Peter Farndon

Personal Details

Name	Peter Farndon
Dates	Born 1950
Place of Birth	Chesterfield, UK
Main work places	Birmingham UK
Principal field of work	Clinical genetics; genetics education

Interview

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INTERVIEW WITH PROFESSOR PETER FARNDON, 7 NOVEMBER 2013

PH = Interviewer (Peter Harper)

PF = Peter Farndon

PH It's Thursday November 7th 2013 and I am talking with Professor Peter Farndon at the National Genetics Education and Development Centre in Birmingham.

Peter, can I go back to the beginning and ask first, where were you born and when?

PF I was born in Chesterfield in Derbyshire in 1950.

PH And did you come of either a medical or scientific family at all?

PF Neither.

PH What did your parents do?

PF My dad was a cylinder liner turner at Sheebridge Stokes in Chesterfield and my mum was what these days you would call a housewife.

PH So were there any particular factors that you think may have taken you in the direction of medicine or science?

PF I think one of the main factors was a BBC television programme called – I think it was called – The Meaning of Life – which was I think on at 11 o'clock on a Monday night in the Sixties and I was allowed to watch this programme and I sent away to the BBC for the two pamphlets and it was absolutely fascinating because it was around the time of Jacob and Monod and they were talking about the One Gene One Enzyme hypothesis and I was absolutely fascinated by the genetics. And then half way through my senior school I came across a biology teacher who took us onto the new – I think it was the Nuffield Foundation A-level course - which was a new syllabus and as part of that there was genetics involved in that and I was just fascinated by it. So in fact I terrorised the rest of my school into doing a project where I made them all taste phenylthiocarbamide pieces of paper which was then written up in the school science review. And I loved the genetics examples in the A-level paper. And then, I don't know why I went into medicine, I have no idea, but I then went to London University, to King's College Hospital. But first of all I started in the Strand and in the second term there was a series of genetics lectures which made me furious and I wanted to stand up to the person who was talking about biochemical genetics and shout "There's much more to it than this, you are ruining this subject, you are making everybody bored, it's really fascinating".

So then what happened was I was called to see the Professor of Biochemistry who said "Would you like to do an intercalated BSc in Biochemistry?" Well the thought had never ever entered my mind because I thought that myself and biochemistry did not go together. But then I thought oh, maybe in the Biochemistry degree there's some genetics. So I went to see him and said "How much genetics is in this degree?" and he said "A whole half course unit". So my spirits fell. And then I met a girl in a lift, as you do, and I said "Aren't you one of the Biochemistry students?" and she yes, so I said "how much genetics is in there?", so she said "not very much but I've got a friend at University College who is doing a whole degree – an intercalated BSc – in genetics". So I walked up Southampton Row to University College, got the prospectus, went back to King's and brazenly said to the Professor of Biochemistry "I don't want to do a Biochemistry degree here but can I go to University College, please, and do this in genetics?" so he said "Smarty pants, there's the telephone then …". No, first of all he said "there's no such thing" so I said "well actually there is because here's the prospectus". So he said "well, there's the telephone, you ring up and find out about it". So I rang up and Bette Robson answered the telephone. And she said

"well, you had better come and look around". So I went and looked around the Galton laboratory and she started out by saying "we haven't got any spaces left, but I'll show you round anyway". But at the end of the time she said "If King's will have you to do a Biochemistry BSc, we'll have you here, we'll offer you a place here". So I went back to King's and said this to the Professor of Biochemistry and thought no more about it because, as I said, I didn't think that biochemistry and myself got on at all well. Anyway, the second MB results came out and next to my name was a little star and at the bottom it said "please go and see the Professor of Biochemistry". So I went to see him and he said "OK, I give in, you can go to University College, to the Galton laboratory, to do a BSc in genetics" and it was a revelation really because at that time in medicine you were kind of told "This is what you need to learn – just learn it". Whereas Harry Harris, who was the Professor there, said "what do you think about this?" So we were invited to take part in everything and it was while I was there that I discovered that I have got 3 rare genetic variants, including a peptidase D variant, and so throughout my medical career I kept getting requests for samples from Sue Povey to send my blood all over the world for people who were setting up biochemical tests. So I had a personal interest in that as well. So I then went back to do Clinical Medicine at King's College …

PH Can I just stop you a moment before that and just ask what year was it roughly that you did your intercalated BSc?

PF That would be 1971.

PH And while you were at King's, were you aware of the fact that this was where Maurice Wilkins and others – Rosalind Franklin – had been working on the structure of DNA in that building, or ..?

PF I suppose if I was it hadn't crossed my consciousness. Isn't that interesting that I worked essentially in the same building? I hadn't thought about that.

PH I have asked somebody else about that, and they were equally unaware. And then, of course, Harry Harris was at one point Professor of Biochemistry at King's. Who was the person who was Professor when you were there?

PF I was trying not to give his name. It was Professor Arnstein.

PH OK. It doesn't sound as if he was terribly sympathetic to Genetics at all.

PF I think it was just this crazy medical student who was suggesting things that had never been done before. Because when I actually tried to change college in London University, that was a major undertaking. But we managed it OK.

PH What was the subject of your intercalated BSc?

PF It was Genetics. And Robin Winter had done it a year before, I now know.

PH Was it purely a taught degree, or was there some kind of project as part of it?

PF No, there were projects as part of it. So I worked with Dr Paling-Wright on looking at DNA repair in XP patients, which was all done with isotopes and everything in those days. So that was the project that I did from that, but it was a very laboratory-based course as well so, although we had several course units, we did a couple of course units in the Biochemistry department. And when I look back at the notes about the understanding of the whole process of translation and transcription from DNA into the phenotype now it's just amazing to see how little we knew at the time as part of those two course units.

