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Lord Phillips of Ellesmere, KBE FRS in interview with Dr Max Blythe
Oxford, 29th January 1996, Interview II

MB David, in our first talk earlier today, we got you halfway through High School. Can we get you into the second half of that schooling and preparation for School Certificate? Things were getting quite serious and you were beginning to get an academic career in focus.

DP Yes, I suppose it was marked as you'd expect by a slow transfer of my friendships from mainly the Ellesmere train boys to some Oswestry boys, more involvement in school activities like school camps, and so on. I went off to Aberystwyth I remember, at the end of my third year, and then to Barmouth at the end of the fourth year. And I developed friends amongst the Oswestry boys who overtook – some of them overtook – the other Ellesmere boys in terms of class performance to a certain extent, though I remained closely friendly with Jack Ralphs and we used to collaborate rather closely on homework which we did partly at home and partly on the train.

MB I think you did the physics and you did the maths or something.

DP That sort of thing, yes.

MB And developed a sign language, deaf and dumb language, didn't you?

DP Well, we simply learned the deaf and dumb alphabet which is, you know, everybody knows – A, B, C, that sort – D, E – all that...

MB And you swapped information across class?

DP And we did that sort of thing, yes, a bit. No doubt had it been noticed it would have been frowned on rather severely, but it wasn't noticed and it amused us at least.

MB What we're saying is that quite a few things were happening, you were broadening your horizons, looking ahead, meeting new friends, seeing new places...

DP Scholastically I suppose I stayed with history as a major interest. Amongst the sciences chemistry became the most interesting. Perhaps it was the least familiar, though I did have a chemistry set at home and did all the usual things like growing copper sulphate crystals and moving upwards into making gunpowder, that kind of thing. The physics master was a Welshman who'd been trained at Bangor and he wasn't particularly inspiring. The chemistry teacher named Wilshaw was a stern disciplinarian, but nevertheless one of these people who got the subject interesting, somehow or other. The mathematics teacher who was a Cambridge mathematician, Peggy Woods, in the lower part of the school was again a rather stern disciplinary figure, but he certainly got me excited about Euclid. We worked through Euclid's

theorems, and a typical homework would be, you know, from the exercises at the end of the chapter choose one thing to prove and...

MB You went for the hardest ones?

DP Naturally I went for the hardest ones. At least ... they probably weren't terribly hard actually. It was always a great triumph though to be asked first to say which one I'd chosen and then go through the proof and then join in a chorus of QED at the end of it, to my pleasure and Peggy Woods' pleasure and I dare say not particularly to the pleasure of the rest of the boys in the class. But I enjoyed all of that. Mathematics came fairly easily at that stage at least.

MB So, by 1937/38 you were stacking up very well. You were recognised as one of the bright chaps.

DP Oh, that's right.

MB But not at sport?

DP Absolutely not at sport.

MB That never happened?

DP I never got switched on to that at all. I did at one stage try quite hard at cricket, but I never tried at football. As I've said I went to the high school as one of the few boys who could swim, laboriously going down the baths with the breast-stroke, and I left as just one of all the boys who could swim still going laboriously down the pool on the breast-stroke. So, sport didn't switch me on as an active participant.

MB It was a distraction?

DP Well, looking at people who were good sportsmen I don't know that it appeared very much to be a distraction in their work. I just didn't see myself as having any particular knack at it and didn't work at it really.

MB Did girls become a minor distraction in those early teenage years? Did they figure in your horizons? You've talked of seeing them on the station platform.

DP Well, hardly at all. My father was somewhat of the view that girls were a distraction. I don't know about sports, but girls certainly were a potential distraction. And so I remember we used to occasionally go with my father when he went preaching at some remote place. And we would be collected by one of the local farmers and transported to the village and go to listen to my father preach, say, in the morning and then have lunch at the farmer's house – it was very often a farmer – and then later on in the day tea, and then the evening service. I remember on one of these occasions the daughter of the house being about my age and feeling really quite interested in this. My father clearly took a somewhat poor view of this growing interest and spoke to me a little later on.

MB Bit of a sermon?

DP No, he wasn't much for giving me bits of sermons. He just intimated that there was plenty of time for girls and they were a distraction.

MB Over the years he registered that particular point a great deal.

DP Oh very clearly, yes. There was virtually no contact, certainly up to the fifth form, between the boys who went to the high school and the girls who went to the girls' high school.

MB Just sightings on station platforms?

DP Just sightings, yes. Not conversations; sightings.

MB Thinking of the teachers in those years, because we've talked of Wilshaw and we've talked of Peggy Woods, were there other teachers who were as significant in this story who we might miss out and not mean to?

DP Well numbers of them were really quite good. I mean, there was a young Oxford graduate named Freddie Dickinson – we used to call him 'Dickie', I suppose – who actually went off to join the Air Force at the beginning of the war, so he was there only in the period up to '39. But he taught history and Latin in the junior part of the school, which he handed over to a chap named Derbyshire, and the rest of the school, and he was quite effective. The man who taught geography in the junior school and then went on later on to teach English was actually a Cardiff graduate named Attfield. He was absolutely no use at keeping order in the class but was a quite inspiring teacher, particularly of English. I mean, he certainly helped to foster my affection for poetry, though we're moving a bit ahead now. He used to take weekly English classes in the sixth form which turned out to be, just looking back on them, fairly civilised conversations on this and that. His one defect perhaps was that he had just about no sympathy with modern poets. You only had to mention someone like Stevie Smith let's say to produce scornful laughter or at least faint praise. So he was a bit locked into the Edwardian period and I confess to something of that still in myself.

MB Yes, and in the sewing shed, back with father, there was poetry often recited.

DP Oh yes. He of course had left school at 14 and had experienced it in a time of rote learning, so he could still recite, if not all at least a very large proportion, of how Horatius kept the bridge. You know, 'Lars Porsena of Clusium By the nine gods he swore' and all that. And Scott's Marmion, and numbers of other poems. He had a great collection of complete works of Wordsworth and Tennyson and Milton and Burns and most of the great poets, in fact. So that was a bond between us, certainly. We were both very fond of poetry.

MB I've come back because he was an enormous influence and I just want to establish that. I don't want to lose sight of that force, in a quiet way.

DP Well, that's certainly true. I mean he also, when he had time for reading, which wasn't a great deal, read books of sermons and theology and so on. And I have to admit that I didn't pursue that track with him, but over Sunday lunch, let's put it that way, there was usually a careful dissection of the sermon that we'd all listened to. And I picked up a good deal of his theological thinking from that, rather than from listening to his sermons either formal or informal.

MB David, just to check, did that religious feel go on through all your schooling years? Did you stay with the church then, because you were a Sunday School person and went to services? But sooner or later it died out, and I just wanted to check whether it went on through the school years.

DP Oh, died out is putting it a bit strongly perhaps. Through the school years, until I got perhaps into the last year in the sixth form, I certainly went to chapel Sunday mornings and evenings and to Sunday School on Sunday afternoons. That no doubt sounds oppressive, but I didn't actually recognise it as being oppressive. I was brought up that way.

