In Manchester. He was working with Douglas Hartree - in Manchester. And eventually he got sent out - oh, there's all the business about prisoner of war camps and things like that. Not prisoner of war, I mean alien. Aliens get sent to camps, don't they.

*He was a refugee from Germany then?*

He was a refugee. He was a non-Jewish refugee from Nazi Germany. He'd been put in prison by the Nazis for a short time. I mean I'm sure even a short time to be put in prison by Nazis is a very unpleasant experience. But he was, for distributing leaflets or something like that. And so he was courageous undoubtedly as a young man. And - anyhow, they met there. They got married. And they got sent out to - to California.

*Together?*

Yes, as a married couple. And indeed Peter, the elder boy, was - was born in Manchester and so went with them. Mickey, the younger boy, was born in California on the day the Hiroshima bomb dropped. So - it's easy to remember that date.

*And then when did she come back?*

Oh, she came back - I didn't know her. Although they both of them moved to Montreal while I was in Montreal. And I met him. I didn't know him well, but I met him there. I never met her. They weren't there for very long. I don't know, four months or - something like that. And they went home before I did. So were already established in Harwell when I arrived. I mean they'd been there for a short time, a few months, I don't know quite what. And - I met them in Harwell for the first time. And we met through music. Because I played the cello and - having been a very keen cellist in school and suffered somewhat from the ravages of war, but was trying to get back into it, and so took part in chamber music and so on. And my future wife - sort of held - well to say it was a salon would be to be very pretentious about it, but she had a few friends in, one of whom was O.R. Frisch, the nuclear physicist, who was a brilliant, near professional pianist. And we had somebody - one or two people around who played the violin quite well. And we had somebody who played the viola. And so we could rustle up trios and quartets and things, and we played a bit. And that's - that's how I first met my future wife.

*And then did he sort of disappear. Was that the point that you thought of marrying her?*

Well, they got into - marital difficulties of their own. And - I was on the scene. And my wife - had a bit of a breakdown because of all this. And there was no question of - of - of marriage at the time, or anything of the sort. But - she went off to South Africa with her children, because her sister was living in South Africa. And her doctor thought it would be a good idea if she separated from her husband in a - you know,

socially acceptable sort of way, without making a great fuss about it, and there was no need to make any fuss, she was just going to visit her sister, that's all. And when she came back he had - by this time moved to Cambridge. Where he got a job. And - well, the marriage didn't last. And after it had broken up - we decided we would get married as soon as we reasonably could. And I remember one very nice thing, my - my parents hadn't met - or I think they had actually on a visit to Harwell but, you know, met them as local friends. And that was all we were anyhow. And - so I thought it would be rather nice after the divorce was through, if she took her children down to my family homestead in Swansea and I met them there. Which I did. And - I remember that evening Peter, aged all of, I suppose it was 8, said - came up to me excitedly in front of his mother and also in front of his brother, and said "are you going to marry mummy". I said "well, I don't know, I mean - " "Well, I told her that she must. And if she doesn't marry you, then she's got to marry Hans". That's another - friend - friend of ours. So Peter had it all fixed at that age. And so faced with that very authoratative opinion of his, we got married.

*Of course in the 1950's, when we are talking about, to have a stepfamily was much rarer than now, wasn't it. Do you feel you encountered sort of hostility from people at all about it?*

Well, from some, yes. Mmm. I can't say we let it worry us too much. And it sorted them out a bit you know. No, most of our friends remained our friends. Some of them had been quite close to Mary's first husband. And we have at least one couple who are very close friends of ours now, who have remained quite close friends - although naturally we don't see them so much because it's a long way away - quite close friends with her first husband. And that's how life should be after all. But it was a little rare in those days. It's much easier now of course. Anyhow, it's all rather a long time ago.

*And another interesting thing is, I think, this whole question of how if you are a stepfather and how you move into a paternal relationship from being a friend. How did you do that do you feel?*

Well, very easily, because - as I indicated, the boys accepted me. Or Peter did in particular. Mickey was a little bit - more difficult about it. Not that he - would reject me or anything, but funny things would happen. I mean I discovered he was - sitting up in bed at 6 o'clock in the morning. He'd been bought a - by me I suppose - a - a small - a miniature carpenter set, and he was sawing through his bedhead with the saw, which caused me to chastise him somewhat. And he did odd things like that which showed somehow that he was protesting. And I think he did feel it rather more and - of course I've seen this whole episode, the details being different, no saws, - repeated now, with the breakup of his own marriage, because the two grandchildren, the elder one, has accepted it remarkably calmly. I don't mean he doesn't regret it, I'm sure he does. But he's accepted it calmly and has overcome it and got on with his life and - in new circumstances, new school and new country. Not a new country but a different country. New friends, new everything. Whereas his sister, who is - just over a year younger - rather similar circumstances, she is the one who finds it more difficult and can get into very awkward moods. Where one feels that - although she's ostensibly protesting about - something here and now, is in fact protesting about something else that is rather further away. One just has to be understanding about it.