There was a course unit on human genetics which was a lot to do with polymorphisms, because of course that's what the Galton laboratory was really interested in. And there were another couple of ….. oh, there was a course unit on cytogenetics and this was before banding had come in so we were invited to look at our own chromosomes, pre-banding era and I've still got my karyotype from that

stage now which I show to the medical students. It was interesting really that nobody gave a thought to the fact that you might actually find an unusual karyotype in one of us when they did it, which of course you'd worry about now but they didn't then. And then, the group that I was with was so interested in this genetics that we spotted in the prospectus for University College that there was another half course unit called – what was it called? - "biometrical statistics of genetics", which Cedric Smith was put down as being the tutor for. Well it had never been run, but we were so interested in it that we actually persuaded them to put this course unit on. And that was absolutely fascinating because Cedric was amazing in how he could actually describe all the different things and he always used to number the people in a family if you were trying to work out probabilities of various people and he would always call them A, B, C and D. So he would always call the first one Arthur and the next would be Betty, and so on and that was an idiosyncrasy that went straight through to the exam paper because he did a similar thing with all the people on the exam paper as well.

PH I am interested by you saying that because while I was at Hopkins Tony Murphy, who ran the course there and applied Bayes in genetic counselling, he always used to invent a name corresponding to the letter, so probably he would have got that from Cedric Smith. Cedric Smith must have been quite elderly at that time, was he?

PF He'd got a shock of white hair, yes.

PH How about Harry Harris? Did he give much personal input to the course, or not really?

PF Yes, he gave lectures, there was a course unit on biochemical genetics. But he was around, and very approachable, and was always interested in everything that was going on.

PH So when you then went back to your clinical course …..

PF Oh, the other thing about the Galton, we absolutely made full use of everybody. I mean, Sue Povey was there and very helpful and – isn't it terrible, I've forgotten her name – there was the lady who did the fingerprints. Holt, was it ……?

PH Sarah Holt.

PF …. who was amazing, we just thought she was wonderful in the way in which she could interpret all the dermatoglyphics. The police would arrive at regular intervals with boxes of dermatoglyphics for her to look at as part of the forensic examination of things. Oh, and we had another course unit with Hans Grüneberg on skeletal malformations in mice, as the mouse is another organism for how to study human diseases.

PH I've always felt that he must have been an important person in linking up with people like Robin Winter who then translated that onto the more human stage.

PF A lot of the work was actually on the skeleton though. He asked us to spend hours putting together mice skeletons to actually work out what the phenotype was.

PH So would it be fair to say that that was a fairly formative year at the Galton?

PF As you can gather from my enthusiasm, it was a revelation. It was a revelation from the point of view of the subject itself, which we all just loved because it was so exciting and I think even at that stage I could see that it had got applications later to medicine. But I think it was the buzz of the place and how as a meagre student all the staff and professors actually were interested in what you thought. So they would actually get you to think about what was going on rather than just do it, and that was the exciting bit.

PH Coming back then to the more mundane perhaps clinical years, where did you do your clinical …?

PF I did it at King's College Hospital in London, my clinical training, and during that stage I did an essay called "Epidemics of spina bifida". So I went to see …. one person was Robert Winston, but also his colleague Professor Campbell …

PH Stuart Campbell?

PF …. Stuart Campbell, to talk about ultrasound. And I also went to see Cedric Carter. I'd met Cedric Carter previously because I joined the Clinical Genetics Society. Well to say I joined it is not true. I used to go along to their meetings because they used to let me go along to them as a student. So I'd met Cedric Carter before but I went along to talk to him about a career in clinical genetics. And he said – as well as talking about the spina bifida – he said the most important thing is to make yourself a proper doctor because the only way that genetics is actually going to be accepted in mainstream medicine is by people who can talk the same language and have the clinical skills that all our colleagues have got. And I had an example of exactly that when I was a senior registrar in Manchester. If we remember, we'll talk about that later. So I took his advice actually and decided that the best thing to do was – having qualified – to do as many different house jobs, and get qualifications in paediatrics and adult medicine. So that's what I set about doing. So having done house jobs in London we then moved to Warwickshire on the basis of a recommendation by somebody who had been a fellow houseman who said that the Membership training in South Warwickshire was brilliant. And I had just got married so we wanted to move out of London as well – and have a baby actually – so I did jobs in paediatrics, neonates, chest medicine, obstetrics, general medicine. So I got MRCP in adult medicine and a DCH to set me up and then I got senior house officer jobs and registrar jobs in general medicine and paediatrics. I decided that I really would like to get back into genetics.

Throughout my career, at that stage in the 70s, just about anybody that I said I'd like to be a geneticist said one of two things. Either: you are completely barmy because it's a non-job really, you don't see patients and what good are you going to do, and things like that. Or there was this undercurrent that you couldn't be an adequate clinician if you were going to go into genetics because it wasn't perceived that one needed clinical skills as part of that. So I suppose like some of my contemporaries we were aware of that kind of background. But I think we could see even then – this is even before a DNA probe had been invented - that actually just talking to people and giving them information and actually making diagnoses was really quite important. So I then began to look at senior registrar jobs and one came up in a unit and I was working in Southampton at the time – paediatric registrar in Southampton - and Nick Dennis, who was the consultant clinical geneticist there, was a wonderful role model about how actually you could be a geneticist and a clinician. And the Professor of Paediatrics was very helpful as well.

