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AN ORAL HISTORY OF BRITISH SCIENCE

Sue Vine

Interviewed by Paul Merchant

C1379/39

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The British Library**National Life Stories****Interview Summary Sheet****Title Page**

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[Track 1]

Could I start by asking you about your decision to read geology at university, could you take yourself back and say why you decided to read geology?

I went to a girls' grammar school where the curriculum was quite rigid and narrow really and so I'd studied physics, chemistry and pure and applied maths and intended to read physics at university, but because of the Cambridge system you couldn't just do physics, you had to do a whole range of things to sort of back it up I suppose so I did maths, physics, crystallography, geology, I think that was probably about it. And geology was a subsidiary at first but after two years you then have to choose what's going to be your last final work and by then I'd decided that physics wasn't that interesting really and that the – part of the geology that I'd already done in those two years seemed more attractive so I decided to specialise in that.

What was it about the subsidiary geology in the first two years that you liked?

Er ... I liked that – I liked the fieldwork in – in particular I liked trying to work out what – what the structures were like and I was quite interested in the mapping side of it and how you could interpret the map to work out what sort of structure the rocks formed, even though they were underground mostly, I liked that particularly and I liked the – I liked the sort of atmosphere in the department, I found that a lot more ... congenial really than in the physics department for instance.

Why is that?

... Er, I think now what you'd call – in physics I think you'd – what would – people would call it now would be sort of nerdy, I'm sure we didn't know that word even then but – and the people in – in geology seemed more like just normal people, erm, that's how it seemed to me at the time.

Who were the – the people in geology at that time?

Well there was Norman Hughes who was a palaeontologist, he was one of the tutors I had, Gilbert Larwood he was another, I think he might have been a palaeontologist; he was quite young at the time. The professor was called Bulman and he was – he was a palaeontologist and it was – it was riddled with palaeontologists really and there was a seda – sedimentologist called Maurice Black, who else was there? Hmm ... oh was a young – I don't know if he was a young demonstrator or a young lecturer or whatever called Peter Friend ... but they were the sort of main ones that I can think of at the moment.

And would you be able to say what about them, what about them in the way that they behaved, talked, marked them out as less, in modern terms, nerdy than the – the physics?

Hmmm ... more sort of approachable and not – not so much – and one or two of the physics lecturers were just sort of up in the clouds in their little world of very obscure abstract sort of stuff and ... I don't know just seemed more – more friendly and down to earth really.

Thank you.

[05.00]

Is there a particular – I realise that you would have gone over the first two years as a subsidiary and then in the third year as a major, we might call, it geologist, you would have done various field trips and we probably don't have time in this interview to cover all of them but I wonder whether you have one field excursion over those three years that you remember clearly enough to tell the sort of story of it, to say where you went, who you went with and what you did?

Well probably the first ever one, in – in that I think the Easter of our first year everybody who was doing geology went to Arran and I think they still do, you know [laughs], it's a sort of classic place to go, and I remember I had a particular friend who – who we – who I sort of knew better than some of the others and she – she was there and ... we walked miles and miles and miles, I mean it was route marches really

where we would go on this route march and get to a rock that we were going to look at and quite often – I'd never done anything like this before, you know, I was at the back of the line struggling up the hill and by the time I got there often the explanation was all done. So it was – it wasn't – looking back on it it wasn't awfully well led really, although the things that you can do in Arran are really interesting, it has, you know, a big variety of different sort of geological settings and things – things that might be interesting, and it rained a lot and of course we didn't have decent waterproofs in those days so it was quite a – but it was a very sort of sociable kind of thing that we all did together so it was – it was very – it was very enjoyable in some ways but I think from – from the learning point of view actually it could have been managed better. And we – we just – each day we would go out and – and look at some different sort of aspect, you know, one day we might be looking at granite or another day we might be looking at sediments on the beach or looking for little amygdales which are like little sort of deposits inside holes in the rocks and – or ... dykes standing up out of the beach, you know, because they're resistant to erosion and – we actually – Fred and I actually went back to Arran last year and walked right around the coast for a holiday and we tried to visit, you know, some of these places, because he – he had done the same field trip the year before so we tried to visit some of these places that we had – we had seen, and it really is very interesting but I think when – at the time I was a little bit overwhelmed by the physical difficulties of getting across the terrain and this sort of thing, because I wasn't used to it. But I mean I think if I did it now I'd enjoy it better with, you know, more – more experience.