*And did you want to be a different kind of father from your own father to you?*

Well, I think one tries - not to make mistakes that one's own parents obviously made. In one's own opinion at any rate. The danger is that in one's assiduity in avoiding their mistakes, you make your own. And - I have no doubt I made some. But I think you'd have to ask them what those were.

*I mean you used the word a moment ago 'chastise'. I think you probably meant it in the old fashioned sense?*

I did, a smart smack across the buttock was the - was the chastisement for sawing through your bedhead at the age of 6. Yes. That's right.

*And what sort of things did you enjoy doing together as a family then?*

Well, I mean I must make one other remark about it, and it covers the whole period, not just when they were - tiny. There is a very subtle difference between being - a parent, a true parent, genetic parent, and being a step-parent. Albeit very close. Well, the difference is at least twofold. There are probably lots of differences, but - one is that you don't get the genetic irritation of seeing yourself in your children. Although my American daughter-in-law says that whenever she sees her husband doing something that irritates her particularly, she knows perfectly well where he got that from. So - it's not all genetic. But - but there undoubtedly is - something - you know, it's seeing it reflected in somebody else. And the other thing is you are more friend than you are parent, somehow. And I remember Mickey one day when he must - oh, he was in his teens, I suppose he was 15 or 14 or something like that. First starting to have girlfriends. And we were in Manchester and he came to help me with the washing up. Which I was doing after dinner. Most unusual event, I may say, without having to be bullied into it. And I realised something was up but I didn't say anything. And we were dead silent for quite a long time, and then he said "can I ask you for an opinion". He used the word 'opinion'. And I said "yes, what about". And he could have said nothing that could have flattered me more. He said "how do you get rid of a girlfriend when you no longer want her". Well, I would never - never, never have asked my father - asked my parents, or deemed it appropriate or even useful to ask my parents that. And I don't think it's just my view of my parents. I think it's also the closeness of the relationship, and it's different - somehow. So we've been extremely close friends - more than we have been parental. And yet there's no doubt that I have played the role of father in their lives in many respects.

*What do they call you?*

Oh, they call me Bean. Which many of our friends do also, following their example. Nobody quite knows why. It is probably because - Mickey, when he was 6, couldn't pronounce Brian very easily. Or perhaps Peter couldn't, because he had a slight lisp come to think of it. I'm not sure, I don't remember how it happened, but anyhow, that's what I'm frequently called in the family and by my friends.

*I was just about to ask you what sort of family leisure activities you had when the children were young?*

Did a lot of walking in those days. And - Peter and his friends from school. Especially Mickey would sometimes - come walking in the - Dales and .. The country between Manchester and let's say Sheffield is absolutely marvellous. The Peak District. And we could run out on Sunday morning. We did a lot of that. Music played a certain part, but - they were musical somewhat under protest. Although later on Mickey took up the guitar. But we didn't play together very much. I was just pleased that he did that, that's all. Rather little that we did together - actually.

*And holidays?*

Well, holidays we - I mean when they were small of course we went on holiday together. And we went camping together and had a variety of - moderately hilarious experiences with tents caving in and things like that. So - oh, we led a full life in that sort of way, certainly. Yes. But of course as they grew up they started going off with their friends. Peter very rapidly - got adventurous and - when he was in the sixth form drove them to Turkey. With a schoolmaster present and various other people, and it had gone a hundred yards down the road from Manchester Grammar school when it broke down for the first time. But they made the boat, so - And Peter has always been extremely self reliant. I like to think that we - did something to help bring that about, but I'm not sure that we did. And perhaps it's typified by a remark he made when his mother asked him rather anxiously "what are you going to do for your holiday". And he said "I'm going to Greece". And she said "when". And he said "tomorrow". And she said "how". And he said "oh ma, I'm going down to the bottom of Italy and I shall turn left". Which is the way he has been ever since.