So I began to look for jobs and a job came up, a senior registrar job came up in another unit and I read the job description and it confirmed all my worst fears. And I thought: I don't want to be a geneticist if that's what the job is. And then the job came up in Manchester and I read the job description and I thought: wow, this is just what I want to do, a mixture of research and application and patient care and being on the practical application of genetics. So I applied for the job in Manchester and was really privileged to work with Rodney Harris and Dian Donnai who were just the kind of people that I envisaged a geneticist should be. And of course it was exciting at that time because Andrew Read was there setting up the DNA service. So I enjoyed my time in Manchester. Rodney wanted me to do an MD on HLA because that was his specialist field. So we looked into what I might do with that but I thought: I think I would quite like to do a linkage analysis and try and find a gene and try and understand a gene, so we then had to try and decide what to do and Dian said to me: I have just seen a patient in a clinic who, as they walked out said, "Oh by the way you don't think my son will get the same thing as my dad and get lots of basal cell carcinomas do you?" So that's how I got introduced to Gorlin syndrome. So I set about – as one did in those days – finding the families. And there was considerable resistance from the Medical Director at the Christie Hospital who couldn't see – and I think I've still got the letter

somewhere – saying that he couldn't see how genetics could be of any value to patients with these groups of disorders. And, anyway, it was all patient confidentiality and he couldn't possibly tell me who the patients were with that diagnosis in his hospital. We found ways round that by trying to explain really what the benefits were, but that would have been in 1982, so it just shows you the attitudes that were around at the time.

Just going back to the story about a geneticist can't be any good clinically, I was asked to go and see a baby on the special care baby unit in Manchester and noticed that the baby in the next cot was actually on CPAP (continuous positive airway pressure) and was having a mild RDS and the senior registrar was there at the time and I said: "Oh look, there's a baby, obviously the breathing difficulties are getting a bit better". So the senior registrar started to give me the idiot's guide to neonatal care and positive pressure ventilation and things like that. To which I replied: "Oh, this baby must be getting much better because the pressure you are applying is only this now and it would have been that before". And he looked at me absolutely amazed and said: "How can you know things like that when you're only a geneticist?"

Going back to the Gorlin syndrome, I started out by looking at the polymorphisms because this was around the time of the White and Skolnick paper about the RFLPs. So we started looking at Rhesus and Duffy and at the blood groups and all those. And at that stage there weren't any probes on chromosome 1. And then 1 probe was published – AT3 with Stuart Orkin in the States. And I said to Andrew Read: "I wonder if we might be able to get that?" and he said "Well, why don't you try?" So I stood next to the telephone and thought: "I don't know if I can do this". I actually picked up the phone, phoned up the Boston Children's Hospital, asked to speak to Stuart Orkin and stumbled around and he said: "That's fine, I'll send it to you". And he just sent it in the post, and it worked first time. My first ever Southern blot actually worked the first time. And then the second probe on chromosome 1 Alec Jefferies let me have, which was one of his mini satellite probes. So that's how we started.

PH How did you know where to start? Were there hints from either chromosome rearrangements or other things that gave you a clue as to the chromosome?

PF There was one paper – no, there were two papers. There was one which said there's a very low LOD score with Rhesus, which we knew was on chromosome 1. But then again, if you go back in history and look at most diseases they had a low LOD score with Rhesus. And there was one paper where Charcot Marie-Tooth disease segregated with Gorlin syndrome in a family. And we knew, I think it was through linkage with AT3, that in one family one form of Charcot Marie-Tooth had actually been placed on chromosome 1. So chromosome 1 was the place to start. And there weren't any probes anywhere else anywhere, or very few. So we didn't take the shotgun approach to linkage analysis, as John Edwards always used to describe it. I started and collected every probe and every marker I could find on chromosome 1 and then went up and down it for more time than I care to remember. But an offshoot of that was that we actually did map new markers on chromosome 1 as part of the human genome mapping groups and in fact later on, when we were looking at chromosome 9, we were able to show through recombinants that some of the YAC studies had actually got a piece upside down in a chromosome. It took me quite a long time though to convince the molecular biologists that recombination data in real people in real life actually showed that their laboratory resource must be in the opposite direction.

PH So when the likely localisation migrated over to chromosome 9, again were there any hints from chromosomal rearrangements or anything else that it might be there rather than just through LOD scores?

PF Well we had been collaborating with three groups, and sharing all our data with each group, and then there was a loss of heterozygosity study in BCCs I seem to remember. And that showed, I think it was something like there were 3 hits on 9p. There were more on 17p, where p53 was, and there were 2 hits

on 9q. So there were 5 hits on chromosome 9 but they were bigger than – apart from p53 – they were bigger than the other spots elsewhere on the genome. So we all decided to look at chromosome 9.

PH And who were the other groups?

PF Andre Reiss in Germany and Georgia Trench in Australia. Erv Epstein in the States was also on the West Coast looking and our other main – actually there were 4 groups, of course, because I have missed myself out of that. And the fourth group, there was Georgia Trench, Andre Reiss, Allen Bale and ourselves, who communicated very greatly as the time went on.

PH Remind me, when actually did the mapping get to the gene itself?

PF The gene was placed on chromosome 9 in 1992, I think. Does that sound right?

PH It sounds right.

PF Yes, in 1992. And then it took a year or so – but the sadness was that we didn't have any facilities in Birmingham, because that was another thing, it took me a long time to convince the university here that actually setting up a facility here on the university side was the right thing to do so we didn't have the facilities in Birmingham to actually find the gene itself and then sequence it. So Georgia Trench and Allen Bale did that.

PH Then when it came to mutation detection presumably then you were in an extremely strong position because of the wealth of family material.

PF That's right. But then we had to actually persuade the clinical laboratory to take that on, which they didn't need persuading at all of course because they had been working with us on the whole time, on the whole project.

PH And did this soon become a semi-diagnostic procedure or how did the mutation analysis open the field up in terms of defining the disorder and being of some practical use?

PF Well, it was both good and bad from the point of view that we had hoped that maybe there would be a few mutations and that we would be able to do genotype-phenotype analysis. But the original techniques of course were SSCP so we couldn't actually sequence it to start with. But that picked up quite a number of mutations and, what we found, they were all over the gene and there didn't seem to be any obvious phenotypic correlation with what kind of mutation there was either, which was I suppose predictable but disappointing because we had hoped there might be just one or two mutations that then we could offer as a diagnostic service. But it did become a diagnostic service, as in so many things, as we felt more confident that the mutations that we were finding were actually associated with the disease. But I mean I always say that, actually, it's not the Patched gene that actually is responsible for Gorlin syndrome, which might sound a rather unusual thing to say, because most of the mutations actually alter the amount of protein product, so in Gorlin syndrome you usually get the equivalent of half the amount of protein product, so actually it's the other alleles in the hedgehog/ patched pathway I think that actually give the individual parts of the Gorlin syndrome.