MB We haven't brought Barbara into the story for quite a while. She went away to college and did some training as a child nurse?

DP That's right. She went to college – The Radbrooke College in Shrewsbury.

MB At the age of about 14?

DP She left the Ellesmere School at 14 and trained as a child nurse and then went off and did some child nursing, first with a private family and then in a nursing home at Letchworth. I would have been I suppose 10, rising 11, when she went away so...

MB So, she's gone out of your life.

DP That period when I was in my early years at the high school she wasn't very much in evidence and...

MB But came back a bit later.

DP She then came back later on.

MB Yes. And became a telephonist.

DP And got a job as a telephonist in Ellesmere. So she was in Ellesmere from I suppose when I was 15 or 16 onwards, that sort of age.

MB In those years you were preparing for School Certificate. You obviously had no great problems with that. I mean whatever minnow you were in whatever pond, that was going to go well. You felt that there were no difficulties. Did that all go well? I mean, a war was boiling up and there were all kinds of other distractions. Did that happen or did you just continue to work all night as you often did?

DP Well, I mean the war began in the year in which I began... Let's think, '39 was the beginning of my year in the fifth form, the School Certificate year.

MB Yes, the beginning of the School Certificate...

DP As you know, it was the so-called 'phoney war' to begin with and that didn't impinge a great deal. I mean we listened to the news and read the newspapers anxiously. And the household, even after my grandparents were no longer involved or perhaps even more than when my grandparents were no longer involved, was certainly politically aware. My parents were both fervant Liberal supporters, my father rather Gladstonian, my mother more revolutionary and radical of the Lloyd George persuasion perhaps. And we read the *News Chronicle* and Vernon Bartlett and columnists of that kind, and were generally unsympathetic to the government, pre-Dunkerque certainly, and we watched the news with some anxiety. By this stage Barbara had actually got married, I think. I forget precisely at this instant the date. But her husband, who was a lino-type operator, went off to the British Expeditionary Force in the autumn of 1939. So we were collectively a bit anxious about what was going to happen and so on through until 1940. And of course it all blew up in April and May, the Norwegian Campaign and then developments in France, just as the run-up to the School Certificate exams began.

MB Yes, around D-Day when you were involved in exams.

DP Well, it wasn't D-Day, it was Dunkerque.

MB Sorry, Dunkerque, I'll get there in the end. So Dunkerque was around the time of your examinations?

DP That's right. Barbara's husband Philip came home from Dunkerque, like a lot of his companions, in a rather bedraggled, disarmed state, but was recalled quite quickly in an attempt to get the defences in shape again for the expected German invasion. My mother started acting as an observer at an air observation post. I wondered about joining the Home Guard, but was considered at that point a bit too young and so on. It was a fairly traumatic time.

MB Yes, amazing years.

DP But the School Certificate went alright.

MB You got prizes.

DP Apart from French, yes.

MB French, you did as expected...

DP And only got a pass in French, that's right, yes. But, the rest went alright.

MB History and Latin you got some prizes, I think?

DP That's right, yes.

MB What about Jack Ralphs? Did he come out of it alright as well?

DP Well, less well than he should have done. He indulged in a peculiar prank … prank I call it. It would have been the spring I suppose of '40 – it may have been '39, I don't remember the dates too clearly – but he and another boy played truant from school for several weeks. And what they did was to leave home at the usual time to catch the train in the morning and walk as though going to the station but in fact along the railway line to the old workhouse, which by now was disused and in a sort of tumbledown state. And they spent the day playing in the workhouse, exploring the cavernous basements and the large wards, and eventually – which must have been quite exciting – following his old interest in walking on the roof, clambering about on the roof. And I suppose it was at that point that somebody saw him and reported to his parents. The silly thing is that all the boys on the train and virtually everybody else in the town I think knew that this was going on, but his parents didn't. And none of us would have told the school anything about it, of course. That would have been absolutely against the schoolboy code. So he was away for several weeks and his performance, I mean, fell a little from that point. He got a perfectly creditable School Certificate but could have done a lot better, there's no doubt. It was a pity.

MB Did you get any rewards for your School Certificate performance? Get any rewards? Get a new bike or do anything?

DP I got a new bike before the School Certificate.

MB Ah well, that's a good way.

DP I mean, I hadn't at this point had a bicycle other than the bicycle I learned to ride on when I was about 7 or something, I suppose. But for my father things were beginning to go a little better. I mean, for some people the beginning of the war meant something of an upsurge in business – farmers for example – and my father was a bit more prosperous and thought he'd buy me a bicycle. That was partly to enable me to cycle to school rather than go on the train in case the train service was disrupted for some reason, and I did begin to cycle to school fairly often. It was eight miles or so and a reasonable sort of bicycle run. I also started cycling to Oswestry to meet Oswestry friends, and not long afterwards we started cycling up to North Wales to camp in the shadow of Snowdon. That's a fairly long bicycle ride up the A5 through Llangollen and Corwen and Betws-y-coed through to Capel Curig and then round to Llyn Gwynant and so on. But we used to go up there to camp from time to time.

MB These camps, just very briefly, we could probably put them on the map. What actually happened there? Kind of outward bound activities?

DP Well, it was subsistence camping really. I mean, we took primus stoves. I knew about primus stoves because my father heated his flat irons on a primus stove. And we used to try and catch rabbits and go and get vegetables from the local farmers and make stews and feed ourselves, and things like that. Generally spend our time chatting about the world.

MB Self-sufficiency times and outings.

DP That's right.

MB With this new GCSE success, you went on to sixth form.

DP School Certificate success.

MB Yes, School Certificate, and you went on to the sixth form.

DP That's right.

MB And specialised in the sciences.

DP Yes, that's right. I mean, as I've intimated sciences were not I suppose my favourite subjects, though I enjoyed them quite well. But it was possibly partly the war-time influence, it was partly Jack Bagnall's influence as a successful engineer. It was partly that my mother's youngest sister Kathleen whom I've mentioned was long-since married to a chap who'd qualified in engineering, again at Manchester Tech, and was by now principal or head of the engineering department in a college of technology. So there were sorts of science and engineering about in the… And the war-time influence was that the country needed the best technicians and scientists it could get. So there was a certain amount of not very overt but covert pressure towards the sciences. And I suppose in a cynical way I thought, you know, so you read history, then what did you become, a school-teacher or something? and I began to think there was rather more to life than that, maybe.

MB So mathematics, physics and chemistry became the order of things?

DP Paradoxically with subsidiary French.

MB You continued the French?

DP Yes, that was at this point taught by Mr Wilshaw, the chemistry teacher, and it consisted of reading French. We read Maupassaut's *Short Stories* and we read *Tartarin de Tarascon*, a rather peculiar little novel by Alfonse Daudet if I remember correctly, and that I found quite interesting. I didn't have that much difficulty with French into English and still don't for that matter, it's the English into French bit that was difficult.

MB And Wilshaw was the main member of staff because he captured you more and more towards chemistry?

