

# Michael Laurence



## **Personal Details**

Name	Michael Laurence
Dates	
Place of Birth	Berlin
Main work places	Cardiff
Principal field of work	Neural tube defects; congenital malformations
Short biography	To follow

## **Interview**

Recorded interview made	Yes
Interviewer	Peter Harper
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## **Personal Scientific Records**

Significant Record sets exists  
Records catalogued  
Permanent place of archive  
Summary of archive

## **Interview with Professor K M Laurence Friday 23rd July 2004.**

PSH. It's Friday 23 July 2004 and I am talking with Professor Michael Laurence at his home in Dinas Powys near Cardiff. Michael, can we start at the beginning and may I ask, where were you brought up?

ML. I was first brought up in Berlin. I don't remember a great deal of it except that latterly things were a bit fraught in Berlin, partly because my mother was politically very active and had a lot of communist or left-wing friends. On top of that she was running a factory outside Berlin, a ceramics factory, and the Nazis were of course more and more intrusive and latterly in Berlin we lived near Himmler's headquarters in Grunwald. In fact we were dead opposite what was called the 'Rassenamt' where Himmler had his office, separating people who were acceptable from those who weren't, and I frequently came across SS men in the local grocers. They were always very polite, they didn't shove me around, but my mother found it very difficult.

PSH. Am I right that she was a well-known artist?

ML. Yes, she was quite a well-known artist. She studied at 'The Bauhaus', painting; you can see some of it here. Most of my paintings have been taken to Switzerland but I've still got a few. My half sister has most of her paintings.

PSH. May I ask what her name was, her surname then?

ML. Her surname first was Heyman, then Loebenstein and then she got married to Harold Marks in England.

PSH. So as an artist she did most of her work in Germany, I suppose?

ML. A lot of her paintings were done since '36, which was the year of our sudden escape.

PSH. Yes.

ML. It was a sudden escape because my mother didn't know whether she would be allowed out, or whether she could sneak out, and I had to go separately to Holland and all I was worried about when I came across the border was my stamp collection.

PSH. Hadn't you been able to bring it with you?

ML. Yes. I still got it in a cupboard, actually I neglected it during the last 40 years.

PSH. How old were you, Michael, when you had to leave Germany?

ML. I was eleven.

PSH. Right, and you and your mother then managed to get out fairly close together did you?

ML. Yes, we first had digs in London and then she started up another pottery and so we moved to stinky Stoke.

PSH. Stoke-on-Trent?

ML. Stoke-on-Trent yes. We actually lived in Newcastle, which is really almost one of the 'five towns'.

PSH. And did you stay there or go back to London?

ML. No, my parents, my mother got married in 1937 and we stayed there till, 1947

PSH. And am I right, you went to University at Cambridge?

ML. Yes

PSH. When was that?

ML. I went to school in Newcastle, which is a sort of very minor public school and went to Cambridge from there, Trinity Hall which is one of the smaller colleges, mostly lawyers are studying there.

PSH. Were you doing medicine?

ML. I was planning to do medicine, but didn't do very well on my physics and I thought I would have to give up and do something else. Something like biochemistry, but I was persuaded to persist.

PSH. Good.

ML. I scraped through my physics and so I qualified to do medicine.

PSH. And after you'd qualified, what year was that, you qualified, Michael?

ML. I qualified 1949. I got my degree in 1947, then went to Liverpool actually, because I hadn't been a conforming sort of chap at Trinity Hall. I should have paid all my gate fines for being late, but I didn't I always climbed through the window into my room. I had a famous pathologist as master of the college, a chap named Dean, who hated my guts and he actually said so in public. Which in some respects saved my bacon because he shouted one day across the quadrangles, "Loebenstein, you are a rotten student. I don't like you. You are a Jew and I like you even less because of that". He said that at the top of his voice and several Fellows heard it and they were horrified, so about a week later he had me sent down, because he knew I had been out of college overnight and I hadn't paid any gate fines. "How did you get in?" I said, "well, how do you think?" (*chuckles*)

PSH. So you went to Liverpool?

ML. I had a year off actually because I couldn't get straight into London Clinical School so I did a year's nursing.