PH Can you tell me just a bit about the gene itself, because I am actually very ignorant about this. Am I right that the gene had been known from other species for a long time?

PF Oh yes, it was named because of the effects it had in Drosophila. So it had been around, yes, for some time. It's a transmembrane gene and it is the intermediate signaller between hedgehog and smoothened and it stops or facilitates the cascade to turn other genes off in the nucleus. It's probably got some other, it's also involved in the cell cycle as well, and there've been a few surprises because it was thought there was only one transcript but we now know there are, as you might expect, several transcripts probably with different levels of expression associated with them.

PH I am going to take you away from the Gorlin research for a bit, Peter, and ask now at what point did you get a consultant job and move here to Birmingham?

PF That was in 1984, I came to Birmingham. After a period of concern that any of us would get consultant jobs. I think it's interesting how the subject developed because John Burn and myself and a few others were in the first tranche of senior registrar jobs in established posts and because the clinical service was being built up – or that's how it was seen in this way – there actually weren't any opportunities at that stage to do PhDs and things like that which we would, I think all of us would, do now if we were in that situation. So there's a group of us who don't have a PhD because in the situation that we found ourselves, you couldn't actually do it without coming out of programme and things like that. So we did clinical research and laboratory research as part of MDs. And that was a deliberate policy I think at that time, to actually build up the consultant workforce. And the people in the Clinical Genetics Society were very instrumental in talking to people at the Department of Health and the workforce planning about how new consultant posts might actually come about.

Towards the end of my training I can remember meeting – I don't know whether you were there, but Alan Johnston and Rodney Harris were there, and they said "the information from the Department of Health is that there actually isn't going to be any money for any new consultant posts". So we then, a few of us who were around at the time, had to decide what we were going to do and I looked at a lecturer's post in paediatrics at Great Ormond Street and various other possibilities, thinking that the genetics posts would have come to an end. Then out of the blue two posts came up, one in Birmingham and one in Newcastle. And I applied for this post, along with other applicants, and was successfully appointed here, and John Burn was appointed in Newcastle. So when I arrived there was, I think, 4 or 5 people in the cytogenetic laboratory here in the Birmingham Women's Hospital, and over at East Birmingham Hospital there was another unit led by Maj Hulten, who had come to that laboratory in the West Midlands believing that there was only that laboratory. Over here, where I was, we were in 2 or 3 rooms, there were about 5 or 6 cytogeneticists, on the first floor were Sarah Bundey and Tessa Webb in the university department because John Edwards had – or was he around then? I think he had just left before I came, but I knew him. I used to sit in his clinics when I was a paediatric SHO at Warwick Hospital, which was an interesting experience. I used to offer to take the blood for him. So when I came here there was Sarah, who was a part-time clinical assistant, Tessa Webb, who was a lecturer in medical genetics, and Jack Insley, who was part-time geneticist and part-time senior consultant at the Children's Hospital. And a part-time secretary.

I can remember, the first day here, sitting looking at the wall and thinking: you've got two options here. Either you can just do your job and do all the clinics that have been laid out for you or you are going to have to make the decision to get involved in committees and writing reports and all those kinds of things if anything is to be achieved here. So that was a kind of road to Damascus moment and I can remember it to this day, thinking that, and it was at a time when they didn't know how many people were employed in the Health Service so they did a study and all the hospitals were told that you couldn't appoint any staff. So I was supposed to have a secretary and they stopped that. So I had to plead for the secretary to come, and I can remember going home one Friday and saying to my wife "It's taken me all week to get a desk and chair for the secretary" to which she replied "You should say 'isn't it good, I have actually got a typewriter and desk and chair for the secretary!'". So I then started about actually talking to everybody in sight about how we might build up the service. So I asked to go and see the Regional Medical Officer, who sat with his head down, not looking at me, during the entire interview, making notes, and I laid out what I thought was needed for a Regional Clinical Genetics Service, because Jack Insley, and Sarah, was entirely supportive about this. And at the end, all he said was "I will agree to see you again". So, as a young consultant, I hadn't got an idea what that meant, but when I came out and told his secretary, she said "Oh, you've made a real impact. He's listened to what you've said and agrees with it".

So, armed with that information, I then went to see the Director of Public Health in the District, as it was then, having spoken to the Medical Director in our own hospital, and said "I have come to see you". And he said "What do you want?" and I said "Nothing". And he said "I can't believe that.

Everybody who comes to see me wants something." So I said "No, I have come to talk to you about how we could build up a service and what kinds of things would be important for the health of our local population." So I said to him "The Regional Health Authority are really interested in this" and so subsequently I said to the Regional Health Authority "The District are really interested in this". So at that time there was a system called RCDRS which was the Revenue Consequences of the Development of Regional Specialties. And there was also a scientific committee. And the Regional Scientific Officer called John Stewart was hugely supportive and said "You need to write a report". So we got a small committee together and wrote a report about what was needed, including what we called then two fieldworkers and an increase in laboratory staff. Oh, and a computer. A stand-alone desktop computer for the dysmorphology database, which Robin Winter had been developing, and for patient records. And – where had I got to? My brain's dying!