In terms of more experience of just walking, of –

Yeah, just walking over the – the hills and tramping about all day and that sort of – you know, I hadn't – hadn't ever done that really.

Were there others around you that also found that difficult given that this was the first –

Well I think there was sort of a spectrum, you know, of the sort of hard walkers up the front and the also-rans down the back [laughs].

[09.36]

What was the make up of this particular field party in terms of the sort of gender balance of –

Oh it was very unbalanced, I can't – I couldn't tell you the numbers but I mean at the time the average for Cambridge was about one woman in ten so it was probably – there were probably only two or three women in the group, well I can only actually think of one but there may have been one or two others. I've sort of slightly forgotten really. And that was another issue for me in the beginning at Cambridge because, you know, I'd come from my girls' grammar school and it was a completely foreign experience to be learning in a sort of minority situation, I don't think it was exactly a problem but it was sort of a – a bit of a – big change really.

What was the – what was the level of comment on the fact that you were a minority of women in the field and a minority of women in – in class in geology, to what extent was it remarked upon or commented upon in the way that geology was taught or ...?

No, I don't think we were – I don't recall any – any sort of single – being singled out or anything, I don't – I don't think – I don't think that was really an issue, it was more a sort of – a sort of social thing in my head, you know, more than the – the way it was handled ... I think it was possibly easier in geology than it was physics somehow, I – I don't – I somehow didn't feel as – that I fitted in so well in physics really.

And was that due to – due in part to gender, the not fitting in in physics?

Well maybe, I'm not sure really, but maybe or maybe it was just the sort of nerdiness [laughs] and – and the sort of – the abstractness of it, you know, it just didn't seem ... real enough, the topics. I mean the basic stuff is real enough but a lot of it is quite ... it's sort of – it's not the same really but if you try and watch something on astronomy on television it's just – just impossibly difficult to grasp and – and some of the physics, you know, it's not just that you don't understand it, it just that it's – it's too – either too small or too big or too – it's outside the normal range of things that you are familiar with so –

Whereas geology had a kind of graspable scale?

Yes, I think so. Although I mean people do have difficulty with the timescale but I don't – I don't find that such a problem really because you're not talking about light years, you're only talking about millions of years [laughs] and I don't – I find that all right.

[13.27]

When you came to the end of your geology degree, or perhaps even while you were doing it, what did you hope to – to do with it, how did you see yourself pursuing it in future, if at all?

Well I – yes, I think I did think I would pursue it, one of the things that I was – I did investigate was doing work at sea, you know, on – on these surveys and things like that, I thought I might have quite fancied doing that, but at the time that was pretty much impossibly difficult for women and I was discouraged from worrying about trying to do that. I mean I think there were actually one or two women doing that, Marie Tharp was an American who – who was working at sea. But anyway, so I – I didn't ever pursue that but – well then at – soon after – I'm just thinking how this works, Fred was studying for a PhD so while – while he was doing that I'd got the job as a research assistant in the geophysics department at Madingley Rise and then when he finished we went straight – straightaway to the States so I gave up the job and after that I – I just worked part-time after that, I didn't really go back to working full-time.

[15.11]

Before I ask about the research assistant work, could I ask you to say how you were discouraged in practice from pursuing enquiries in terms of oceanographic cruises, so what you did in order to investigate that as a way forward and the particular nature of the discouragement, you said you were discouraged from ...?