*Could you describe the house that you lived in when you were in Manchester, when the boys were just in their teens?*

I saw it only the other day because I was in Manchester for a conference. It was a large - Victorian house. Which had been - a skin specialists house before they -

bought it. My dear mother-in-law, when she moved into the house, discovering it had been a skin specialist and knowing - and finding out that that was a thin cover for a venereologist, sprinkled - sprinkled lissol on the - on the flowerbed outside the doctors consulting rooms. Well, that says something about her scientific background. It was a large house with servants quarters and so on. A very pleasant house in many ways. The woodwork was beautiful and - the finishings were marvellous. Tall - high rooms, you know. All that. Lovely garden. A lovely garden. Which - And when we moved to Manchester we went through a helluva period during which half the house - the whole house was done up. But with a view to presenting us with the servant's quarters, which were done up even more with a bit of an addition. And we lived in half the house and they, who were getting old already and had a house that was much too big for them, they couldn't get servants to run it properly and so on, had the size of their part of the house reduced in scale. But of course we all had the run of all of it. And we lived there for nine years.

*And did you have quite a bit of domestic help?*

We had rather little in our half of the house. Granny and grandpa had some in theirs with old retainers who were almost as old as they were. And my mother-in-law could never see why somebody aged - getting on for 80 shouldn't still come in and - wait on them or whatever. It wasn't so much that the old lady didn't want to come in and - do the dishes. But she was no longer capable of doing them very well. So - well yes and no. But we never had anybody living in. Never have had.

*So they had living in help?*

Oh no. No, no, no, no, not while we were living there, no. No, that - I mean that went out with the war, unless you - unless you lived on a dukal estate or something.

*I think we've talked about family leisure. But that is probably slightly different from your own special interests?*

My own special interests have - have changed at various times. I mean I - was very musical and active in my youth. And I'm glad to say in the last few weeks that I've taken my cello up again in all earnest, and am going through all the - manuals trying to get back. And it's coming back and I'm delighted it's beginning to come back and sound reasonable, in an elementary sort of way. So I shall have to persevere. So that was an interest of a serious kind in my early days. Which went on until - well - until about 19 - 20, I suppose. And then gradually slithered off, only now to emerge. I was very interested in - in gardening when I had a garden. And the garden in Manchester provided me with an opportunity to grow lots and lots of roses. So I did a lot of rose growing at the time. In the earlier edition of 'Who's Who' you will see rose growing appears as a hobby, but it's a bit pretentious of me. But at any rate I enjoyed it. And - well again I have to do that now because I have a garden, so I do a lot of gardening. Much later on when I was at Imperial College - for some reason I no longer quite remember, I decided to try my hand at painting. And painted a bit. I never exhibited anything, but there are one or two simple little paintings of mine hanging in Imperial College now, which they seem to like to keep, so that's - that's fine.

*What sort of paintings are they?*

Well, one is a painting of a pair of battered old shoes of mine. And one is a painting in the morning mist of the Albert Memorial. So - those hang on the walls of Imperial College. I think more for sentimental than for artistic reasons, but - I mean one of the reasons that I took that up was, I suppose, that I - I had realised that I had to have something that totally absorbed me, so that I simply stopped thinking about work. I mean by this time I was deeply involved in the higher reaches of science policy and interaction of the government, running Imperial College and so on and so forth. And - the responsibilities were quite great. And the opportunities for worry were plentiful. And it was very easy and I was doing the Royal Commission and so on and so forth, and I was President of the Institute of Physics. So I took on a lot of things all at once and it was fine. Except that I had no - real relaxation that forced me out of it, like playing golf or - playing cards or doing anything that was totally different, but absorbing. And this really is the secret to have something that stops you thinking about it entirely. And painting did that. I find I can't think about anything else if I'm

painting. Fortunately, I can't think about anything else if I'm playing my cello either. So that.

*You also put down computing as an interest?*

Oh yes, well - it's a State secret, or was. That although I was the first Chairman of the Computer Board. Which provided all the computers for University research and teaching and so on, as a result of a report I did back in the 60's. I had not myself, ever, programmed a computer or indeed used one. And I kept that secret and so did all my friends, I'm glad to say. So for some years I ruled the roost over computing in Universities. And then I - years after that - and it was at a time when - people were beginning to have P.C's. But really rather at the beginning of that and P.C's were not the sort of reliable, simple devices that they are now. And I decided that really the time had come I must - must break this bad habit of mine and learn how to use a computer. So I started and took to it like a duck to water. And it very rapidly became a hobby. On which I - a hobby in which I satisfied my own need for using it as a word processor for obvious things, writing speeches and lectures and things. Where I rapidly got into the habit of not being able to do it without a word processor anymore. I find - I actually do find now that my thought processes don't work properly unless I'm stuck behind a computer. A word processor. It helps me to think. It's something to do with making changes I think. You can make changes so easily. And of course you can - you can think of things in the wrong order and change your mind and put them back again. That sort of thing. So I find that exceedingly helpful. But I wasn't satisfied with just doing that, I had to learn how to programme it also. And - so I spend quite a bit of my spare time - interesting myself in computing. I learn about one computer language a year I suppose. I'm interested in computer languages as such. It gives me something to talk to Peter about, which - which pleases me. I mean he's a professional of course. And he says I'm approaching the stage of one of their second year students. I think that's rather a grudging sort of remark, but it's probably true nevertheless. It satisfies exactly the same - need for me as doing crossword puzzles or playing bridge or playing chess would for others. Playing chess I suppose. It's about as difficult as playing chess well. I enjoy that sort of challenge I suppose. But as a hobby of course.