PH You had seen the Senior Scientist …

PF Yes, that's right, so we wrote this report and they said "we can't wait 5 years". Because you put in a bid one year for the money to become available in 5 years' time. So they gave us a special grant at the end of – after I had been here about 8 months or so – to appoint two fieldworkers and all the other things that were needed. The next thing I did was, with Jack, we went round and set up a set of new clinics all over the region and began to talk to people, and offered to give talks, and things like that. So slowly but surely, that's how we actually built it up. And then, because we hadn't found the Gorlin gene in 1984, and we had been doing a lot of work with Bob Williamson with some of our families, trying to map the CF gene, because in Worcester we had a family with a recombinant that actually placed where it was on chromosome 7, I put in a bid to the regional research committee for a researcher to come and actually set up a DNA laboratory in the university department rather than the service department. Well, it was a hybrid, it was between both really. And I went along to explain all about DNA technology, and ended up explaining how restriction enzymes worked by banging the desk and inventing a piece of DNA and chopping it with my hand. And at the end the Chairman said "Well, we've got no idea what you have been talking about, but it's obviously really important for the future of genetics so we'll give you the money". So that was how we got the first DNA techniques actually going in Birmingham. That would be about 1985 or so. And from that we actually set up looking at the families with cystic fibrosis. And then we had to make a decision: should it stay in the university department or should it go into the cytogenetic laboratory. And we all agreed at that time it should go into the cytogenetic laboratory. So that's how we started the DNA service going.

PH And on the clinical front, I mean the number of staff has expanded now hugely, so starting from yourself as really the only full-time clinical person, how did it build over the next 10 or 20 years?

PF Well I think there are now over 100 people in the laboratories and I have not counted them recently because obviously I have retired from being a consultant clinical geneticist but I think there must be 30-40-50 people in the clinical department and I think there's over 10 consultants now. It was fascinating how one had to use each iteration of whatever the system was because they then got rid of the regional development of specialties and then I think we had commissioners – GP commissioners at one stage and then the local commissioners. Now the West Midlands did something that not a lot of other areas did and when all the central administration for commissioning new services on this 5-year rolling programme were disbanded the districts kept on those people to take the money from each district to actually make sure that it met the strategic requirements, which didn't happen elsewhere in the country. So we were quite fortunate and because we had made cases backed up with how many patients were being seen and all that kind of thing. What we tried to do was ask for clinical development one year and a scientific development the next year and whatever our internal discussions, challenges, disagreements were between all the people in the parts of the service, we only ever put up a united bid. So we usually got what we asked for. It was tough at times and when the people, when it was devolved into commissioning, into individual sections of the region rather than as a

whole, every year we would be given the junior member of the commissioning team because people didn't think it was important and you would have to explain every year everything that you had previously explained about why it was so important.

PH That sounds familiar.

PF And every year it would be "What would happen if we only gave you half this money? What would the impact on the service be?" So we spent an awful lot of time every year going through this process. But it was worth it in the end.

PH Peter, can I bring you now away from Birmingham to the UK scene, because you have been involved in a whole series of things. First, what about the formation of the British Society for Human Genetics? Because I mean you were perhaps the key person in that. Tell me a bit about the background to that and how it happened.

PF I think I was one of the people involved. It goes back a few years before that. As you know, there were several societies so originally there was the Clinical Genetics Society and then the Association for Clinical Cytogeneticists. And the Clinical Genetics Society used to have two meetings a year, two 2-day meetings a year. And then, with the development of the subject, there was the – I shall probably get these terms wrong because it's in the dim and distant past of course – there were the molecular geneticists, the Clinical Molecular Genetics Society, who used to come along to the Clinical Genetics Society meetings. And then I think in those days they were called the Genetic Nurses and Social Workers Association, and they used to come along to the Clinical Genetics Society meetings, so we got to a situation where each society would have a meeting of its own and then everybody would join together. And so we decided that we would change the name of the Autumn meeting, I think it was, from being the Clinical Genetics Society meeting to the British Medical Genetics Conference because a few years before Alan Johnston and Rodney Harris persuaded John Burn to be the Secretary of the Clinical Genetics Society and myself to be the Treasurer and Conference Organiser. So I was trying to evolve and develop the British medical genetics conferences. And because everybody was together at these conferences and could see that what was being discussed, a lot of things were really in common, and there was a feeling that to be divided into the separate groups wasn't necessarily sending out the right message and we could all work together. And so over a period of time there was a groundswell of opinion that actually the Clinical Genetics Society and the nurses and molecular geneticists actually had no problem at all in dissolving each individual Society and forming a new British Society. The name had to be decided and oh, for about a year or so, discussions like this went on and the ACC were slightly more reticent about this, partly because they were a Friendly Society and the others, some, were charities and the ACC was concerned that, being a Friendly Society, they couldn't disband and join a new organisation.

So the start of the BSHG was put off by at least a year or year and a half while discussions were ongoing with the ACC. And there were some other issues that the ACC were concerned about. Now two things that really tipped the balance was that the Clinical Genetics Society asked Pat Jacobs, who was a scientist, to be President of the Clinical Genetics Society. And that was because we thought she was wonderful. In fact she was a wonderful President of the Society, and I think that brought into sharp relief that really we were all in it together. And then Martin Bobrow became the President of the Clinical Genetics Society, and he was the President over the time that we were trying to get the BSHG organised. And I've got paperwork in the end which actually shows that the other three societies decided that, on the 1st January of whatever year it was going to be, they were going to form the British Society whilst the ACC decided what it could do about the Friendly Society status. But I'm very pleased to say that a little while before the day we were going to join and form the BSHG the ACC became full members of that. There were of course some concerns about how it would all work so the original structure of Council was very formulaic with, I think, I can't remember now but I think it was three people from each of the Societies. And there were concerns that the Chairmanship of it would

actually rotate between the different groups. But at that stage there was a very positive attitude to actually making the whole thing work. There were discussions about whether it should be called the British Society for Medical Genetics at that stage but one of the concerns using the word Medical or Clinical, some people felt that that could give the impression that it was a medical society rather than encompassing all the people who were involved in genetics. And after a great debate it was decided that it would be called the British Society of Human Genetics to mirror the Americans and the European Society and the great hope was that it would allow other people who were in human genetics to actually join the Society. That didn't happen to the extent that people had hoped.