PSH. I see. So this was between your degree in Cambridge and before you'd finally qualified in medicine.

ML. Yes.

PSH. I see. And where did you do your clinical training?

ML. In Liverpool.

PSH. In Liverpool. Right. Presumably Henry Cohen was in charge then.

ML. Very much so, yes. He was a neighbour of mine actually.

PSH. And how long did you stay in Liverpool after you'd qualified?

ML. I stayed a year.

PSH. That was doing house jobs?

ML. House jobs. And it was a bit complicated, as during my nursing year I got exposed to TB. I was nursing on a ward with a lot of youngsters with open TB, I myself never got open TB, I think, but I had caseous glands and I came under the care of a chap named Coop, quite a well-known chest physician who said, OK you can carry on, but take it easy. Well, you don't take it easy as a student, so I kept going until the end of my clinical years by which time I was married. We had our first child and so I had to earn my living as soon as I could. I then went down with TB very shortly after qualifying.

PSH. How long did you have to take out, a year?

ML. A year at Grove Hospital which is now St George's, and at Frimley Hospital. Frimley was a holiday, glorious. Have you been there?

PSH. I have yes, not for a long time. It's out in the Surrey countryside isn't it?

ML. Yes, with a glorious walk of Canadian Redwoods.

PSH. Yes.

ML. Enormous trees. There were quite a few young doctors there. We were given the privilege of managing our own therapy and we were allowed to do

as we wished within reason, and I used to go for long walks which was very pleasant.

PSH. After you had had your year off, where did you go next?

ML. I went to Luton and Dunstable hospital. First of all I was told I would have to go either into radiology or pathology. I didn't want to do either. So I went to Luton and I reluctantly did pathology with actually quite a good pathologist. He stopped me from doing too much. He was a very good chap. He refused to let me do all the PMs. At 3 o'clock he told me to leave the lab instead of staying on until all hours. He refused to let me participate in the emergency work.

PSH. That was very considerate.

ML. I resented this enormously, I really did.

PSH. Still he must have known it was in your interests.

ML. Oh yes. I met him many years later because he moved to Carmarthen and we talked about the old times and really he was very caring.

PSH. When was it then that you went to Great Ormond Street?

ML. Well, I went from Luton. I first tried to go to Plymouth, where there was quite a well known paediatrician, Gardiner. I didn't get the job. Just as well, it was a terrible set-up. So I then got a job at Portsmouth, where there was a very dynamic pathologist named Darmady. You may have heard of him.

PSH. Yes. In fact I remember he was still there when I worked in Southampton.

MI. Yes, well he then became virtually Professor of the lot. I had been in Darmady's lab, which was Portsmouth and the Isle of Wight, one week and he had me in his office "What research are you going to do?" he asked. Literally I said "I don't know". "You have a week to decide. If you don't decide for yourself I will give you something to do". And I came across some very interesting things. The first thing I came across was a very rare malformation of the lungs in babies and I published that, with much difficulty, because at that time the Journal of Pathology was run by a very autocratic well-known pathologist, forgotten his name. I've still got his corrections to my script.

PSH. I've got it down in the publication list, Michael, which one can find on the computer. "Congenital pulmonary cystic lymphangiectasis".

ML. That's it.

PSH. 1955. It's just about your first paper.

ML. It was my first paper. It was like spitting blood getting that written and corrected and re-written in the end. It turned out to be quite an interesting paper. Then Darmady said "Well that's well and good. What proper research are you going to do?". He was into doing things in the lab like making protein and bacteria-free fluids of various sorts. And he got me on to various methods of killing off bacteria. It wasn't very nice work and as a side-line I then played with rats and I tried to get these poor rats to pass urine and not get infected. It wasn't very easy. There was a sort of set-up between Portsmouth and St Thomas's and Portsmouth and the Royal Free Hospital. I attended scientific meetings. We in fact had the senior registrars from the London Hospitals rotate with Portsmouth, which caused a good deal of resentment, because the local registrars wouldn't get their foot in to the senior registrar ladder, which was rather sad.

PSH. How long did you stay at Portsmouth before going to Great Ormond Street?