Well actually the – I talked to Drummond Matthews because he – he was involved in the geophysics department already and he had already done quite a bit of work at sea and I think his experience was that there just weren't any women doing it and it would be an awful nuisance and, you know, all the rest of it, so that's all I did really and I thought, oh well, you know, never mind. Fairly – fairly – you know, I was discouraged fairly easily really, I mean maybe if I'd have really gritted my teeth and ... pursued it, but I think it possibly would have been difficult then.

What about having women onboard was – was thought to have presented a nuisance then?

I don't know exactly 'cause I never got there [laughs].

You said that Drummond Matthews said it would have been –

Yes, he said – he said, 'Oh no, you,' I'm not even sure ... whether it was – I don't know exactly, whether it was just the sort of sleeping and washing arrangements or whether it was – whether it was thought to, you know, cause difficulties among the sort of make up of the population on the boat or I – I don't know really, or whether he just didn't think I'd be suitable or what. I wasn't applying at that stage, I was just having a chat and so I didn't – didn't think it was worth struggling with it really.

[17.26]

Were there other moments in – in doing science at Cambridge where your gender prevented you from taking up a certain opportunity, or going on a certain trip or experience?

No, I don't think there were. I got a chance to go on an – a sort of big field trip in France, I'm not sure which year it was, one of the summers and it was something that was sort of sponsored by BP and they looked for students, geology students, from a whole bunch of universities and well you could apply really and – so I went on that and there were – there were a few other women there, it wasn't – I don't think there was any – any discouragement.

The Spitsbergen expedition, was that something that you –

Er, don't – that didn't ever seem to be ... on offer, I'm not sure whether I wasn't doing the right – I think I probably wasn't doing the right subject because we – I think you had to be doing something a bit more mineralogical probably, I think that's probably why. I would have gone, or I would have tried to go, you know, I would – that's the sort of thing that might have appealed but I think I wasn't – I think I – I concentrated on palaeontology in my last year and so it was kind of in – slightly up the wrong direction.

[19.22]

Could we now then turn to the job that you did take up then when you finished your degree, that of research assistant at Madingley Rise, could you first of all just give us the sort of dates of your service there so we can pin that down before I ask you about the nature of the work in terms –

Oh it would have been between about September 1963 and a bit earlier in the summer, probably July or August 1965.

Okay.

'Cause we left to go to the States in I think about September 1965.

And what did the – the work as research assistant there involve?

Well what it turned out to be was – a lot of it was working on the – the data that was brought back from sea and that was just because of the – the coincidence of the timing really, that there was quite a bit coming back from – from sea, I'm just trying to remember if I did something else before that, that's what I remember really. And it all had to be – it had to be processed to make it into a form that – that you could look at and so one of the – one of the jobs that I had was inputting this information into – into a form where it could be reduced by computer, and everything was put onto

punch tape in those days and then you would take it down to the town, to the university computer which was a huge – I mean it filled two rooms, an enormous – and then you would get your – your answers back on punch tape and [sighs] I can't exactly remember how – how you – I'm not quite sure now what you did with your punch tape when you got it back. But one – one of the big things that we did was to make – because on – on the cruise – this is the discovery cruise, they would – they would zigzag back and forth across the ocean, and then they would zigzag back and forth at right angles so you would have a grid of readings and then there would – the positioning wasn't nearly as good then as it is now because there wasn't GPS to do it with so when we got all this information back you had – you could draw sections through the ... of the readings that you took and then read – to try and make sense of them we – we transferred these onto polystyrene, sheets of polystyrene and – so that you could set them up and shuffle them about to try and line them up and you could even have your other set at right angles to try and make a three dimensional sort of picture of – of what they had recorded, so that was – that was one of the sort of – and it was at that point that – that we were able to see the stripes recorded by the magnetometer over the sea floor. And those had been recorded before off the states of – off the west coast of the States but in – I think that may have been the first time they had been recorded in the Indian Ocean.

Where were you constructing this sort of polystyrene model?

It was sort of in the – in the loft of the – an outbuilding of Madingley Rise called The Stables, well it was stables, old stables, and – and it was just all over the floor and it was just –

And who were you working with on this?

With Drummond Matthews quite a lot.

Were there other research assistants there at the time?