*I think I've probably covered your leisure activities, haven't I?*

I think so, yes. I do a lot of do-it-yourself now. Since we - since we - bought a house of our own, where we were going to retire to and will. D.V. That was 4 years ago. I suppose I should say it was typical of me that just at the point when we had decided that we had found a house that we wanted to buy, and it was more or less settled. I had a heart attack. And my wife actually moved into this house while I was in intensive care. And she would say that was typical of me. Not being present at the time of the crisis. Because very often things have gone wrong in our lives, trivial things, not serious things, and I have been abroad or something. And I have had to travel a great deal in my time - not the last few years - but before that, for about 10 years I was travelling a lot. I once crossed the channel 5 times in 1 week, which was absurd. I was going out to the Far East a lot and so on and so forth. So that was just a family joke. But it did actually happen that I was in intensive care when - when she took possession of the house. Well, anyhow, as a result of acquiring that house and preparing it over a period of years, which we knew we would have to do to move in finally, we use it as our weekend house and gradually it is becoming more and more - as we would like it. And I have done a lot of it myself and greatly enjoyed doing that. Because I think I told you, my grandfather was a carpenter and taught me how to use - how to do things. And I've enjoyed getting back to that. So that's another - hobby I have. I don't think very much about - changing doors and - simple things like that.

*Which part of the country is this house?*

Oh, it's a house in London. It's in North London. In North London. And it's very convenient because - using the Northern line we are 50 minutes away, door to door, between our two houses. And so moving between them is trivially simple at weekends.

*I think the one area we've not then talked about is your interest in politics. When did you start to become actively interested?*

It's one of these things that - that - that happens over a long period. I'd always been politically conscious, though not affiliated to a party. I had long and sometimes - slightly heated I suppose, not seriously heated, arguments with my father about - political issues. Certainly with my fellow students and so on. I was always more or less middle of the road, sometimes leaning slightly to the left. But never very far. I don't think I would acknowledge that I ever leant to the right, but maybe some people nowadays would say that I have done. Over some issues maybe. Talking like a true SDP chap already, aren't I. And then of course I got involved in science politics, and issues of technology and government when the Ministry of Technology came in. And even before that, on the old Advisory Council for Scientific Policy. So that was the point, back in 196 - 2 or 3 or something, when I started getting involved in issues. And issues are politics - really. And so by that sort of time I - I would occasionally meet Civil Servants and Ministers and so on and would start talking about policies with people who actually were themselves dependent upon those policies. Or responsible for advising them or - something. And that's a very different viewpoint that you get from sitting talking about things in the abstract. Actually being able to do something about it. And I enjoyed working with people who were governing us. I felt that there was - I mean I wasn't alone, I was always in a committee or something, a group of people. But I felt that there was a role - for people advising government - the government of the day. It didn't matter which government it was. One might lean - personally one way or another way. One might vote for one lot, but find oneself serving another lot. And it's perfectly possible if you're either a Civil Servant or genuinely in the middle - more or less. And that's the way I was. And - so when the Wilson government came in and Blackett started taking it apart and things, I got dragged into things. And I was on various advisory bodies. And there's a very hazy line between politics and advising government. I mean advising government isn't actually politics, but it's very close to it. It's very close to it because there's no point in advising government - on an issue that is - where they have taken a contrary political opinion, unless you handle it in a way intended to change their political opinion. And - and that's a different order of magnitude of a job. And it's something that I have had to learn - and re-learn all my life, that if there's an issue you have to say well, is it worthwhile, is it feasible to get them to change their political stance on this, because if we don't there's no point in fighting the issue itself. And we might as

well accept and make the best of a bad job. You can, of course, be accused of compromising on principle. And I daresay I have been accused of this - like most people who have to operate close to government. But the fact is that unless - unless you are yourself contributing to the formulation of political - stances, you don't have much hope of getting such a stance changed, and you then just have to say well, either I accept that, or I get out of advising these bloody people, because their views differ from mine. And the fact is if you're trying to do something, let us say, to improve - to improve the way science is done in the country .....