DP Yes. The interesting thing about Peggy Woods was that he'd seemed dominant and totally self-confident as a mathematics teacher in the lower school. In the sixth form he was interesting because there was a rather small class – there were only four of us – and we would sit around his desk while he developed the calculus for us. And since that was quite new, that was very interesting, but he was noticeably less confident about it himself. Wilshaw on the other hand remained absolutely

confident and we did interesting practical work; simple organic syntheses, messing about with chemicals, condensers, Bunsen burners, all that stuff.

MB An inspiring time.

DP It was. All that was good. Physics remained not terribly exciting, but alright. I could manage.

MB You could cope with it. By the time you get on to your second year, were you thinking of doing chemistry as an honours degree?

DP I was thinking that if I went any further it would be chemistry, yes.

MB Were there any doubts at that time whether you'd go on to university? I know some of your friends were probably going into the Forces.

DP Well I went through a little patch at the end of the first year in the sixth form thinking maybe with the crisis that's going on in the world out there I'd be better working for a time in a munitions factory before I joined the Services. But I shared this thought with the sole surviving member of the second year sixth form at that time, and we talked about it a bit and I talked about it at home a bit and the general consensus was that I would do better to get trained properly. And make a real contribution rather than assembling fuses or whatever I would have done in one of the local factories. So I stayed on at school. But yes, I did at that point aspire to go to university, though numbers of other people were doing things like going on one year courses and joining the Naval Division or the Air Squadron and things like that.

MB Yes, there was a great exodus.

DP I should mention, I don't know whether it was the influence of boating on the Mere or whether it was an interest in Naval history or whatever, but I and most of my friends were quite clear that if we were going to join the Services it had to be the Navy.

MB David, in that second year of the sixth you start to apply to university. Did you apply for grants, for a university bursary?

DP Well yes, I applied for a state bursary. The government had at this point introduced a scheme of bursaries to send people to university which was in parallel, in addition to the existing state scholarship and county scholarship schemes which had existed pre-war. So I had my name put down for a state bursary to go to university at some point in that year and I entered for state scholarships and county scholarships in the way that one normally did, as part of the Higher School Certificate exercise.

MB And you subsequently got a bursary and a county scholarship?

DP That's right, yes. But it was a drafted arrangement. You didn't get a free choice of where you went or what you read at university. At the end of August 1942 I simply got a letter from somewhere – it may have come via the county, it may have come directly from London – offering me a state bursary to read physics and

radiocommunications at the University College of South Wales and Monmouthshire in Cardiff. Period. And as I've said physics wasn't really the top of my agenda, but radiocommunications sounded interesting and I could see the connection with – we all knew something at this point about radar and how important it was – and it sounded a worthwhile thing to do. So I didn't do anything to resist taking up this bursary, which incidentally offered full fees and travel expenses and the princely sum of one hundred and forty pounds (£140) a year, which was perfectly adequate to live on and even save money on in those days.

MB And so you prepare and start packing to go to Cardiff?

DP That's right, at the end of September '42.

MB Was this about the time that the loss of your sister occurred?

DP Yes, she actually died a couple of weeks before I heard, or a week before I heard, this news about going to Cardiff. She'd been diagnosed as having diabetes some years before, but the trouble had been put right by strict dieting and so on. And for some reason she left off having regular checks, got married, had a miscarriage, and her husband having come back from Dunkerque was sent off to North Africa. She started living with an aunt in Ellesmere, because by this time my grandmother, having adamantly said she would never set foot in Ellesmere again, came back to Ellesmere, driven out of Luton by the bombing. So she was living in Wharf Road with us and my sister was living with her aunt, out of close enough observation perhaps by my mother, and suddenly went into a coma and died. I was actually away on a school farming camp.

MB You were got back, got off the train to be told she'd died?

DP That's right.

MB The end of a relationship that never quite took off.

DP I'm afraid so.

MB But a tragedy for the family and one your father took a long time to recover from.

DP Well, he never did really. I mean, it left all sorts of feelings I suppose that surely somebody should have noticed, somebody could have done something about it.

MB His little 'tuppeny' he called her, didn't he?

DP That's right, yes.

MB She'd gone.

DP That's right. My parents I think could never talk about it really, you know. They would choke if you brought up the subject.

MB And subsequently, within a month or two, you were saying goodbye to them at the station to go away.

DP Yes, they went with me on the familiar steam train track. By now of course the trains had blue-painted windows and blue-painted electric light bulbs and it was all highly austere war-time. And they went with me to Shrewsbury Station, saw me onto the Manchester to Cardiff train, and off I went.

MB And in your writings you say, at that point, I wondered what would come of it all.

DP That's right. I got on the train as Chilton Phillips waving goodbye to his parents and arrived in Cardiff persuaded that from now on I was David Phillips.

MB And found a Cardiff you hadn't expected? You thought it would be a bit mining and a bit industrial.

DP Well, that's right. I suppose I had recollections of Burslem and the Snead Colliery and all of that, and was confronted by this marvellous civic centre in Cardiff.

MB All that stone.

DP With all these buildings with Portland stone.

MB Beautiful.

DP Beautiful, that's right.

MB The government building is splendid.

DP Oh, the museum and the City Hall and the County Hall and the Temple of Peace, so-called. And the University College building which had been designed it's fair to say 'from the outside in' in a characteristic way in about 1900 and shows what it will look like outside, who cares what it looks like inside? But, a splendid-looking...

MB You passed all this on your first taxi ride, you said in your writings.

DP That's right, in my own account, yes. I passed all this on the way to these lodgings.

MB Remarkable lodgings!

DP Lodgings that I'd chosen with a pin from the lists sent to me by the college, which turned out to be, perhaps I could call it, the most notorious lodgings in town.

MB Yes, I think that would be right.

DP It had about seven other young men in it, most of whom were students of mining, most of whom were members of the college rugby football team. And here I

arrived never having ever seen a rugby match in my life, not coming quite from the South Wales valleys culture that they all came from. And Mrs Gunn met me in a friendly manner, took over my ration book, showed me upstairs to a room and brought me downstairs to – there were two sitting rooms downstairs that were used four at a time by these students. And they looked at me sideways and said 'Well what's your name then?' And I said 'David Phillips' in as close an approximation to a Welsh accent as I could manage!

MB And you were home and dry!

DP And they said 'Ah, we'll call you Dai then!' So I was Dai Phillips for the next two years.

MB Mrs Gunn was a real character!

DP Mrs Gunn was a toughie. And she was married to a chap somewhat older than herself who'd been a sea captain in sail, sailing out of Cardiff. And he had wrists the size of my thighs really, but by this time he was well past his best and he pottered about the house doing menial tasks at Mrs Gunn's instruction, like laying the coals in the fire and starting the fires up and so on. Rather a pathetic figure but fearsome in his day I would guess!

MB Where was this house, David?

DP It was in Colum Road, which is...

MB Not far from the university where you were to go.

DP Not at all, no. If you go up Park Place which runs along the side of the civic centre and across the back of the college, then you come to some traffic lights and the other side of the traffic lights it's Colum Road.

MB So, you could walk in every day.

DP It was an easy half-mile walk, if that.