ML. Two years.

PSH. Two years.

ML. Two years and on one of these occasions I went up Great Ormond Street actually, to ask Bodian who was the pathologist there, about lymphangiectasis and he had the slides for a month and at that time I was applying for jobs at Radcliffe Infirmary, Oxford, and I was interested to get into the Radcliffe and I went to Bodian and said what do you think of these things? "Mmmm quite interesting. You ever done any PMs on spina bifida babies?" I said "No, what is spina bifida?" My retort. "Would you like to do a research fellowship on spina bifida and hydrocephalus?" So I went back to Portsmouth for another three weeks, looked at some of the things Bodian gave me to read and I went back to him and said "No thanks. It's too specialised." So he said "In that case would you be interested in a research fellowship into histochemistry?" Oh yes, now that is something I know a little bit about. "Yes I would be very interested, but I first want to see if I can get a job in the Radcliffe". He said "Alright". So I went up to the Radcliffe for a job. Bob Smith, I think was the chap in charge and in fact he appointed me in the morning and I had to go back in the afternoon to the hospital for confirmation of the job. Well, the secretary said "just wait a minute. We have to discuss it between ourselves". And she then asked me in and one of the chaps said "Why weren't you in the armed forces?"

"Because I had TB".

"Oh. Oh. Do you mind waiting outside for a bit".

And there was about a forty minute shouting match in the board room and out came the hospital secretary as white as a sheet and said "Will you please never again apply for a job in any of the Oxford hospitals"

PSH. Good heavens.

ML. So I said "Why".

"Because you are not acceptable"

Why am I not acceptable?

"Because you are sick"

I said "You mean the TB?"

"Yes"

"Are you going to condemn all young doctors or all medical students to be not in this hospital because they contracted TB? Because a good third of them have got TB."

PSH. I didn't know that.

ML. Stupid ass. Well, the Oxford United Hospitals as it was then, was reported to the, I think, GMC.

PSH. Quite right too.

ML. And they were told never to discriminate doctors with TB for a job. And the next chap who was appointed at the Radcliffe was a friend of mine, who also had TB, who in fact had worse, who had open TB and had a partial pneumonectomy and they appointed him without an interview.

PSH. So, did you go back to Great Ormond Street?

ML. Yes, I went back to Bodian and said "Yes I'll take the job". I didn't know what I was in for, so Bodian gave me a free hand. I had to do a proportion of all the PMs, but I did all spina bifida's and hydrocephalus's and I got stuck in. I not only had to do the pathology but I also had to join in the clinical work, the neurosurgeons who were involved, one of them was Wiley McKissock, was it?

PSH. It could have been Wiley McKissock.

ML. Yes, it was Wiley McKissock and McNemeny at the Maida Vale and MacNab so I spent more time in clinics than I ever did in the lab. And my PM work went further and further into the distance. They all got potted but not finished and if they'd got wind of this, it would have made the chap in Liverpool look like small beer.

PSH. I can imagine. So when did you really start to get interested in spina bifida and hydrocephalus?

ML. Well, right away, because it became quite an interesting project and I did mostly clinical things rather than pathology.

PSH. Yes.

ML. I collected all, there was a Paediatrician, Dennis Powell I think, was his name who had done quite a bit of work on deformed children.

PSH. It wouldn't have been Kenneth Till?

ML. Oh he didn't do anything much on spina bifidas, he felt they were a dead loss. Probably right. No, there was a paediatrician who had done a series, so I did a bigger series of some 500 babies. Followed them up.

PSH. And you published a lot of papers from that time.

ML. I did; the significant paper that I did was on hydrocephalus, which showed that an awful lot of the hydrocephalics in fact survived, mostly those without spina bifida. Some of them were very badly handicapped mentally. One or two of them did quite well. Most of them survived and I did a paper at the British Paediatric Association, I suppose, it must have been about 1958. During a meeting at Windermere I shared a hotel room with Lorber and he tried his best to destroy my confidence, which was really rather unfair. It was my first real important paper and I had to give my paper without notes – ad lib. It went off very well actually. That was my introduction to him. I didn't think much of Lorber.