*Why not give a concrete example. Take the Wilson government. Something you thought ought to be done?*

There are so many examples. I mean it affects almost everything that one does close - close - to government. I mean I can give you an example from right now, because it's always easier to give you examples from right now. It's exactly the same story. The issue of student loans. Students have, in the past, if they got admitted to a University or Polytechnic or whatever, were given a grant through the local authority which was intended to be adequate for their meagre needs, but - but needs anyway. And that gradually got worse and worse and governments got less and less willing to provide in the rising sums that were implied by that. And students are now in the position where they're having to borrow money from banks, from their parents, from friends - all sorts of places where they probably have to pay back at exorbitant rates. And there is an unofficial loan scheme of a very unsatisfactory kind, which the students operate themselves. And what is being proposed now is an orderly loan scheme run by the government or by the banks or by some properly constituted agency, that will do something fairly and - in a reasonable manner without trying to make big profit on it, and so on and so forth. Now, you can say I do not believe in loans. Loans are morally wrong. Everybody at that age has a right to be educated and so on, and thump the table if you wish. And I do believe, as a matter of fact, that it would be much better if we had a properly funded grant scheme. I think it's right on all sorts of grounds. But the fact is the government has made up it's mind that that is not going to be the case. Now I have a number of academic colleagues who, faced with that proposition, will say, well oppose it. Refuse to have anything to do with loans at all.

If I refuse to have - supposing I'm in a position to influence the nature of those loans in the way they're administered and the - the generosity of them or something. Which I am. Then, believing as I do, that the government's made up it's mind and we we're not going to change it on the principle of the thing, what is my proper duty, as a matter of principle to oppose it and let them invent a scheme which is not as good as it might be. Or to say well, OK, you've taken this decision, I don't agree with it, but you've taken it, I'll now work with you to try to make it as satisfactory for students as I can. Now of course - some people would get excited and say well, that's like saying so and so, and they would almost certainly immediately mention Hitler or something, straight after. I mean there are some principles that - that you simply must, as a civilised human being, hold and can have nothing to do with anyone who rejects that. But I can't feel that an issue of student loans is, for me, in that category. And so I will do what I can to make it as workable as I can. And that's an example from right up to today. But it is a kind of situation one finds oneself in over and over again if one is working anywhere near to - to government. And of course the - the actual issues will depend upon the party in power and also depend upon the Minister you're dealing with. Now I still haven't answered your question, how did I get into politics. All I can say is I'd been in politics for a long time in that way. Working with the government in power. Sometimes trying to help the party in opposition. Quite openly, I may say, not behind anybody's back. Because it's generally believed in this country that it's unhealthy if there isn't an opposition that could, if the people wanted it, to take over, without a big learning period. So - I've been able to keep reasonably close to both sides. Anyhow, it was a source of considerable distress to me that the Labour Party got into - such a mess. I never joined the Labour Party. I was closer to the Labour Party than any other during the - ooh - second half of the 60's and all the 70's, I suppose. Even though I had to work with the Conservatives for much of that time. And did without very much difficulty I must say. But I was really a natural cross bencher and which is what I became when I joined the Lords. I was deeply distressed by the obvious break-up of the Labour Party before it had broken up. The break-up of it's - any moral - force it had. All these internal quarrels and so on and so forth. And I'd been fairly close to Shirley Williams for a long time, because she was a Minister while I was at the SRC, and I got to know her then. And - when she - was about to form the SDP she asked me if I would join. And - I mean I was in the Lords

by this time and I said no, I wouldn't. I was a cross bencher and I wanted to stay that way. And anyhow I was Head of Imperial College and it wasn't right that the Head of an institution containing every possible political opinion should - parade his own around the place. And she professed to be disappointed and so on. And in the meantime things were pressing ahead and it was all rather exciting, and I was very interested and - rather regretting that I couldn't take part. Because I did believe that that's exactly what was wanted. A middle of the road party which - was not the replacement for Labour, I wasn't interested in a replacement for Labour. I was interested genuinely in a middle of the road party that didn't play on whatever the other side did.