MB So, you start in your new department, physics I suppose, the physics department?

DP Yes, that's right, it was physics. Curious phenomenon that, because numbers of the other boys who'd been directed into physics and radiocommunications like me had also liked chemistry. And since they came from rather intensive hard-working schools in South Wales they thought well, why should we put up with this, we can always do first year, we can fit in first year chemistry as well. It didn't occur to me that that would be a good thing to do at all. I thought well, here I am. Physics, radiocommunications and mathematics; that's quite enough. And so it was.

MB What kind of a set was it, twenty, thirty?

DP There were about twenty doing radiocommunications, I suppose.

MB Some senior people?

DP There were some senior people. There were three students who would have been a couple of years older than the rest of us perhaps who'd already served in the Royal Air Force as radar mechanics I suppose. They were at this point. So they put us all down by starting to introduce the radar jargon that they already knew. They would talk to the rest of us about 'Well, when you come to deal with a PPI, as you know' and we hadn't the slightest idea what a 'PPI' was. It's a 'plan position indicator', a sort of circular cathode ray tube television set on which you get the echoes from radar targets, but they tried to keep us in place by deploying their superior knowledge in this way.

MB But you caught up?

DP It didn't work for long!

MB Yes, you caught them up and went ahead.

DP Well, after a time. I mean I do remember in the first year University College Cardiff was a fairly regimented place. We had to sign the list when we went in to lectures; nothing optional about lectures and practicals in those days. We had exams at the end of every term and even more serious exams at the end of every year. I remember the exams at the end of the first term in physics. I got 26%. That was undoubtedly a record! And I thought well, this really is a minnow in a pool of sharks or something. But it got better later on.

MB Was the teaching good?

DP Well, it was mixed. The physics – we were led to believe that some of the physics lecturers were merely repeating lectures that they'd given every year for the last I don't know how long, and students had passed down lecture notes from one to another. So I remember beginning a lecture on particle physics by some long-standing lecturer which everybody knew was going to be given with the words 'Matter is essentially discreet and particular in nature.' And so it did, and we all chanted it at the same time! But the radiocommunications course was of course something that they'd had to develop from scratch very quickly, so it was taught by a physics lecturer who I suppose had been detailed to do it, who was actually a Manchester graduate.

MB Who had worked with Bragg.

DP Who'd worked with Bragg. And he was one of the few people in Cardiff who, pre-war certainly, had still done some research work. So he was the first x-ray crystallographer I ever met, and his Fourier maps of a molecular structure were the first Fourier maps of a molecular structure I ever saw. And since molecules and chemistry, I mean, still seemed rather interesting, I began to think that maybe physics wasn't entirely irrelevant to that interest.

MB Nice to have that interest that Wood brought in.

DP He was quite good, but his detailed knowledge of radiocommunications wasn't that far ahead of ours. I mean he was busy working a few lectures ahead most of the time, and he admitted it perfectly clearly.

MB A straight kind of person. Back on the digs scene with your new-found friends from the Valleys, you started to go and watch quite a bit of rugby?

DP Oh, I did. I never ever attempted to play, but I went and kicked the ball out with them, I remember, on a green patch in Cathays Park once or twice. But I never attempted to play, but I did follow the game with them.

MB And got quite passionate about it.

DP And went up to the Valleys with the college team to watch them play. And of course war-time Internationals went on in Cardiff, of a sort, and people used to come down from the Valleys in buses. And we would go along and get spare tickets from the people coming down from the Valleys and go down to the Arms Park and watch the war-time Welsh team play, or the war-time English team play or whatever. Yes, it quickly became a major interest and it's the one aspect in which I became a committed Welshman, I suppose. I'm still, perhaps not as passionately as some years ago, but I'm still quite fervently Welsh on four Saturday afternoons a year.

MB Right. With these rugby players you began to take hold of not just an interest in rugby, but also a bit of the drinking that went with it?

DP Oh, that's right. I mean, the students union, which was a bomb-damaged building on the other side of Park Place from the college, was the focus of student life. Unlike pre-war universities it was also quite heavily dominated by young women, because lots of the young men of course were on short courses or didn't go at all, which incidentally led one of the… Which led the college rugby captain to tell us all quite seriously in digs that we should be careful about our behaviour and not behave too ostentatiously as students because a lot of people in the city would have relatives in the Forces and they might very well wonder why we were not there too. So we were a little cautious about being too uproarious as students, except during Rag Week.

MB Ah, this was important. Your first Rag Week.

DP There was a Rag Week in support of the local hospitals of course, at that time in the middle of the spring term, when we dressed up and collected money and did behave with a good deal of licensed buffoonery, let's put it that way.

MB But collected a lot of money.

DP Collected money, yes.

MB And you met your first girlfriend?

DP That's right, yes.

MB I was going to ask about that.

DP I had a friend in digs whose name was Dai Davies, and he played outside-half for the school rugby team and was rather good for the college rugby team I should say. He had a girlfriend, and towards the end of Rag Week he said 'My girlfriend has been up in Aberystwyth playing for the college netball team' I think it was 'and she's coming back tonight and I've got a date with her. But she'll have a friend with her with whom she shares her digs and would you come along too and have a date with this girl?' So, being entirely inexperienced in going out with girls I said 'Well, alright, fine.' So we went down to the station and met these two young women coming back from Aberystwyth on the train and took them out for a drink and went along to the students union dance. And that's where my first relationship with a young woman began.

MB A long relationship evolved.

DP It lasted until the end of the summer term, in effect.

MB In that summer break I think you went to London?

DP That's right. I had an initial plan with this girlfriend that I would spend a couple of weeks in Stratford-upon-Avon. There was still a Shakespeare season going on in Stratford at the time. We formed a plan to go there, and then officialdom intervened. It was decreed that people taking this course would have to go and get some work experience somewhere and I was sent off to Greenford to work in a Royal Electrical and Mechanical Engineers workshop for four weeks or something, wearing Home Guard uniform. I'd been in the Home Guard since the beginning of 1941, I suppose. I'd been a Corporal in Cardiff even. So I tottered off to London with a couple of other friends, found the way to Greenford, got lodged in some barracks and started working on repairing Army wireless sets in this REME workshop. It was not terribly constructive work, most of them we threw away because we couldn't do anything about them and the others we mended, in the traditional way as I later discovered, by banging them to see if that would cure some dry joints or whatever. But in the evenings we went up to the West End to the theatre quite often.

MB And saw some quite good performances.

DP The first professional play I ever saw in Shaftesbury Avenue was Ibsen's *Ghosts* with Beatrix Lehman in the leading female part and Max Adrian as the son. And I saw the Sadlers Wells ballet. I will claim that I identified a red-haired girl in the chorus as being rather better than the rest.

MB Ah – our Moira.

DP And that turned out to be Miss Shearer, that's right. And I saw Margot Fonteyn and others.

MB So, a good summer really, apart from those radio sets.

DP So, a good summer, yes.

MB Back then to Cardiff to a fairly intense year, radiocommunications year?

DP That's right, with a good deal of – well there was a certain amount of Home Guardery.