I don't ... there may have been but I don't – I don't recall them, I think a lot of the people who were working there were – that weren't staff as it were, they were PhD

students and they were doing all the sort of nitty-gritty of the work and trying to make some sense of what they were finding out and – I don't – I don't recall – I didn't work with somebody else in my sort of category as it were.

[25.07]

And I did – at that time I started drawing up some of these sections as – as well.

What did that – what does that mean, drawing up the sections, for people who don't know what the data that came back looked like or what they've –

What I can't remember is how you get from your punch tape to your – to your – this – Fred will probably remember, I don't know, don't exactly remember that. Well there's – there's – there's computer programs that will get you from your – your total magnetic field reading to your magnetic anomalies so that you can then – you know, you can plot a little wiggly curve, because if you – if you recall – if you try and plot the whole field then the whole field is large and what you're interested in is very small in comparison to the whole thing.

So the computer allows you to isolate just the anomalies from the –

Yeah yeah.

And when you say you – you drew them up, you literally drew them on – on –

Yes.

Where and how did you draw them, it seems a very specific question I know but do you remember the actual practice of doing these drawings?

... [Laughs] With pen and ink, I mean – I mean they were – they were first drawn – they must have first been drawn from numerical values on – on graph paper and then to make them look like something that somebody could understand, you know, then

you would – you would trace over your graph paper and your scruffy pencil plot in pen and ink.

And was it those neatened up pen and ink curves that you were sticking onto the polystyrene and putting onto the map in the stables?

Well it must have been blown up versions because it was bigger, it was quite big, you know, it was all over the floor, I mean it wasn't just like on a page, so the same thing but bigger, probably ten times bigger or more. And – and the purpose of doing it was to – to try and see it all in – in sort of – in two dimensions rather than just one section on the page.

So that you could sort of peer through it and almost –

Yeah, you could look through and see – see the – see the – the individual sections lined up.

What do you remember of the reaction of other students, other academics around you to that model that you'd made in the loft?

I think ... I – I'm not sure really, I mean I – I had a feeling people might think we were sort of playing up there but [laughs] I think ultimately they did – they did appreciate what came out of it, but ... it was sort of playing but sometimes you need to – a physical prop to help you understand what's going on so ...

[28.58]

Were you tempted at this time to do research yourself, to do a PhD yourself?

Hmmm, well this was – this was quite a sort of transient time for us because, you know, that was the time when Fred was working up to going to the States and it wouldn't have been – it wouldn't have been a good time to be starting on it really and so I – maybe if we'd have stayed in Britain I might have thought of it, but then I think

I also thought that having one of us doing a PhD might be enough, as it, you know, was a very time consuming sort of thing.

[29.54]

What help did you give to Fred outside of your job at Madingley Rise, but informally as – as someone in a relationship with Fred and then married to Fred, what assistance did you give him with his PhD?

Well I suppose I – I'd been sort of interested in the whole thing because I got involved with it at Madingley Rise and – I mean mainly – I suppose draw – drawing stuff up for him, drawing diagrams up and also typing. I – I decided it would be a good idea to try and learn to type a bit more than two fingers and so I taught myself to type a bit better so I could – I could type a – you know, a tiny bit better than he could so that was a little bit useful and eventually I typed up his PhD thesis. On those days – I mean it's extraordinary when you look at it from now how you typed on stencils, I don't know if you've ever tried, it's sort of like a wax layer between two sheets of thin paper or something and you put it in your – I just had a portable typewriter and – but you have to – that when you hit the keys have to cut the wax because then when you've typed your sheet the way you get a print is for ink to go through the – the stencil, so if you make a mistake in typing your page, you know, you've got to go back and paint over the little wrong letter with your sticky stuff that will fill the hole and then retype and – and if it doesn't look too good you have to retype the whole page so it's – it's unbelievably laborious compared with what you would do now. So we struggled through that ... probably most of it really I didn't – I don't think I really helped with the actual sort of unravelling the science really, or I – I don't remember any – I don't – probably not.