**Tape 4 Side C [Track 7]**

So believing that - the formation of a - a central party was right. It had to be done, it should be done. I got increasingly regretful that I felt that I couldn't take part in it. And then one day I - wrote to Shirley and I simply said to her "I was looking at myself in the mirror this morning and deciding that I couldn't go on looking at myself in the mirror having said no to you, so can I change my mind". And she was very pleased and said "yes, of course you can". And she said "don't think I don't know how difficult it is sometimes to make up your mind". So I did and I became one of the first hundred who signed the - signed the declaration in the Times or whatever it was. And - joined in with as much enthusiasm as I could. I put some bounds on it. First of all I gambled on Imperial College knowing me well enough by then to understand my motives and know that I wouldn't - let them down by being too extreme or - I suppose that would mean undermining their own positions by being extreme. And anyhow would brush it off and just say "oh, that's old Brian, you needn't worry about that". Which is more or less what happened. Some of them admired me for it, some of them grumbled a wee bit. There was no serious problem at all. But it was because I'd been there a long time. And knew them very well. And I - I drew a line on certain things. I said "I'm prepared to take part in private meetings, over discussions about things. I'm prepared to go and join in electioneering, but only if it is so far away from London that it is plausible that I will not run into any Imperial College people in their own constituencies by so doing". So I supported Shirley at Cosby. And take some credit, of course, for her getting in. It was fun. It was fun, but I cannot pretend that I was at ease, electioneering. I wasn't. It's not my line of country. I hate being put in the position when I have to give a slick answer to a problem that I don't know the correct answer to. Or good answer at anyrate. And I'm afraid if you want to be a canvassing politician, you have to be able to answer all questions. You have to be able to say something. And saying "I'm sorry, I've never thought about that", is a sure way to lose the election. So I'm not a politician in that sense, at all. And I know quite well now, from the little experience I've had of it, that I would never stand for parliament myself. But, I mean in the Lords of course, I can play whatever part I like. And - when the famous - ballot took place and the SDP split into two, slightly more than half of us in the Lords stayed with the SDP. And slightly less than half joined the Liberal Party, and it is now the

SLD. And it looked for a time as if we might almost be a party that existed solely in the Lords. Which would have been a curious - constitutional, or perhaps unconstitutional, state of affairs. It's not quite like that fortunately. Since I became Vice-Chancellor, however, I really did feel that I had to keep my public head down. And I have done so and all my colleagues in the Party - who are sufficiently close to me for it to matter, and David Owen certainly, and my colleagues in the Lords, all understand perfectly well what my point of view is and what my limitations are. And roughly speaking, they are that although when I speak I will speak from the SDP benches, and there's no bones about that, the speech I give will be indistinguishable from the speech I would give on the same subject from the cross benches. Plus I will only speak if I have something to say. I mean that's to say if I can say it sufficiently authoritatively that it ought to be the case that I can carry my party with me anyway. Which means that it can't be a too political issue anyhow, but provided it isn't too political an issue I can expect them to accept my - if not my authority at least my arguments - and carry them with me, which has always been the case. So it requires a certain measure of tolerance on both sides. But - I mean my natural - next step would be to return to the cross benches. I would - I couldn't join - the Tories. I really couldn't. I couldn't join Labour unless it changes much more than it has done. I couldn't bear to be in a Party that was dominated by the mass battalions of the Trade Unions, for example. I've got nothing against Trade Unions, but I don't think they have a place as Trade Unions in a political party. Their membership can belong, by all means. But not as organisations. I think it's wrong fundamentally. I couldn't join the Liberals. I could have joined the Liberals long ago if I'd wanted to. I'm not going to do that. I'm not going to kick David Owen in the teeth, however, when he's down. Which he is. Whether he admits it or not. And I also owe my SDP peers a debt. Because throughout the Education Reform Bill, they accepted my judgement as to whether they should vote one way or another. And at all hours of the day and night for several weeks on end they followed my lead and I was able to take 15 people also, depending who was there, out into the lobby with me. And that's a debt which I shall never forget, and certainly can't rat on just like that. So now it is my duty to go and - support them occasionally on issues where they know better than I - if I possibly can - I do go and support them. Which doesn't mean necessarily speaking. So I do that and I must do that for the time at anyrate. My own suspicion is that in due course the

Labour Party will change sufficiently that David Owen will rejoin it. He will not join the Tories, as people seem to - some people seem to think he will. I'm sure he will not. But he - he quite possibly would join the Labour Party - since this conversation is not to be relayed to the press - he probably would if a few more things change. And roughly speaking it's a question of their economics coming right, their defence hasn't come right yet. And if he did that I should then feel free, and I'd go back to the cross benches. Where I would be - possibly from which I should never have come. Anyhow I did.