MB Was that really a serious exercise? I mean, were you regularly involved?

DP That was still serious. We had twice-weekly parades and I must say I quite enjoyed marching the platoon up and down on the parade ground.

MB How did they take to an English corporal marching Welsh Home Guard men?

DP Well, some of them, not then but subsequently, I mean one of them I remember said in years afterwards 'Typical, isn't it. An Englishman comes to Cardiff and what happens? He's made a corporal in the Home Guard!' But I didn't encounter a great deal of that. I mean, my protective colouring was quite good by this time really. After all, Dai Phillips is obviously half-Welsh to pass muster. We used to go on exercises in the Castle grounds looking for German paratroopers and we used to fire-watch in the College of course, and there was the occasional air-raid.

MB Yes, you were still with Mrs Gunn.

DP We were still with Mrs Gunn, yes. There was a certain changeover of lodgers there. The college scrum-half who was also a fellow student on the radiocommunications course, Johnnie Thomas, he came and joined Mrs Gunn and he remained a friend for many years afterwards, so...

MB Was there anything spectacular about that second year? This was a two-year degree course.

DP I had a different girlfriend from the school of domestic science, which of course was going at full-blast and...

MB This was to last the whole year. Another relationship that went a year's span?

DP That lasted the whole year. That's right.

MB You tended to have these relationships and they had to come to an end. Was Father speaking to you still?

DP I suppose so, probably. Not directly because he didn't know much about it. I was busy writing letters, but I certainly shirked a long-term involvement, let's put it that way.

MB And that wasn't to go away.

DP That wasn't to go away for a long time, certainly. After all, by the time you've read Manon Lescaut you know what a dangerous business it is!

MB By the time you get to the end of that course, you've got to do more work. How was that arranged?

DP Well, a delegation came round from some ministry or other to interview all the students and tell them what to do, you know. There was no … there was rather little freedom of action in those times. And this delegation appeared, and it had an interesting constitution. It was made up of two novelists, CP Snow and William Cooper, otherwise known as Harry Hoff, and a secretary civil-servant, and they sat in a room in the college and interviewed us one by one. So I went in to see them and they looked at my record and looked at me and Snow said 'Well, I see you've done quite well. Second in the class, I see. That was really quite good. I think that the place for you to go is to Malvern to the Royal Signals Establishment', as I think it was called at that point. And I said 'Mm, I want to join the Navy.' And he said 'Well, that would be rather a waste. What would you do? Repair radar sets or something? I mean Malvern is a very exciting place, a lot of the country's best scientists are at Malvern and you'd find yourself doing original work and rubbing shoulders with them. Malvern is the place for you.' 'I want to join the Navy' I said. So, Hoff chimed in and said 'Do you really know what Malvern is like? I mean, there are people like Andrew Huxley and John Pringle and all sorts of scientists from all sorts of disciplines. It's a microcosm of all that's best in the university world. I mean, that's certainly the place for you to go to.' 'I want to join the Navy' I said. 'Alright', they said 'join the bloody Navy!'

MB So, that was arranged?

DP That was arranged, yes, and I went off to London and had medicals and things at the Admiralty and found myself at Portsmouth in PP Radar Class.

MB What year was this? We're getting to '44.

DP '44, end of '44. By this time… I mean, you mentioned D-Day earlier on. D-Day coincided with the examinations in the summer of '44.

MB Yes, I knew it coincided with something, David! What did that training consist of that you then got as a radar specialist?

DP Well, it began at *HMS Victory* training as a sailor. I mean there I was, a midshipman – we were all midshipman in this class except for the class leader who was a New Zealand RNVR lieutenant named Scotney, who was supposed to keep us in order and tell us how to do things. And we had to do things like going in to *HMS Victory*, which of course is a shore station based on Nelson's flag-ship, but we didn't go on board Nelson's flag-ship at that stage, it was in the buildings. We had to go to the wardroom guest night dinner and dress up with bow ties and things. That was a new experience.

MB A big experience.

DP My first bow tie. In fact most of us spent the previous two hours learning how to tie bow ties, I remember.

MB And learn how to eat fancy in the mess.

DP And then learn how to eat an apple with a knife and fork, which wasn't quite the way I used to tackle it.

MB You hadn't done that in Ellesmere.

DP No, we didn't do that in Ellesmere. Or with Mrs Gunn for that matter! And we then did a good deal of marching around on the parade ground, but I was used to that, except that Naval drill involves less stamping than Home Guard/Army drills. So there were some subtle differences, and salute differences and so on.

MB David, one thing you might not mention but I should is that you'd become quite a good shot already, so that on the rifle range you must have been rather effective.

DP Yes.

MB That's true, isn't it? I mean you could really pack them into a small spot?

DP I was a good shot, yes. I don't suppose I am now, but in my day that was the one thing I could do, yes.

MB And so people came to watch you shoot?

DP People gathered round when I was at the butts, yes. As the chap signalled 'A Bull' people said 'That must be Dai Phillips!'

MB So you learned to do all the things that basically an officer would require?

DP That's right. We went to *HMS Excellent*, the gunnery school, and learned how to control Naval guns in action. And we had a week at Roedean in Brighton, which had been taken over to teach RNVR officers seamanship, so we learned how to erect sheerlegs and how to tie knots and all that, all that kind of stuff. And then we went to *HMS Collingwood* at Fareham to learn about radar. That was the radar school.

MB How long were you in that kind of training?

DP I suppose two or three months, something like that. At Collingwood we learned all about – well one came out filled not with acronyms but with numbers, like 281 and 288 and 277 and 293 which were the numbers of the various radar sets that operated at different wavelengths or frequencies. And at the end of all this we got despatched to ships in various places.

MB But was there a feeling that the war would come to an end before you got on board a ship?

DP Well, yes. I was actually in Portsmouth at the end of this course waiting to be allocated a ship on VE Day, so it was all a question of how long the war in the Far East would take. And there was of course, even within the Service as I knew it, no

intimation of the development of atomic weapons and the possibility that the war might end rather abruptly. I mean it looked as though the Japanese would fight to the last man and that the Navy would be rather important in that.

MB So there was no suspicion of that. You were sent to Rosyth.

DP So, I was packed off to join *HMS Illustrious*, a fleet aircraft carrier, which was refitting in Rosyth at that point, with a view to going straight out to the Pacific to join in on the attack on Japan.

MB So, you join a first ship and live on board ship for the first time in dock?

DP That's right. Well, I get on the train and go up to Edinburgh and then to Rosyth and take a taxi into the dockyard, walk up the gangway and say – I was still a midshipman officially, though I was promoted to a sub-lieutenant within weeks of getting there – 'Midshipman Phillips reporting for action, Sir.' They didn't know anything about me as it turned out, but they were used to that and allocated me a cabin. And there I was in the wardroom of *HMS Illustrious* being refitted, the ship populated by dockyard mateys, many of whom were women incidentally, doing the riveting and welding and so on, and a lot of new radar sets, some of them American, being fitted.

MB So, it was an important refit?

DP It was a major refit.

MB And you were second in terms of radar authority.