PH It's going to be interesting to see, now that British Society has renamed itself as the British Society for Genetic Medicine, what impact that will have, particularly on the European Society which has become itself very much more medical than it was originally. It will be interesting to see.

PF I think that the European Society has a slightly different remit, and I think this is where the British Society tried to get much more into research and putting forward basic science a few years ago. And I have always argued, both when I have been a member of the BSHG and ESHG, that at the International Conference people who are heads of departments and people who are starting out tend to go to that because the people who are actually doing the job in the middle want to talk about practical details about their job and the latest things that come on. So that's why the European Society has started putting more educational things in as well, and quite rightly too, but when the British Society dropped the bit about the clinical applications, ie what you do in your job, then the attendance actually fell. So I think putting Genetic Medicine back into its title acknowledges that group of people as well as the researchers as well. So I'm hopeful that it's actually going to have a really positive impact.

PH Before we get on to the European Society can I ask you a bit about Royal Colleges and the joint committee, because that, again, you were very much in the thick of?

PF Well, I think the joint committee has come about, has a lot to do with your foresight when you were Chairman of the Royal College of Physicians Clinical Genetics Committee and I think at that time politically it was a really important move because the Government's style at that stage was to ask each different group of professional people for an opinion and if it differed slightly they said "You can't agree so therefore we're not going to agree" and we've got examples of where that actually happened in genetics, so I think one of the key drivers of the joint committee was for everybody to come together as one voice and be able to give a uniform opinion. I think a lot was achieved in the early days of the joint committee because it had all the people from the different constituencies, not only in genetics but the Royal Colleges and patients and public health and other people on it. So one of the wonderful things about it was that if the group asked for something to be done, if the evidence was that a particular change in clinical practice needed to take place, or you needed to do a report, or you needed to talk to the Government, there were people on the joint committee and representatives who could actually make it happen. So the British Society, for instance, could ask its members to put this into clinical practice. The other Royal Colleges could ask for things to go like that. And of course we had a representative of the Department of Health on it and there was a direct communication so the policy makers at the Department of Health could hear what was actually being said, both from a strategic point of view and from a day-to-day practical point of view. And there were various things that the committee could pick up and try and make a contribution, and one was the Consent and Confidentiality Report which came out of the reality – and it wasn't perceived, it was actually reality – that patients were not getting genetic tests done because some members of our own community and in other branches of medicine said "You can't have this information" or "I can't share this genetic result because it would breach somebody's confidentiality". And at our initial look at that we weren't at all sure that that was actually correct and we took advice from the people who were responsible for the Data Protection Act and took advice from lawyers and people like that and did a survey of current practice in the genetics community and other medical specialties and then actually tried to give a measured

response, to say “well, actually …”, what we wanted to say in the report was “these are the things you can do” because everything is always written from the point of things that you can’t do. So we tried to say ”Yes, you can do this”.

PH Now coming back to the European Society, it had been through a bit of a shaky period in the late 80s and early 90s, but when did you first get involved with it, roughly? Was it before the transition from Jan Mohr to others, or was it as part of the transition?

PF No, I got involved because of, apparently, how we had been running the British Medical Genetics Conference. And Marcus Pembrey said, after you had pointed things out at the European Society, that he was concerned about the style and form of some of the meetings and that maybe, to make the Society grow, there could be different ways of doing it. So he asked Ruth Cole and myself – Ruth was the Administrative Officer for the British Society – if we would organise a European Society of Human Genetics meeting in London, which we did. And I therefore then was invited onto the Scientific Programme Committee and – I can’t remember when – onto the Board. And then I was told that I was too British in suggesting that we might like to have minutes of meetings and a record of decisions that had been made but following on my suggestions at committee meetings, I think, I was invited to be the Secretary General.

PH Was that directly after Jan Mohr had stepped down, or was there somebody in between?

PF No, when I got involved, Jean-Jacques Cassiman was the Secretary-General.

PH OK, and you continued as a kind of Secretary/Treasurer for quite a long time, didn’t you?

PF I can’t remember how long. It was only about 6 years or something like that.

PH OK.

PF I would need to look that up.

PH Now it’s flourished very much since then. But there’s one thing I’ve always been a bit sad about and that’s that relatively few folk from Britain either go to the meetings or are involved in the organisation and that’s always disappointed me. What’s your feeling about that?

PF I think there are two points about that. One is the fact that the middle people look to the BSHG and I think that traditionally, until the latter years, I think the number of people going now, the European conference has now got an excellent reputation in the Genetics community in this country and more people are actually going. I think most people here looked to the States for their annual meeting. But I think the quality of the European meeting is now rivalling that, and it’s smaller so that you can actually meet people. I’m not sure about your statement about the involvement of people from Britain in the organisation of the ESHG actually. I think if you look at the various committees and the various people who have served on the sub-committees as well, and on the education committee, I think there’s been a fair proportion of people from Britain. In fact some of the other people have pointed out how many people from here and Holland there have been on those.

PH I am encouraged by that because I had wondered whether it might be seen as part of a more general distancing of Britain from the rest of Europe.

PF Oh no, I think it’s the opposite way.

PH Do you mean the rest of Europe is distancing itself from Britain?

PF No I mean they are coming together, certainly on genetics. No, I am encouraged by that.

PH Good. The last topic I really want to go over, or at least on my list, is the Genetics Education Centre and your involvement in education. And one thing I picked up, just looking a bit at the background, you did an MSc in Education. When was that?

PF I did it, I think when I was 50, yes.

PH That's good.