*So there must have been very exciting times in that experience in the SDP?*

Oh yes, I mean there was the exciting time when we - when we looked as if we were - even headiness of all headiness, possibly going to win an election. It - it - for a short period it really did look like that. It was, of course, effervescence - rather than solid liquid. To mix a metaphor.

*And out of the politicians you worked with, I mean who are the people that really most impressed you?*

Well, David Owen himself is a very remarkable - man, who has all the gifts of high statesmanship. I don't think there's any question. He has also a certain degree of arrogance of manner. Which I think is derived - I'm sure is derived, from having been kicked upstairs too quickly. He became Foreign Secretary much too soon. It was very damaging to his future career. To have held him back a bit - would have been better for him - as a person. He needed kicking around a bit first. I speak with some feeling. I mean - having shot up a bit too fast for my own good also. And he did it much more publicly than I after all. And I think that has contributed to the fact that he appears to be arrogant. The Foreign Secretary is expected to speak with great authority and lay the law down a bit. And he does - and mostly I think he has it right, but he does it a bit too - too much among every subject and - and that sort of thing. But nevertheless he's a very considerable personage and a real statesman. Indeed - he's the only alternative, as a conviction politician, to our dear Maggie. I mean if you look around for another Maggie, there isn't one, but there's David Owen who is not all

that different a person, in some ways. Which is interesting. Some of the - others, I always thought very highly of - of John Roper, who was the Chief Whip in the Commons. He's, unfortunately, out of politics for the time being. I rather hope he'll get back in again. There were several of them. Some of them now, of course, have joined the SLD. And - well, I'm glad to see some of them apparently doing quite well. I bear them no ill-feelings of any kind. Wish them luck, indeed.

*I think that has probably covered most of the areas that I would like to cover. I don't know whether there is anything else that you have thought of that we haven't covered?*

I don't think so.

*Maybe then I could just ask you a final summing up question. I mean you obviously have had a very varied life and so I wondered whether you could say which areas you have had most fulfillment from?*

Oh, people often ask me - which job I've - enjoyed best, or something. I've been extremely fortunate. I mean I really mean that, I have been extremely fortunate in the jobs I've been - able to do. I've enjoyed them all. I found each of them worthwhile. I have learnt something from each of them which has turned out to be - very valuable for the next one, or later ones that I had done. So it has been a cumulative process in a way. And it must be for others to determine where I had - the largest measure of whatever they want to call it. Success or - or infamy or - or did least damage, or whatever. All I will say is that for me the top of my professional career - will always be the time I spent at Imperial College. I mean what I'm doing now is on a - wider scale. It covers more activities. It covers more institutions. It is in many ways a bigger job. But it is further from the - workbench. It's further removed from people. As I may have said before, it's like being an Admiral instead of a Captain. It's nice to meet the chaps and be dealing with them directly. Influencing what they do or helping them directly to do it. As Vice-Chancellor I'm dealing with policies. As Rector I was dealing with people as well. And at the end of the day people is what it's about. And I - I mean I told my colleagues when I became Vice-Chancellor, I said "look, you will have to remember as much as I, that there is a danger that the Vice-

Chancellor becomes locked up in an ivory tower and loses contact with what it's all about. And you must help me by trying to make me remember. And I'll do my best to remember too". Well, one way or another we - managed to keep contact. But it isn't the same. So - that and the fact that - I have very - fortunately succeeded the late Lord Trend, who was Secretary of the Cabinet for a long time, but I succeeded him in the position of Chairman of the Nuffield Foundation. I don't know whether that ever came out.

*No, we didn't talk about that?*

Well, I am now Chairman of the Nuffield Foundation. And - it's a small institution. We spend less than 4 million pounds a year. Whereas there are two or three other foundations spending upwards of 10, you see. So it's not large. But it's very respected. It has for many decades - done remarkable things. It has influenced the course of science teaching in schools immensely - for many, many years. It has done work for the care of the elderly and things of that sort. Which nobody else has been able to do. It has been able to conduct enquiries which should possibly have been done either by the profession itself, as with our recent report on Pharmacy. Or by the government itself, as with our recent report on Town and Country Planning, which I chaired myself, as a matter of fact. And which for one reason or another, the bodies which should have done it couldn't have done. For a variety of reasons. And we've been able to do it. And we seem to have - enough - public respect to be able to do it and get away with it. And people are willing to accept invitations to join a Committee of Enquiry to do so. To give you one example, which I was dealing with today as a matter of fact. We were - made aware some years ago that there was a movement in Northern Ireland - amongst some parents to break away from this either you're a Catholic or you're a Protestant mentality amongst the schools. And try to found some genuinely integrated schools. The problem was 'how'. And it's quite difficult, because you've got to raise money and acquire premises and so on. We got into this - I wasn't in any way responsible for getting into it, it happened before I was Trustee as a matter of fact. But we got into it anyhow. And - we have just had the Northern Ireland Department of Education take over the first 8 integrated schools that could not have been created without us. They have now adopted them, they maintain