DP I was. There was a lieutenant-commander, Brian Place, who was the radar officer, a long experienced chap with a lot of experience in radar, and me. And we were supervising this refit, learning where all the wires went, helping to design the new communications and display system. There was a radar control room where we interacted with the people whose job it was to direct the activities of the fighter aircraft that had to take off to repel the expected kamikaze bombers and so on. So the radar results were plotted on a large screen and the control officers spoke to the fighter pilots who were supposed to intercept them and so on.

MB Was this a fulfilling role? Having all that training and having been at university, did you actually find yourself doing something you felt worthwhile?

DP I think that was probably better than going to a ship that was already at sea and going through routine operations. It was. There was an element of creativity about it.

MB And you had a sense of authority, because you actually stacked up in the pecking order there quite well as a radar officer.

DP Well, I mean it quickly became rather peculiar, but from the beginning I had, as a sub-lieutenant, more access to senior officers than some of the lieutenant-commander seaman officers seemed to have. And they didn't like that particularly.

MB No, I can imagine.

DP But as a technical person one was slightly different, I suppose.

MB David, you had some fun as well. You mentioned playing the harmonium for a service one morning, because there was a bit of you that was a musician that we haven't talked about.

DP Well, that happened a little later on. And I think it evolved from the fact that after my early violin lessons at which I made no progress, when we moved to Wharf Road, I transferred to the piano at which I also made rather little progress to my lasting regret, but...

MB You did know three tunes.

DP ...but, I did know three tunes, as you say. And from time to time I would sit down at the wardroom piano and play one or other of these tunes or maybe try to pick out one of the songs that we used to sing in the wardroom of an evening. And the commander was well aware of this. I also joined the ships choir. The commander, the ship's commander, that's the second-in-command, had a rather good high tenor voice and he was quite keen on having a ship's choir. So I joined that, and learned how to sing a bass part and so on. Well, one Sunday morning he walked into the wardroom and found me sitting around there doing nothing and said 'Phillips, Warrant Officer Smithers' – it wasn't Smithers but I've forgotten his name – 'is off sick this morning,' he was the ship's organist, 'You will play the organ at church', and walked out. Now, you know, the Navy is the Navy. That was it. So I wondered how I was going to cope with this. And I went up to the hangar, the ship's hangar, which ran the full length of the flight deck with lifts connecting it with the flight deck, which is where the church service took place, and sat at the harmonium. I knew about playing a harmonium because my mother had done it, so I knew one had to pedal the pedals to produce the wind for it and I knew one had to pull out some stops, so I did all that. And the ship's company mustered and the captain stood up to start taking the church service and announced the first hymn. I carefully arranged my fingers on the keys and struck the first chord, and everybody started singing and I left off, and then we came to the next verse and I struck the opening chord again and they went on singing and I left off. And so it went on through the service. The commander never said a word to me ever about this. He probably thought that was resource. I don't know. But he never said a word about it. Some of the radar mechanics said the following day 'I didn't know you played the organ, Sir, but you did play very quietly!'

MB David, you get this refit completed?

DP No, VJ Day interrupted that. I was actually at home on leave when the atom bombs were dropped and that was clearly the beginning of the end. We all agreed that the Japanese were not going to last much after that, and indeed they didn't. And the refit was changed; not ended, changed. The American radar sets were taken away and UK radar sets were put in instead. So instead of the American SM1 with an enormous aerial, we got a UK293 which was essentially the same sort of thing, like a search-light but with a smaller area. So that delayed things a little, but before

Christmas we sailed round from Rosyth, north about, around, to Plymouth, which was the ship's home port.

MB You actually sailed anyway. You eventually got to sea?

DP Oh yes, and we then went down to Gibraltar, the ship having been made into the fleet trials carrier. And at that point they were busy trying to find out how to land jet aircraft, jet fighters particularly.

MB So, you spent time with the fleet air-arm landing things on you?

DP That's right.

MB Was it a satisfying period, being at sea and doing that kind of work?

DP Oh yes, I was and am very romantic about the Navy and the sea and that was...

MB That was a good period?

DP That was splendid, yes.

MB Were you thinking about what was to come later as well, because there wasn't much war left.

DP There was a little bit of ... there wasn't any war left, there was a question of what point does one get demobbed or just possibly... Since radar was newish and certainly going to be increasingly important in the future, I mean, there was talk about different forms of gunnery and radio-control of rockets and things like that. So it was clear the Navy was going to become more technical, so there was a little bit of talk of people staying on. And indeed my friend Johnnie Thomas from Mrs Gunn's, the college scrum-half, did stay on in effect and became a captain before he retired later on in the nuclear submarine front.

MB Were you tempted?

DP No, not particularly. I didn't know quite what I wanted to do, but there was a government scheme for ex-servicemen either to go to university if they hadn't been or to go back and complete their studies if they had been. So I thought let's try that and see what happens.

MB Back to Cardiff?

DP So, come the spring of '47, which was exceptionally cold, snow everywhere, I had what everybody confidently expected would be my last first class railway ticket and went home to Gobowen where I was picked up by a family friend. And that was the Navy. Then I went back to Cardiff for the summer term to get back into the swing of college life. Not to MrsGunn's – I wrote to her but she was, her premises were full – and she recommended a friend in a different part of Cardiff. So I went to stay with Mrs David instead in Canton, if you know Cardiff, and starting from the September began on the honours year, the honours physics year.

MB Which went well.

DP Yes, it was, it was slightly difficult to begin with. Maybe I got over some of the difficulty in the summer term, but learning again how to listen to lectures and how to study and think about it and tackle new relatively difficult conceptual things, for a time that was tricky. But I got on top of it by the end of the year.

MB By the end of the year, yes. You went up a little bit earlier I think to get back in tune with...

DP Well, I was there for the summer term of the preceding year.

MB Yes, so you had a term and a whole year.

DP That's right. One of my friends who'd been on the radiocommunications course '42 to '44, Eric Stanley, came back a little later and he decided he would take two years over the Honours course. But I thought I'd wasted enough time already.

MB You came out near the top of the lists.

DP No, not near the top of the lists. At the top of the lists.

MB At the top of the lists, yes. And then there is a question of industry, further research?

DP Yes, people came round from ICI and various other companies and said 'You don't want to do research. The thing to do is to join industry now. We at ICI are developing terylene at Harrogate. Why don't you come to Harrogate and help us develop terylene?' And I did think about that and went to see them, and in the end decided one way or another that I would rather do research. And this was partly because the only research on offer was x-ray crystallography which I'd heard about from RG Wood and which related to chemistry to some degree. So it appealed to me, going back to earlier days, and I thought that sounded a good thing to do.

MB You signed up with Wood?

DP No, he by this time had left the physics department and become a hospital physicist. That was his evolution so. I did see him from time to time but ... he worked at the Royal Infirmary as a hospital physicist on radium needles and interesting things of that sort.

MB So, he'd moved away.