PF I had always been interested in education and I had managed to persuade the local commissioners to fund an Educator post here and a Genetic Counsellor with an interest in education. So in the West Midlands we set up a thing called the Centre for Education in Medical Genetics. And I didn't want it just to be a delivery arm of the regional genetic centre because I wanted it to have some sound educational underpinning so that we could actually give educational chapter and verse for what we were trying to do. And try and work out what the best way was of explaining genetics to people. So after a few years I thought, a lot of this I think I do instinctively but I'd like to know why it works and there must be other ways of doing it. So I applied to go to Cardiff to do the part-time MSc course there. And the region were very good because the Postgraduate Dean had a scheme for funding people to do medical education so the West Midlands region funded me to go and it was two days a week about every six weeks for two years, which was a fascinating experience. And at the interview they said to me "Why on earth do you need this qualification when you have already got all those that you've got?" To which I replied "Well, actually, I don't. I don't want the qualification. That's not why I am coming. I actually want to learn more about how this works and what are the right techniques to use and what are the different educational theories". So that's why I went to do it.

PH And then, leading up to the formation of this Centre, how did it come that you were able to put in a bid for this Centre and this was successful? Was this all part of the White Paper on Genetics?

PF It was. It started before the White Paper in that Ron Zimmern and Hilary Burton, who over the years have done some really seminal pieces of work on strategy, identified that a National Strategy for Genetics Education was required. So they produced a document, having asked various groups of people in focus groups, and then another group which looked at all the data, put it all together, then made a series of recommendations. And one of the recommendations was that there should be a National Centre for Education in Genetics, and that was taken up by the White Paper. And it was a bid, and along with quite a number of other people we put in an initial bid which got through the first stage. And then we were asked to put in a detailed bid, which we did, and we were successful against some pretty stiff competition. And then I decided that we weren't going to do what lots of other NHS organisations had done, which was to tell everybody exactly what we were going to do and how marvellous we were, because I had seen at that stage too many other organisations then disappear within a year or so. So I decided that what we really needed was an evidence base because we needed to know what people who weren't geneticists really thought about genetics. So we spent some time at the beginning of the Centre actually finding out what colleagues in other specialties, right across the board, from Medical Records to Physiotherapy to the medical specialities, what they actually thought about genetics. And most people at that time said it's not even on their radar, it's of no practical application to them. And when we went into this in more detail, a lot of it came down from the senior members of the profession who were saying this because they had no experience about how genetics was actually being applied in practice at that time. So this of course then led us into the strategy about how you would actually approach it by explaining through clinical case examples – which always grabs health professionals – how genetics was important for individual specialties. The other thing that we learned was that each group of health professionals in the NHS has got a different learning ethos so you can't use the same way of engaging with one group as you can with another. So although the underlying genetics might be exactly the same, you have to present it in the learning ethos of that particular group. So we spent a long time sorting all this out before jumping in really and providing lots of resources and things like that.

PH What were the main initial planks in your programme?

PF The first plank was to talk to patients. So the first thing we did, alongside this talking to health professionals, was with the Human Genetics Commission patient panel and with the Genetic Interest Group, as it was called then. We asked a group of people with a genetic condition, or with a genetic condition in their family: "Knowing what you know now, if you went back to when you had the original diagnosis and the information, which health professional would you have preferred to have given you the information? What information did you want then, and what did you want the health professional to do?" Because we needed to know that to be able then to say to the health professionals "Well, this is the group of people that we need to target, this is the information that you need to know, and we suggest that maybe here are some resources that might help you to do it". And it was very interesting because half the patients said "I don't want the information from a geneticist to start with. I want the information from the person treating me. So I want to hear the genetics and the diagnosis from the person treating me. And then, as regards the family, or genetic testing, I'll go and see a geneticist please." And other people said "Although the person treating me is very good, I want an expert opinion right from the start." So that was quite an important piece of information, to say to the other groups of people "this is the reason why we are actually talking to you about this". The next plank was finding the hook of the individual specialties to talk to. So we did a piece of work where we spoke to neurologists, dermatologists and cardiologists. The neurologists said "You don't need to convince us about this. In our daily work, as part of our diagnosis, what we want to know is how do you explain this to patients in better ways because we'd like to do it better". The dermatologists "Ah we can see this is going to be really quite important in a little while. It's not yet, but we need to decide what it is we need to know when we need to know it". And the cardiologists said "This is of no relevance to our subject at all".

PH What year was that?

PF This would be – oh – 95/6?

PH Things have changed.

PF Oh, they have changed, yes. So what we had to do: with the neurologists you say "here's the information". With the dermatologists, you work out what diseases they are likely to see and the information they might need for them. And with the cardiologists you say "You are quite right dealing with hypertension and stroke and myocardial infarction but, unless you find the people with long QT and hypercholesterolaemia and Marfan syndrome in your practice, patients are going to die unnecessarily. So why don't we talk about how you identify those people out of all your practice?" So we had to kind of target how we went to each individual group. But, as you've just said, things have changed remarkably now, and everybody is saying to us "We can see that understanding genetics and genomics is really quite important".

PH How long after you started the programme did you decide to step down from being a clinical geneticist and go into this full time?

PF Oh, it would have been 7/8 years into the programme so I was Consultant Clinical Geneticist during that time.

PH And now it's 5 years on from that?

PF No it's 3 years on.

PH On the whole – I know it's difficult to ask you to summarise it in just a few words, but do you feel this has been a success?

PF The Education Centre?

PH Yes

PF Well, yes against the objective criteria which we were set out to be assessed on. So we have an evaluation programme and we've got quite a lot of evidence that actually talking to, say, GP trainers

about what it is that they need to be able to talk about genetics with their trainees, has actually had an impact on the GP trainers' practice. Now that, for us, is just wonderful. That actually applying some education might actually have ended up with a change in clinical practice. Because in the evaluation hierarchy that's at the very top of it. And when we started, Janet Grant from the Open University in the first year said "There is a real potential for doing this kind of education, in the way that you are going to do it, to actually tick the very top box of the evaluation hierarchy". And she said "I think you will find that for some people you will actually do that". Of course there are lots of things that we wished we had been able to do, or been more successful at, but we have delivered learning objectives for a whole range of health professionals in genetics, and we are just vamping and re-vamping them for genomics. We have supported educators. We have provided educators teaching genetics courses, and we have provided targeted resources for learners to follow through individually or for teachers to use, to adapt and use as they want. The other thing that we did, we worked with Skills for Health to produce a list of workforce competencies which map against Skills for Health framework and we also produced a toolkit for people who want to develop a new service in genetics.