the schools, and they're just about to ask parliament to pass legislation which will put on them a statutory duty to foster integrated education. Which two years ago would have been unthinkable, because both Church hierarchies were implacably opposed. It's happened, and I was entertaining the - Northern Ireland Minister of Education at lunch today in Bedford Square, where - where our headquarters are, the Nuffield Foundation headquarters are. And he very generously paid tribute to what we'd done. He said it would not have been possible without us. Now - I didn't think of it. And I merely kept this going. The fact that the Nuffield Foundation, which can spend - less than 4 million pounds a year, can in a very few years give new hope to those parents who want, at anyrate, to break away from this ghastly polarization of Northern Ireland, if you don't start with the children they get caught by it all. And the fact that we've been able to make it possible is something of which I'm - I - I have a very humble pride in what we're doing. And I'm not trying to make out that everything we do is dramatic like that, or - or as profoundly significant as that, but we have the opportunity to do things like that if we can spot them. So I mean a thing I've learnt through that is, that you don't have to be spending tens or hundreds of millions to be able to do a bit of good in this world. It's a question of choosing the things to do that you - that you can do, that perhaps other people can't do. I mean the Northern Ireland government could not have done it. There's no question. They could not have done it. But we were able to act as catalyst and given the catalysis that we provided they are then able to come in and say "well, this is going to be a good thing, we can back this".

*So that is an area of fulfilment more recently, which you ...?*

Yes, which - And I mean I'm delighted that they've - they saw fit to elect me as Chairman, because - although as I said, when my predecessor died, because he was a very great man - because this is a very deep interest that I have which - I shall be able to devote more time to when I retire, which now is a year later than when I last spoke to you, because I'm - staying on here for a while. But come 1990 I shall be devoting a little more - time to that. And it is something that will keep me - deeply engaged in all sorts of things. much more of my own choosing than ever before in my life

probably, for a number of years. And that is a very rewarding and - pleasant thing to contemplate.

*Is there anything looking back that you would say you particularly regret?*

Having a cold for this final interview. Oh, one regrets all sorts of things. I mean I regret all sorts of - individual - unhappinesses of one sort and another. I mean it is impossible - in any circumstances I imagine, but it is quite impossible moving amongst - prima donnas like myself, all of whom are to varying extents emotional and - we certainly all have our Achilles heels and tender spots - not to cause offence from time to time. And I have no doubt I've given at least my fair share, if not more than my fair share, of offence to people. And one - when one realises one's done that, one is always regretful, but I mean I don't see any point - you take the first opportunity you can to make up for it somehow, say sorry or if you can't do that, have a drink or whatever. But there's no point in looking back and regretting it, it doesn't get you anywhere. No, I don't indulge very much in guilt. I think it's self-indulgence.

*In fact that is a very interesting answer, but I meant the question in a slightly different way. I meant are there missed chances, things that you really wish you had done?*

Well, I mean there's the sort of thing I suppose - a friend of mine said he had great difficulty in making up his mind whether to accept the Chair in Princeton or the Chair in Harvard. Very difficult choice. In the end it was settled for him because he wasn't offered either. I mean there are things I suppose I might have liked to have been, which I didn't become. We all have those. There are also things that one - realises one would have been a more rounded person had one done them.

*Such as?*

Well, in my case it would have helped me a great deal if at some stage in my career I had actually worked - in industry. Or in the City or both, but I mean - working in circumstances where I was not reliant upon public funds. Where I was responsible for earning a living in the sense in which business means that. Where my livelihood

depended upon - and this is really the point, where my personal livelihood depended upon - my - good judgement. And therefore working for a huge giant of a company where you don't get sacked any more than you do in the Civil Service, is not what I mean. But it would have helped me, I think, because I had done a great deal - I put a great deal of effort, wouldn't say I've achieved very much, but I put a great deal of effort into trying to bring Universities and industry close together. And government too for that matter, because it's a triangular relationship that one needs usually. And although I've - I've worked in or, at any rate, very close to, with and very close to government, if not in, and Universities of course, I've never worked in industry. Unless you call the Atomic Energy Authority industry, and it isn't in the sense in which I just defined it. So that - that I - I - regret, because I think it would have - helped me in a variety of ways.