DP And he'd been replaced by a Canadian who'd spent the war as a conscientious objector in Cambridge with WL Bragg and others, who was a crystallographer, though not engaged in structure analysis. A Canadian by the name of AJCWilson. And at this point he was a reader in the physics department. It was still the same professor that it had been in my earlier days, but he was a reader, and it was he who took on graduate students. So he took on me and one other as graduate students, to do

crystallography. He wasn't at all a chemical crystallographer and that was my interest. He was a theoretical crystallographer in the main, so his approach to introducing me to chemical crystallography was to say 'Well, here are some bottles. The compounds in these bottles are alkaloids which you may have heard of, at least most of them are. Why don't you see if you can crystallise any of them, and if you can work out the crystal structure?' So I said 'Alright', and went away and started crystallising these things from these bottles. And the first that I crystallised was a substance called ephedrine hydrochloride, which is the stuff which is present in anti-decongestant nasal drops. I crystallised that and it included a chlorine atom. Now, I don't want to get all technical about determining crystal structures, but there is a fundamental difficulty in it. And one of the ways around that is to introduce an atom that's heavier than the rest, preferably in the same place as another lighter atom, so that you can use the method of so-called isomorphous replacement. So I also got a quantity of ephedrine hydrobromide and crystallised that as well, and worked out the structure by the method of isomorphous replacement, in the days when one... Well, I began by constructing an x-ray set from Army surplus rubbish.

MB Army cameras?

DP That's right. They had a camera or two from Wood's day, so I was able to use those. We estimated the intensities of the x-rays by looking at photographs covered with black spots and guessing by eye how black they were in relation to some arbitary scale of black spots.

MB Visual discrimination at that time?

DP Visual estimation, it was called. That's right. And all the calculations we did by hand. No computers. Just a few calculators, but not today's pocket calculator. I mean the sort of adding machine you found in shops in those days with a handle to turn. So my total three years work leading to a PhD, I would guess a competent graduate student not working very hard could certainly do in a month, probably in a fortnight nowadays.

MB But that was a different time.

DP They were different times.

MB And those were only small molecules really?

DP Very, yes.

MB Thirteen or fourteen atoms?

DP A dozen or so atoms, that's right. The most interesting part of it perhaps was that right at the beginning of this period Wilson was still working on an idea that he'd had in Cambridge which had to do with a peculiar question – can you, using x-ray measurements, decide whether a crystal structure has a centre of symmetry or not?

MB A classical question.

DP Now, biological compounds as you know tend not to have centres of symmetry, they are optically active. And that was an important question, therefore. And the accepted answer was that because x-ray reflections from that side of a central crystal planes and that side of a crystal planes are bound to be pretty well identical... I mean, there's an exception to that too, but since they are bound to be identical obviously you can't do it. It's one of the things you can't do by x-rays. Now, Wilson had done some work on the statistics of x-ray reflections from crystals. And he decided in a flash of insight in round about the spring of '49, which was in my first year as a graduate student, that by looking at the statistical distribution of x-ray reflections from a centre of symmetry and non-centre of symmetry crystals you could distinguish between them. Now the question was, was he right? Would it work? So he came into the lab and described this finding of his to myself and the other graduate student. As it turned out I was the only person who had available some x-ray measurements that I'd made of a centro-symmetric projection and a non-centro-symmetric projection from ephredrine. And in collaboration with a junior lecturer named Don Rogers and the other graduate student whose name was Eric Howells we set to work on using these intensities and some others that we got from other people scattered around the country, to see whether the Wilson paper had actually got it right. Rogers actually devised a quite good semi-graphical test of the statistical distribution, and using my intensities and others we showed that it worked. So, there's a paper by Howells, Phillips and Rogers which was at the time much quoted, which showed that it is possible, practically, to decide whether a crystal structure has a centre of symmetry. It doesn't sound a very big deal, but...

MB But it was important then.

DP But it was important then, and it was a very good introduction to, if you like, the importance of ideas in research. And also important in the proposition not to rely too much on dogma, really.

MB I was just saying Wilson was probably an impressive person, from what you've said.

DP He was. He died recently in his early eighties. He was not a very conversational person, friendly enough. He would come up to the office where I worked in the second year, where Eric Stanley also worked, and as often as not he would sit on a stool and say nothing and leave it to us to say what was worrying us or what the difficulty of the moment was, or to start a topic of conversation. I remember once saying... There's a test one does to see how good the analysis is, how well do the observed x-ray measurements agree with the calculated x-ray measurements, and you produce a sort of reliability index...

MB About the position of the atoms?

DP About the position of the atoms, that's right. Now if you're dealing with a centro-symmetric structure, I observed in my work on ephedrine, you get a higher reliability – well, the index shows that the measurements agree less well than they do than if it's a non-centro-symmetric structure. So I said to him on one of these occasions 'What do you think the theoretical background to that is?' And he said 'That's an interesting observation', and after a little while went off and came in the

following morning with it all worked out from his statistical analysis. So that was another little paper in *Acta Crystallographica*.

MB That was just starting off, that journal, at that time, was it?

DP Yes, 1948, I think.

MB Yes, so you were publishing early in that?

DP That's right. Some of the founder papers. He was a Canadian who came from Novia Scotia and we talked about, we used to joke among ourselves about the price of fish in Nova Scotia or some inconsequential thing like that.

MB But he was a supportive person despite his quietness?

DP Oh yes, very.

MB It's nice to have him on record.

DP As I say, he was tremendously good at this theoretical end of the game. The practical end of it I had to learn for myself.

MB So, you came out of this PhD work with papers, and some were technical and some were on molecular structure, I'm gathering?

DP That's right, yes. Eventually there were papers on the structure of ephedrine hydrochloride and the structure of acridine, and some papers on little technical developments like devices for calculating by hand, which now can be done easily on a computer. That kind of opportunity is not open to graduate students these days. I mean, they are presented with a computer and a program that somebody else has written and they don't have to work it out for themselves. I feel rather sorry about that in a way, but of course they can tackle much more challenging problems.

MB But, there were two wings to what you were doing; the technical input, all the time trying to find a better way round a lot of fundamental problems that have to be resolved in a new, relatively new field, and the other side, the joy of molecular structure which had been there for a long time.

DP That's right. A benzene ring with side chains, all that sort of thing.

MB Ah yes. Exciting though, isn't it, constellations of microscopic...

DP Actually looking at structures is – it remains a thrill really. The journals are full of them nowadays.

MB And you finished that thesis called...

DP 'X-Ray Studies of Compounds related to certain Alkaloids'!

MB It was a good piece of work and you went through the examinations.

DP They had a very curious system of examinations in Cardiff in those days. There was of course an external examiner for the normal degree examinations going on at the time, and this person also had to be the examiner for PhD's, but because he probably wasn't an expert in the topic of the PhD thesis the thesis was sent to an external examiner for review. So in this case my thesis was sent to a man named EG Cox – Sir Gordon Cox as he later became – who subsequently became the secretary of the Agriculture and Food Research Council and became another contact later on. I went to see him just last week as it happens and we talked about that. He wrote a report on this thesis which he obviously thought was alright. But I had inadvertently mentioned in it that looking at structures, even the structure of the benzene ring and measuring the bond lengths, was certainly more advanced than theoretical calculations of molecular structures. And it happened that the external examiner for the degree course that year was a man who'd even written a book on theoretical physics and he was somewhat aggrieved by this sentence. So it was the only sentence in the thesis that attracted his interest at all and we had a, somewhat difficult for me, debate about this very ill-advised comment of mine. But I was given the degree in the end, well on the spot really.