What do you remember of discussing it, whether you think that you helped or not, what do you remember of discussing the actual ideas and theories themselves about how to interpret the – the anomalies?

Well the question was where were these stripes coming from and how – how you were going to – how you were going to prove – I mean he had this idea that there

might be reversed strips on the ocean floor and so I – I was quite interested in how he was going to ... prove it because people, you know, you can't just say, 'I think this is what is happening,' you have to have good reasons so he did try and get some readings from – from seamounts that were going to be differently magnetised from each other, I think that was the gist of it. I – I – I don't remember an awful lot about ... I – I don't remember ever thinking that it was unlikely to be right, I thought it seemed once – once he kind of had the idea and – and we had this various evidence I thought it seemed like ... very likely, I don't remember. I mean I wasn't sort of trying to put the other point of view or anything 'cause it seemed – seemed very plausible really.

And do you remember when and where you tended to talk about this sort of thing?

... Hmm, no not really [laughs]. Because at that time, for those two years, I mean we were working in the same place and living in the same place as well so, you know, it's hard to separate one from the other really.

[34.59]

The – the atmosphere at Madingley Rise was extremely lively and everybody was very keen to discuss what everybody else was doing, and they had a teatime and a coffee time where everybody gathered and discussed everything and it was a very stimulating and lively environment, principally created by Edward Bullard who was head of it at that time and he was always – every – you know interested in what everybody was doing and encouraging other people to come and have a look and it was a very nice atmosphere to work in and so, you know, we did have chance to discuss what we were doing with everybody else and see what they thought and ... we didn't work in little isolated capsules.

[35.56]

Was – was gender significant in any way there in terms of ...?

I ... I wasn't aware of it I don't think. I don't think anybody ... I mean I – I think I was in – in – I'm just trying to think who else was there but ... there were one or two other women there but – I don't think it was a problem, hmmm, but I don't think the – the ratio was any better than it was in the rest of the university, I think it was similar. I think I felt ... I don't know how to put it ... I think the – the place was full of bright – bright young research students and I think I thought I wasn't quite up to that grade but I don't think that was to do with being a woman, I think it was just that I wasn't quite on that level intellectually, you know, I was sort of at a more mediocre sort of level.

What made you think that, what about the way that they ...?

Just – just – just the way they were sort of so ... just thought they seemed more able really, more – a lot of them, but it made – you know, it – you can't tell now, now that I'm mature, you know, whether all of that is just bluster or whether they're actually more clever, you know, now when I look back, but that's how it seemed at the time that they were – because they were more sort of full of it.

[38.10]

What do you remember of stories that they told of cruises once they'd come back and were in the department?

Oh there was a lot of sort of ... comradeship between people who'd been to sea together, and you know, disasters that they had got through somehow and a lot about instruments that broke down and how they mended them and this sort of thing, that was one of the features in those days of cruises, you know, because they were – they were – they – they had gravimeters that had to be kept very stable and then they had magnetometers that they had towed and they had – they did dredging as well so they were putting things over the side and, you know, that just so many things, mechanical things that could go wrong that there was a lot of talk about that kind of thing really, that's what I remember.

What did you hear about the sort of social culture onboard, the kind of – the things done when the work had finished if you like?

Er ... don't remember, don't remember them, that didn't seem to be a – that didn't seem to be a big thing that you came back and talked about, what they talked about was how they – how they conquered everything that went wrong and – and there was quite a large section in Madingley Rise, out the back, where it was all technical labs where they, you know, they designed their instruments and mended their instruments and invented their instruments and all of that, you know, there was a big team there that looked after all the nuts and bolts. I don't remember people talking about the social – the social side, except they did watches, I remember they used to say they did, you know, round the clock watches to look after all the instruments that were running.

[40.40]

If I was to show you a copy of the sort of famous paper of Fred and Drum's, the 1963 paper.

Yeah.

Are there parts of this in terms of the – the diagrams that you would recognise having contributed to?

Probably, I probably drew them.

So I've just handed you a copy of that.