PSH. Which years was it then you were at Great Ormond Street?

ML. I was there till the end of 1959.

PSH. And you started there in '56?

ML. 1955.

PSH. Could I ask you now we've got to Great Ormond Street, when did you first encounter Cedric Carter?

ML. I met him in the dining room. Great Ormond Street dining room was a very good one, at that time it was probably the best dining room in London of any of the hospitals and you didn't really have to pay for the food. A four course luncheon for virtually 50p.

PSH. And it was a very good way of meeting colleagues.

ML. Yes, that's how I met Cedric and he looked over my figures and helped me, and then I looked over his figures. He was at that time doing a very nice study on Down's syndrome. A family study. It was to look at the prognosis, life history, life chances.

PSH. Had he started his studies on neural tube defects at that point?.

ML. He hadn't done any neural tube defects at all. I pushed him into that.

PSH. That's interesting, so in a way it was a two-way thing. You got him interested in the neural tube defects and he got you interested in the genetics.

ML. That's right, yes. I found him a fascinating person. Very modest, working in a tiny room in the old part of Great Ormond Street Hospital, which

was no longer used a terrible room. He was at that time working under Fraser Roberts, with Cath Evans.

PSH. Yes. Yes.

ML. I found Cedric and Cath Evans delightful people. They helped me a great deal. Cedric introduced me into the methods of looking at life histories and the way you take disparate families and use them to look at the whole. That was very, very instructive indeed. And when I came here, with the object of doing some of these family history type of investigations, Cedric encouraged me and after very little time he joined me in the studies.

PSH. Had you started, either you or he or both, any family studies at Great Ormond Street?

ML. Yes, Cedric had done family studies of course into muscular dystrophy.

PSH. But not specifically in London on neural tube defects?

ML. No that was me pushing him into it. He in fact, joining me and stopping me from making too many mistakes.

PSH. So did you have family material in London already to start analysing before you came to Wales.

ML. Yes, in fact I had done several family studies on the London based cases.

PSH. Am I right that Tim David was associated at one point with these studies?

ML. Yes she joined me here.

PSH. No I was thinking of Tim, Tim David, later from Bristol.

ML. No.

PSH. Ok I may have got that wrong.

ML. No no no.

PSH. OK.

ML. I don't think so.

PSH. OK. So at Great Ormond Street, you were doing a lot of paediatric pathology generally, had you come up with other interesting problems linking with Cedric outside the neural tube defects?

ML. Not so much. I was interested in what turned out to be chromosome abnormalities with brain defects, the single ventricle malformations.

PSH. I suppose at that time, when you were at Great Ormond Street, there wouldn't really have been much diagnostic chromosome work available?

ML. There was no chromosome work at all. I don't think they had a cytogeneticist at that time.

PSH. Did you have any contacts with Paul Polani at all?

ML. Yes, a little bit, because in London we all joined up with Paul Polani, Bodian and his group.

PSH. What year then was it Michael that you came to Wales?

ML. I started work on 1 January in 1960.

ML. We came to Wales and stayed at the Esplanade Hotel, which was a very superior hotel, which I believe didn't make any money, so the owner torched it one night in the spring of 1960.

PSH. Not when you were staying there?

ML. No, no. We had moved to this house by then.

PSH. Yes. Would I be right that you were able quite rapidly then to set up the family studies on spina bifida.

ML. Yes. I got a lot of support from Joseph Rowntree and they started me off. They gave me, what was at that time an enormous grant, something like £5,000. Mere bagatelle now. It started me off and I had two field workers who followed up all the cases of spina bifida I could lay my hands on, spina bifida and hydrocephalus, in the valleys. We excluded Cardiff, Newport and Swansea. We concentrated on the valleys, because I was challenged by the high incidence there.

PSH. Was it known already that the incidence was particularly high in the valleys before you started your work?

ML. They knew, there was quite a lot of it, but they didn't realise how much, when I started following up all the cases in the birth registers, I got a shock.

PSH. You must have, because am I right, it was as high as 1% of all births in some areas.

ML. Yes, it was.

PSH. And nobody could have thought it was that common before.