MB What was your social life like in those years of your PhD? Did you have another relationship or semi-relationships?

DP Yes. By the end of the PhD I had yet another somewhat long-standing relationship with a young woman who was a medical student in Cardiff at the time. And of course the students union and Saturday nights in the Woodville, the Woodville Arms, were no longer quite as important as they were in my undergraduate days. I still watched rugby, particularly Internationals. We still rushed out and got tickets from the fans coming down from the Valleys, cheered Jack Matthews and Blethin Williams and other luminaries of the Cardiff and Welsh teams. Listened to the College string quartet quite a lot. Went to visiting orchestras. I remember the Berlin Philharmonic coming, which was rather early in the rehabilitation of the Berlin Philharmonic. I belonged to the Film Society and watched classic films like *Les Enfants du Paradis* and so on.

MB So, it was a good time?

DP It was a great time.

MB So, you're really stacking up and finding a way to a new research future?

DP Well, a new future. A new life, yes.

MB And at the end, with postdoctoral status.

DP Well, at the end… Well, the degree examination was in the summer of '51, so I completed my PhD in a little under three years and by then wondered what to do as a postdoc. I mean, there were beginning to be advertisements for postdoctoral positions, but the number of postdoctoral posts in 1951 was a great deal less than the number available now. But one advertisement was for postdoctoral fellowships in Canada at the National Research Council Laboratories in Ottawa, a scheme that was

devised by the Canadian government in order to attract scientists from all over the world to Canada on the short-term but rather in the hope that some of them would stay and help to build up Canadian science. So much encouraged by Wilson, who as I've said was a Canadian, I applied for one of these and was given one. And in September '51, [I] sailed from Liverpool in the Empress of Britain for Quebec, and thence to Ottawa.

MB Again seen off by parents.

DP Again seen off by parents. My father at this time – let's think, 51 and 23 is 74 – was 74. He tended to be of a pessimistic frame of mind and I suspect he thought I shall probably not see him again, but it didn't turn out that way.

MB Was your girlfriend there also to say goodbye?

DP No, she wasn't there.

MB But, you were going to write to her still?

DP I was going to write, that's right.

MB David, before we take that story across the Atlantic it would be quite nice to know your views of that time. I mean, what was the position of x-ray crystallography in Britain as you developed this studentship and got a PhD? Was it a field that was clearly expanding and exciting, did you have links with other universities or was it fairly isolated pockets?

DP It wasn't an entirely new thing in Cardiff because of Wood's work. So there was a junior lecturer, there were two junior lecturers who were actively engaged in it, slightly more on the theoretical side than in just determining structures, hence the mixture in my work. And we did have contact with other groups, I mean, partly because we needed information from other groups for trying out these theoretical ideas. In addition we went to national conferences from time to time. There was an organisation called the X-Ray Analysis Group of the Institute of Physics which held annual conferences in various places. And I remember particularly one of them in London. I remember it particularly for two reasons. It was when this work on centres of symmetry had come to a head and created a good deal of interest, so we were going to talk about that. And the other reason I remember it is that I and two of my friends had all bought motorbikes at this point and went up to London by motorbike, which was the longest journey we'd yet attempted by motorbike. At that meeting I saw Bragg and Dorothy Hodgkin and other leading figures in the field, and got to know some of these people. And subsequently in the summer of 1951 there was, I suppose it must have been the second trial meeting of a newly founded post-war organisation, the International Union of Crystallography, which met in Stockholm in Sweden in the summer of 1951. So I went with my friends to that meeting and there all the world's crystallographers were assembled. It was a very pleasantly small field at that time, so if you were in the field and reading *Acta Crystallographica* you actually knew the names of just about every active crystallographer in the world. And the leaders like Wilson, I mean, personally knew all the leaders in the field and there was no stuffiness about being introduced to them. One of my vivid memories of Stockholm

was actually in Uppsala, where part of the meeting was held, walking down the road behind two other people. The other two people were WL Bragg, who was the real founder of structure analysis, and Max von Laue who was the first person, or he and his student colleagues, the first person to observe x-ray diffraction by crystal. And there they were, you know, from here to there, walking down the road in front of me.

MB A special moment?

DP A rather special moment. The other person who made an impression on me was Dorothy Hodgkin who played quite a part in my subsequent life. She was there talking about her relatively early work on Vitamin B12. And what was most interesting about that was she was showing early electron density and Patterson maps, which is a bit technical and we don't have to go into it, electron density maps as she thought of the structure of Vitamin B12. Now B12 has a cobalt atom in it which is nice and heavy so there's a straightforward way of finding out where that is. So she had the cobalt atom and there it was, a mountain in the middle of this map, and nobody argued about that. That's the cobalt atom. And around it were all sorts of vague shapes and Dorothy was saying 'Well, this looks to me something like a porphyrin nucleus', and nobody in the room could see anything vaguely resembling a porphyrin nucleus, but she was right in the end.

MB But, that looked a bit vague at that stage?

DP It looked extremely vague at that time. I'm always reminded by the bit in the *Midsummer Night's Dream* about a poet, you know, about 'with his poet's eye, in a fine frenzy rolling' who 'gives to airy nothings a local habitation and a name.' That was Dorothy. She could see things that other people couldn't see. Extraordinary.

MB Did you get to know her at that stage or was that to come a bit later?

DP Oh, in passing. I got to know her when I got to Ottawa because she had a sister who lived in Ottawa. And Dorothy used occasionally to come to see her sister and when she was there she came into the lab and we had a chat about what I was doing and she knew of me. She knew of me from the Cardiff research days.

MB That's taking us on our journey a little bit ahead of time, but let's just get you to Canada before the end of this session. You leave Liverpool?

DP Yes.

MB Go across the Atlantic and land in Quebec.

DP Via Greenock actually, and landed in Quebec.

MB An important moment, and I wanted Quebec to be our kind of landing post and staging post to our next session.

DP So, we sailed up the St Lawrence. And here is the romantic Phillips looking out at the high ground to the left, the Heights of Abraham, thinking about Wolfe taking his troops along the river in boats with muffled oars on the night before the

battle reciting Grays' Elegy to them and saying 'Gentlemen, I would rather have written that than take Quebec tomorrow.' That was Wolfe. He did take Quebec tomorrow, but he died in the event. And of course when I landed in Quebec and walked up into the town on the way to catching the train from there to Montreal, I expected to find a statue of Wolfe in a prominent place.

MB Not a bit of it.

DP Not on your life. It was Moncalm, the French leader, who also died in the battle, so I got a somewhat immediate feel for the difference between French Canada and English Canada, but...

MB You were in Canada.

DP I was in Canada.

MB David, that's from where we're going to take the story next time.

DP Okay.

MB For today, thank you very much.