PH And then what about the next few years? How do you see them developing? Thinking now in terms of the education rather than genetics and genomics overall.

PF Well I think the need for education to put, to enhance patient care, will still be there and, as regards patient care, it's going to fall I think into two main groups. I think it's going to be still that in the bulk of non-geneticists' practice, they need to be able to find those families where there is the highest probability of a genetic disorder with a major genetic component. So they are still going to need the skills of taking a family history and ordering the appropriate tests. And a lot of that, the basic skills about taking a family history, but they also need just-in-time information to be able to get the information about the diseases that they see for the patient in front of them. I think, as regards genomics, that will have a major impact on a couple of fronts. One is in the development of new therapies, but that's going to be in research and development. The second one will be in personalising medicine and targeting treatment and that's going to be, I suspect, mainly protocol driven, because it's going to be "If you've got a patient with this diagnosis, you apply this genomic or genetic test and on the basis of the result of that you stratify somebody, alter their management, give them a different form of surveillance maybe, or treat them with a targeted drug. So that's interesting because that's an awareness-raising package for the majority of people in the NHS, I think, rather than an education package because you've got to be aware that these protocols are available and things like that, whereas the other one – actually dealing with families – I think that's still an education package. So recently we've been, we are producing a series of eLearning packages for Specialist Registrars in various medical specialties and when we produce them we start out by asking them what it is that, where genetics and genomics fits into their daily practice. And the national agenda at the moment is to really push awareness and education of genomics and how we might get targeted treatment in cancer, for instance, depending on the genomic information from the cancer. So we were recently talking to some oncologists who said "Yes, yes, we're doing that and we're quite interested in that, but actually the education that we need is about taking a family history and how single gene disorders and how you can find them in this whole group of patients". Which rather surprised us. So there's still going to be a need for that education.

PH A lot of things seem to come full circle and end up back on what you might call the bedrock of Mendelian genetics.

PF Absolutely.

PH Peter, I have been asking everyone I have seen two questions. The first one is, are there any, or have there been any particular mentors or teachers that have been of special influence in terms of your career in medical genetics?

PF In medical genetics I think that's got to be Rodney Harris and Dian Donnai and Andrew Read.

PH The Manchester team basically.

PF It was the way they approached everything.

PH Yes. And the other thing which I have asked everybody is if you had to choose one special area of your work which you feel most proud of, or identify most closely with. I am not thinking in terms of a particular paper or project or anything, but if you were to choose something where you feel it has been your particular contribution. Is there anything that stands out?

PF I think I've been very fortunate in that, being based in everyday clinical practice and seeing what the NHS is like and how the staff make it work, and also being involved with patients and having them as the first priority, but also then being involved, just because I was around at the time I was, in the national level at feeding that information back from real life into strategic decisions. I can think of a number of occasions when I've said "If you do that, or if you do that strategy, this is likely to be the effect in real life on the ground". Thinking about it, I think that's what I would hope my major contribution has been, is actually trying to persuade people that altering a strategy in a particular way is likely to have a much better effect on patient care than maybe the original idea that was being put forward.

PH Peter, we've gone over quite a few things, and we could spend the rest of the afternoon on this, but before I draw things to a close, are there any big areas that you've been involved with that we've left out? Or do you think we've covered the main areas?

PF The other one is the United Kingdom Genetic Network.

PH Ah, and that was on my list. Just say a word or two about that.

PF The genetics community have always worked together and the laboratories in particular with the clinicians had worked together and individual regional laboratories had developed services for individual diseases depending on the local interest. And there was a great deal of communication and swapping of samples. And Alan Milburn, as part of the White Paper, had seen how effective this informal arrangement was, but appreciated that actually a small amount of money into a piece of administration would actually really pay dividends in having a mechanism for people working together. So I was asked to be the first Chairman of the UKGTN and I hope that one of the things that I tried to do was to be completely impartial all the way through and all I ever wanted to see was to make sure that the tests were available for the patients at the right time. So when I first became the Chairman it was really – you can't say formalising, because UKGTN was never really, not really a formal organisation because it's remarkable that to this day the whole thing works by agreement, by consensus and willing agreement between all the different parties, there's no binding agreement, it's all done by collaboration and co-operation.

PH Well that's a sign of success, Peter. And I really do think your contribution there has been huge because although it was an idea and we tried to make things work before, without that pump priming of funding to actually get an organisation it would have never really happened.

PF One of the key concepts that I tried to introduce, and I had to fight really, really hard for this, was that at the beginning it was suggested that the UKGTN recommendations about which tests should go into clinical practice should be assessed by the UKGTN about whether – or be ranked in order of affordability, and which ones should be first to be put in. And I was quite adamant that actually the funding mechanism should be completely separate from the mechanism of making this decision. Of course it relates, but I knew that the funding mechanism could change, as it did, at regular intervals. So what I wanted was a system that actually said: we've had an independent assessment of the clinical utility and validity of these tests and they are fit for purpose in the NHS. We are recommending that these are put forward. And then it's a different discussion, I argued, for how they are funded. But I tried

really quite hard to separate the two. And it was very interesting how everybody agreed that testing for long QT was entirely appropriate – a test on the NHS – but it wasn't funded by the Commissioners, not because of the testing but because of the perceived knock-on effects of needing more pacemakers.

PH Peter, it's been fascinating, and I've learnt a huge amount, but I think we must draw it to a close now. So, well thank you very much indeed.

PF Well, I hope this is the kind of my life that you were interested in.

PH Absolutely.