ML. Well, you see, so many of the births took place in small community hospitals, all of which have disappeared now. One of them is still a golf club, the Lydia Beynon, the monster on the hill,

PSH. The Manor Park [Celtic Manor].

ML. And in fact the Monmouthshire valleys were the worst.

PSH. Yes.

ML. In some areas there were 3 or 4 people in the extended family, 3 or 4 affected, mothers, parents.

PSH. When did you start thinking there might be some relationship to diet.

ML. Well, I thought this very early on, 1962 or '63; that's when I had Nansi James and Mary Briggs working for me, visiting the families who had an affected child. Nansi James was particularly interested, because she worked most of her previous life with diabetics.

PSH. So she had had a lot of dietary experience.

ML. A lot of experience yes. Without Nansi James the study would never have got off the ground.

PSH. Can I ask what were Cedric's views, because I could imagine that he was perhaps approaching it from a more genetic side, but did he . . .

ML. No, he had quite an open mind. He had a highly intelligent intellect. He thought that it could be something in the diet. We looked at all sorts of things, including the mines. Including base metals, all sorts of things, and we had a major study of all the stream sediments in South Wales.

PSH. Did you have any contact with Archie Cochrane on that?

ML. Not really. Archie, he wasn't interested really. He was going on other things. He'd got interested in his 'family illness' by then.

PSH. Porphyria.

ML. Yes.

PSH. But I was thinking, with his knowledge of epidemiological factors in the valleys.

ML. He gave me access to his statisticians, with some reluctance. There was a chap named Miles who was very helpful. A whole lot of things I got interested in at that time, breathing disorders and so on. I worked with Coates for a while.

PSH. Just pursuing the neural tube defects, coming back to the family studies, when did it become clear that there were in fact quite large family risks for close relatives? Was that something that came out mainly from your studies?

ML. Yes

PSH. Or partly from Cedric's London studies?

ML. No. Cedric's London studies started a bit later. They were done very quickly and very efficiently. In fact we came to the same conclusions which was very nice, but with Cath Evans and one or two other people who worked with Cedric on these neural tube defects, we put our heads together and then I had this idea that it might have something to do with poor diet, rather than anything like heavy metals or drugs. We looked at almost everything.

PSH. Was folate something that was recognised at that stage?

ML. Yes, it was recognised to some extent. Things came together. There was Brian Hibbard and his wife working in Liverpool on the folic acid metabolism defect. They did this in the last years of the 1960s, I think 1969 and 1970 and '71, Dick Smithells did a quick and dirty study in Leeds,

PSH. Did he distinguish at all between folate and other things?

ML. No, not really. There have been quarrels ever since. The North East and the North West and London have quarrelled with one another over the causes of spina bifida over the next 10 or 20 years.

PSH. When did you get anything suggestive about folate being involved.

ML. We did this study with Nansi James and Mary Briggs, and I put a few figures together and it seemed likely. What we did, we looked at the next pregnancies of women with a neural tube defect, we then said, will you join us in a study to see whether poor diet or possibly folic acid supplementation did or did not cause an improvement. And it was done double blind and we had some, I suppose 150 subsequent pregnancies, and we got some funny sort of results. So at that stage, Cedric looked at the figures and said "Yes you haven't done that right. You should go over these figures again. We will do it together". We found that the results were sort of just on the border line. The results were much better than they seemed at first, because there were several women leading us astray.

PSH. Yes.

ML. When they were closely questioned, they admitted to having not taken the tablets and whatever, and when these were corrected, the results became quite clear. It was folic acid supplementation that reduced the risk to virtually nil.

PSH. I suppose at that time you didn't have the possibility of checking levels or anything which would confirm whether they were actually taking things?

ML. No. We did take blood and there was a chest freezer full of bloods from patients who had had blood taken, but not then had biochemistry on them.

PSH. Can I ask Michael, when did you start to get involved with pre-natal diagnosis and neural tube defects. Was that in conjunction with Alec Turnbull when he was in obstetrics?

ML. No, Alec Turnbull got involved because of me, really. He had other fish to fry, but he became quite an enthusiast. Unfortunately he left in the middle of the work.