Yeah, I – I would have drawn these, they look very scruffy don't they, by today's standards, 'cause all – all of this would have been done with stencils, this lettering, you know, it's – it's terribly primitive really but – handshake ...

So that was the – the profiles on the – the first diagrams?

Yeah, I mean these are the sort of – these – this sort of thing is the kind of thing that we would have turned into the polystyrene models, this – this kind of section, I mean that's just one section but they actually had lots of them really. Yes, I think I drew – I certainly drew these.

And by those you mean this is on –

This with the blocks.

Yeah, so page 948, bottom right hand corner, yes, we've got diagrams which seem to be a – a curved line on top of, or behind blocks of – this is normal and reversely magnetised ocean floor?

Yes, this was ... the blocks of the interpretation of the curves.

And you drew those – where did you draw those, at home or in the department or ...?

No, in the department I think, I don't think I drew at home 'cause I used, you know, all the equipment, the pens and all of the stuff that I used was – belonged to the department. [Pause]

Thank you. Do you remember Fred writing this, 'cause I think he did the writing for this paper, do you remember the – the period of time when he was putting this together?

Well it would have been – I don't know what the date is on there, it would have been towards the end of the period when he was finishing up his PhD 'cause that was – I think that was part of it. It was a very busy time what with write – you know, getting that ready and getting the PhD done and thinking about moving to the States and ...

[44.00]

How did you feel about the move to the – to the States yourself?

I thought it was an exciting opportunity really, and it was, I mean it – it did turn out to be a good opportunity. It was – and Professor Hess and his wife who – Fred had gone to work with him really and they sort of took us under their wing when we got there a little bit and it was quite – quite a culture shock at the time, to step off the boat and find yourself in – in this place where everybody sounds as though they're on a movie set, you know [laughs]. I mean now it – it's much more – it wouldn't be such a shock because everybody's seen no end of American movies and, you know, they're just sort of – it seems more normal, but then it didn't, no. But ... oh we enjoyed our time there, both our children were born there so what happened I didn't have a – a proper job but it just so happened that because I had had a little bit of experience of drawing diagrams already when I got there that I was able to do a bit of part-time work drawing, not particularly for Fred actually but for several people who were there and I just did that at home part-time, and that was – that was the only thing I did in the way of work while I was there. Although I did have a visa that would have allowed me to work but what with one thing and another that was enough really.

How was – if it's not too personal a question, how was childcare and domestic work divided up between you at – in America, between you and Fred?

Fred did his work and I did the child and the domestic, and this is one of the reasons that I wasn't looking for more work actually because he always, you know, put his work first so that that seemed to take all the time so I needed to be available to do other stuff.

And how did family life run alongside periods of time when Fred was travelling, Fred's job involved certain amounts of travel for conferences and for – for fieldwork?

Well he travelled away for short times for conferences and so on on and off and mostly we didn't go. But in the summer at that time the staff were really free to go and find themselves something useful to do for two months so they were – they just sort of paid them for ten months and then they could go and do fieldwork or go and work somewhere else or whatever, and for two of the summers we took – I don't know, several weeks to travel across the country, two separate times and Fred was able to do some work, you know, during the – during the travel and we all – we all

went. So you know, we had nice opportunities to go and explore the country and ... and there's some amazing places to explore, we really enjoyed that.

Did you and the children then actually accompany Fred in the field, accompany him on fieldwork?

Er ... no, no we were in the vicinity but we didn't go and watch him get bits of rocks or – 'cause a lot of the time he was collecting samples and before we had the children there was one – one little bit of fieldwork where I actually did go with him, a very traumatic really – it was the first summer we were out from England and we – he had this little – little butte, which is like a little hill sticking out of a prairie, where he wanted to go and collect a rock and it was sort of quite a big hike across this prairie and the grass was full of rattlesnakes, you could hear them rattling so I was terribly nervous, it was really hot, so we got to this rock safely and got our sample and then had to come back and of course just because we were just out of England we just had a little bottle of water each, and actually we probably needed something like five litres each, so on the way back we were just impossibly dehydrated and we found a cattle trough looking all slimy and horrible and we drank out of there because we were so desperate, but we learnt our lesson. That was really the only time I actually went I think to the place where he was collecting his rock, but mostly what – what – the following summer we had a baby and we went and camped where he needed to be or stayed where he needed to be and he went off and did it and I just did something else.

What did you tend to do with the children while he was collecting his samples?

Well just go exploring really. And one – one – I don't know how there are so many summers but one summer we spent – we went to Cyprus actually where he was doing fieldwork and we had both the children then – no, we went to Cyprus twice, no, it must have been after we came back to England, and – and we just sort of holidayed while he did his work.

[51.05]

I think that he mentioned this in his recording, Kyrenia, is that how you say –

Yeah yeah, we stayed in Kyrenia one time.

On the north coast and I believe that you stayed with another family who the – the husband was also a geologist doing fieldwork and the two sort of families at home stayed together?

Yeah.

The Cann family he said?

Yeah, yes, that's right. He was here at that time and he subsequently moved to Newcastle and then to Leeds but he was here at that time and he – he was working there that same summer that Fred was there and we stayed together in this hotel and we rented a car each, one for the families and one for them to go and do rocks, and we just holidayed with – the wives and we just holidayed with the children, the four children while they went off. And it was very hot, we had – we spent quite a bit of time on the beach but we had to sort of go and shelter in the shade somewhere in the heat of the day. But we just had a summer holiday basically. There was one – one piece that I particularly remember was not on the beach, we went – thought we'd walk up into the mountains a little bit, and only a small walk 'cause we had all these children but – who were all under about eight I think, so we parked the car in the shade of a tree at the bottom and we started walking up the side of the mountain and stopped for a rest at some point and we saw ... some shepherds arrived near the car and we watched them and eventually they moved the car somehow out of the shade of the tree so that they could get under with their animals and we were sort of a bit horrified stuck up this mountain and thinking that they were going to take the car away but actually they just wanted a piece of shade, so they must have come there specially because they knew that tree would give them some shade and found that we were in it. But we didn't – we didn't go and do the actual geology.

[53.48]

And – and finally can I ask you a bit of a big question and that's over the course of – of your life from sort of this point onwards, from the sort of early '70s onwards, how have you engaged with science, either professionally or privately?

Well when we came back here I picked up a bit more work drawing diagrams for people in the environmental science department, so they were sort of in the rough vicinity of geology I suppose. And then ... about ... I'm not sure how – I think about 1980-ish I started working part-time for the Open University as a – as a part-time tutor and then I carried on doing that for almost twenty years on different courses and that's really the main way that I kept in touch with science, apart from just sort of a little bit of brush off from Fred. And I tutored in, well, geology primarily on three different courses so – and I enjoyed that. It wasn't a plan exactly to do it but the opportunity cropped up and it fitted in well with having children still at home and so I could fit my work round whatever I needed to do with the children ... hmmm, and actually I enjoyed the – the OU courses because I thought, with hindsight, you know, that the subjects that I – or the way it was approached through those courses was much more interesting than the courses that we had done as students.

Why is that, in what way?

Much more interpretive and not so much sort of cataloguing. When we studied – when we studied fossils at Cambridge the primary aim was to be able to recognise them, name them, draw them, know what they were related to and – and just generally catalogue them and very little – very little emphasis on what does that tell us about their environment, for instance, or I suppose we also would have had to – had to know what age they were, they did use them for stratigraphy but not – not – not very much for interpretation of the environment, and I found that very – very interesting doing the OU courses. And the final course I tutored was about how the atmosphere of the – or how the earth itself and its atmosphere has evolved in con – simultaneously with the evolution of life and how each has affected the other, and that is something I had never thought about before, I had never thought about that as a student of – of geology when I was younger and it was just an eye-opener really. So, you know, I've had an interesting time doing that.

Thanks very much for agreeing to be interviewed.

Okay.

[End of Track 1]