PSH. Yes

ML. To be quite honest then Brian Hibbard took it on. He became quite an enthusiast and actually was a good organiser.

PSH. So when was it that, I am trying to remember when AFP and prenatal diagnosis for neural tube defects came. . .

ML. That was interesting. That came, when did that start, 1972 or 73?

PSH. With all the material from your study, you were very well placed.

ML. Right at the beginning. The first meeting was at the London hospital. Paul Polani was involved, so there was a girl who was working there, what was her name?

PSH. Mary Seller?

ML. Yes.

PSH. And then I suppose, would that have been the time when you . . .

ML. Cedric was involved too.

PSH. Cedric yes, but I was thinking of Rodney Harris. Maybe that was that the time when you developed links there?

ML. Rodney Harris perhaps was involved before Paul Polani. When people sniff that there's something of interest, they are like sharks on a kill. That's when Nick Wald got in.

PSH. Yes. And then things moved really from prenatal diagnosis to screening and you were very much involved in developing that.

ML. Yes. It was quite fun. We didn't really have the resources in Cardiff to do it properly, that was very sad. I devoted most of my staff to it, rightly or

wrongly. By that time I had a well-running cytogenetics unit. When did Mr Cook join us? Mr Cook was in right at the beginning, and then in 1962 I think, I started cytogenetics.

PSH. Yes, because that must have been one of the first chromosome labs in the country.

ML. It was, yes. Again, we didn't have the resources to do it properly.

PSH. No. So who was it then who was the first person you had with you on cytogenetics.

ML. Miss Ishmael, she has retired now. She was a nice girl, worked very hard all on her own.

PSH. That was in the lab at Llandough.

ML. Yes, with Norman.

PSH. Norman Stark?

ML. Yes.

PSH. So, he was the sort of technician there.

ML. Yes.

PSH. Was he especially, he wasn't just cytogenetics was he? Was he a sort of general technician?

ML. He was a general technician, he worked I think, originally, with Tom Parry. I was very glad when he changed to my department.

PSH. Haematology?

ML. Yes. And then he became cytogeneticist.

PSH. So by the time things moved over from Llandough when the new hospital opened, you probably had half a dozen people in cytogenetics.

ML. Yes. About 6 or 7 people. Some of them on soft money, some of them were health service.

PSH. One thing which you were also very much in, Michael, was the early development of the Clinical Genetics Society,

ML. Yes.

PSH. Now that began when, I was over in America at the time and I heard about it, but I knew that Cedric Carter and Sarah Bunday were involved.

ML. We had a meeting in Edinburgh, when was that?

PSH. It must have been about 1970.

ML. It must have been well before then. We had a meeting in Edinburgh where I think we decided who would be interested and how it should be done. I have got the file here.

PSH. That would be very interesting in due course. And what was the next thing that happened.

ML. We had a meeting at Salisbury.

PSH. Who was involved at Salisbury, Marina Seabright?

ML. I think she was involved too.

ML. Certainly I think the first meeting was Edinburgh, the second Salisbury.

PSH. And am I right that Sarah Bunday acted as the kind of co-ordinator with Cedric to get things going.

ML. I think she came in on it a bit later.

PSH. Because it met quite a lot at Institute of Child Health initially didn't it?

ML. Yes, but the London Hospital was the next meeting after that a meeting was held at the Institute of Child Health.

PSH. Right yes. And apart from yourself, Cedric and Sarah Bunday were there any other people who were especially involved in getting that society off the ground?

ML. I think Derek Roberts was quite involved too.

PSH. I think you're right, yes.

ML. Because he was interested, not in clinical genetics, but population genetics and geographical genetics.

PSH. But he had sort of set up a service, because there wasn't anybody else at Newcastle then?

ML. Yes, that's right. He did a lot of work on the outer islands and Iceland.

PSH. Yes, he has told me about it and it is very interesting.

ML. I don't know that Liverpool did anything to begin with.

PSH. I don't think it did, because I was there at the time and I would have known. I don't think it did. No.

ML. Surprising really, because Clarke, Lord Clarke, had done a lot of work on butterflies.

PSH. He was never really interested in Genetics as a specialty. He felt it was something that everybody should do and there wasn't any need for it to be different.

ML. He took over from Cohen, who was a generalist.

PSH. Yes.

ML. Cohen used to give remarkable lectures, which were quite good fun but not very helpful.

PSH. No. Coming back Michael, just for a minute to the neural tube defects. One area we haven't talked about which you have done a lot on over many years, was the psychological and social aspects.

ML. Well, I got involved in that from the start, because I noticed how destroyed the families were when they had to cope with a malformed child whether it survived or not. So I did a whole load of studies together with Brian Tew and a whole lot of other people, looking at various aspects of the sort of involvements of the families, distant families and communities and so on. The interesting thing was, I involved the wives of a number of fellow consultants or academics and they all went on to do something quite major themselves. Jenny Asher, as you know, worked in the Ministry of Health in quite a senior job. Well, I had 5 or 6 people working on the non medical side, like Jenny Morris, who did a superb interview job, and Sarah Elder, your neighbour.

PSH. Absolutely.

ML. She did a very, very good study. They all helped me with the genetic clinics, which were about 30% neural tube defects and 60/70% other genetic problems.

PSH. That's an extraordinary change Michael, isn't it, that, because I remember when I came

ML. Neural tube defects disappeared

PSH. And you've documented that in your follow-up studies. It is a most remarkable change

ML. The neural tube defects, over a period of 10 years, went from 1 in 100 of all births in South Wales to less than 1 in 1,000.

PSH. That is truly remarkable.

ML. That is partly folic acid, which I fought over tooth and nail. The Ministry of Health really were disgusting over this. They didn't want to be involved. It was only when the National Institute in the States started to do it on a national scale, they thought well maybe we had better support it a bit. And they brought out a few lame documents. They never actually said "you should take it", partly because they were afraid that there could be something, a) it costs, b) there was a group of people, including a chap named Renwick, who said it caused trouble. There has never been any proof there whatsoever. Never any evidence even.

PSH. No.

ML. But I spent a lot of my time fighting these people, left, right and centre.

PSH. But now I think it's accepted.

ML. Now I think it is regarded as normal antenatal care. Certainly that a woman who has got a relative with a neural tube defect should be on folic acid before she starts a pregnancy.

PSH. Michael, we have spent a lot of time and I don't want to tire you out. I have been asking two questions to everybody I have seen, to finish up. One of them has been, what piece of work, series of work over your career do you feel most proud of or attached to?

ML. Folic acid supplementation. Finding that women on poor diet don't do really as well as middle class women who feed themselves more sensibly.

PSH. Well that was something you made a huge contribution to.

ML. I hope so. But the people at the Elephant House [Department of Health at the 'Elephant and Castle', London] didn't really believe me.

PSH. The other thing I have been asking everybody is what person in your scientific and medical career do you feel was the greatest influence on you.

ML. Certainly Cedric Carter. Peggy [Cedric Carter's widow] whose funeral I went to this week, told me, I think the day of the first Cedric Carter lecture. "You know you are in genetics because Cedric steered you there?" He did. And she told me how he did it. He apparently thought, well this chap is halfway to genetics anyway, I will push him that way and that was at Great Ormond Street. And at every turn apparently he pushed me. That was really quite interesting and he was a real eugenicist. He did it with his own family. He did it in his life. He did it with me.

PSH. But you never regretted getting pushed into genetics.

ML. No, not at all, because, it's very interesting. Cytogenetics I went into because it was really part of pathology at that time, paediatric pathology, and it turned out to be really part of genetics.

PSH. Yes.

ML. I didn't run a cytogenetics lab because it was genetics, it was something that came my way. Malformations, again, really genetics. A good 50% of babies with malformations turn out to be genetics. One didn't know that at the time; for example these third ventricle syndromes, something I published on quite a long time ago, turned out to be partly cytogenetics, partly genetics.

PSH. Well Michael, it has been very fruitful and I am grateful for you telling me about it and we could go on an awful lot longer but I think . . .

ML. Well you know, there were some 500 odd publications over the years. It's a lot.

PSH. It's a lot. It's an achievement, I will switch the machine off now and thank you very much.