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Berkeley, California

Ian Carmichael

*Ian Carmichael: A Life in Geology, Teaching, Research, and Administration*

Interviews conducted by  
Samuel Redman and Lisa Rubens  
in 2007

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[End of Interview]

**Interview 1: April 6, 2007**

## Begin Audio File 1

01-00:00:07

Redman:

All right, hello. My name is Sam Redman, and I'm a graduate student in the Department of History at the University of California Berkeley, and today it is April 6th. I'm sitting down with Ian Carmichael, a Professor Emeritus. This is our first session together today, so I'd like to talk about your early life, history, and a little bit about your life before — well, before coming to Berkeley, and a little bit about your early influences. So the first thing that I'd like to ask you about is your parents. If you could tell me a little bit about who your parents were, where they were from, that would be a good way to start.

01-00:00:57

Carmichael:

Well, Sam, my father was an MD from the University of Edinburgh. My grandfather was an MD from the University of Edinburgh, and my great grandfather was an MD from the University of Edinburgh. So it was with some shock that my parents found out that I didn't want to become an MD, either from the University of Edinburgh or from the University of Cambridge, where I went to university. My father lived all his life in Edinburgh, and then migrated to England. His Scottish friends thought that to be a great act of disloyalty and whatever. Scots don't go to England because it's better, that's a terrible admission of a lack of faith in the place. It's like a rat deserting a sinking ship. My mother came from Southeast Scotland, in a place called Dumfries, and when she met my father, I suppose in the 1920s, she was living in London and he was living in London, and he worked for an institution called the Medical Research Council, which is renowned, in England anyhow, for its support of medical research in this huge, wide range of fields, and including of course, the famous Watson-Crick combination, which gave them discovery of the double helix.

So my father had served in the First World War, and I think that made him enormously sensitive to the issue of the waste of life it seemed. He spent two years in Gallipoli or a year in Gallipoli, or it was, then two or three years in Northern France, in the trenches there. He left a totally irreligious man as a consequence, but very determined to look after people, and it was because of that he went and became an MD. Actually in England you don't get an MD degree, that's a higher degree. You get an MB, Bachelor of Medicine, and a Bachelor of Chirurgiae [Latin for “surgery”], and you're allowed by courtesy to be called a doctor. You're not in the literal sense a doctor in the UK. It's only in the United States, where we actually give you an MD degree as the first degree that you actually have earned the degree titled doctor. So the only doctors in England actually, by and large, are either the people who've got an advanced MD degree or PhDs. In England anyhow or in Scotland as well, surgeons do not like being called doctor. You call a surgeon in England Mister, and he's very — or she is, Miss, whatever. I've never met a woman

surgeon, I've been out of England too long, but they're very snooty about the way they want to be called by their title, Mister, and never call them doctor. It's to distinguish between a surgeon and a physician. So my father was in the medical profession, in the research side of it, working at the Medical Research Council. His interest was neurology, and he had two children. I was the eldest son, and he had a younger son, my younger brother, who is four years younger than I am, and he lives presently in France. He's still alive. Now, do you need to know my dates of my father...

01-00:04:32

Redman:

No, that's all right. I mean if there are dates that you'd like to share as we go on that's fine, but since much of it is in your autobiographical sketch, I think that, I wouldn't worry too much about.

01-00:04:48

Carmichael:

OK.

01-00:04:49

Redman:

So did your father practice medicine at all, or did he know right away that he wanted to do research?

01-00:04:56

Carmichael:

He did both. You're allowed to do both in England. You can work for the Medical Research Council, and you're attached to a hospital, so he saw patients. He didn't practice in the sense of having visiting patients in their houses, which is still a tradition in the UK, that doctors still go to the homes, unlike here. No he didn't do that. My grandfather did that, and he had a horse and trap to do it. I can remember, when I was about the age of seven, he took me around his practice in Edinburgh. He had this horse and trap, and I got alongside him, and he just threw the reins over the horse's head when he went out to see his patient, and came back again and talked to me and talked to his horse. He loved that sort of life. I don't know how old he was when he died, but it was a life which certainly appealed to my father. It never appealed to me. For some reason or other, being a family doctor has never appealed to me at all. I think it was the lack of — it was being firmly embedded in a community and not being able to move out of it, I think, which drove me up the wall. I couldn't stand the idea of not being able to travel widely, and I've always liked to travel widely.

01-00:06:08

Redman:

OK. Now did your father or did your mother go to boarding school, or were they —

01-00:06:17

Carmichael:

My father went to, I don't think it was boarding school. No, he went to the Edinburgh Academy, which is a school, before he went to Edinburgh University. My mother, I have a sneaking suspicion, was educated privately, as they say in England, and she never went to college.

01-00:06:34

Redman: OK. Now your family lived in London until you were about eight, is that correct?

01-00:06:41

Carmichael: Right.

01-00:06:44

Redman: I'm just curious what you remember about that time period. I mean, obviously it's difficult to recall memories, but before you were you know, six, seven, eight years old, but I'm curious what you do remember about that time, and what you know about that time in your life.

01-00:07:00

Carmichael: There are two events in my early life, which I think affected almost everybody. There was a crisis about a war coming in 1938. So many people left London because they thought it would be bombed, and I went to Dumfries with my mother, and we stayed there, and my father stayed in London. We lived, at that time, in a place called Hampstead Garden Suburb, which is a little suburb near a part of London called Golders Green. I've never been back there, so I don't know what it's like now. My imagination, my memory, is a large house in a very picturesque and country like road, but I'm sure in reality, it's much smaller and much more built up. When we returned from Dumfries, I then went to a boarding school, so I was what, nine years old or something? Then I went to boarding school because it was clear that war was coming. The government had a policy of trying to move people out of London, so that when the bombing came, which they anticipated, there would be fewer casualties quite obviously, which is not a thing that they wanted, and I learned to deal with. So in 1939 my father and mother moved out of London to Sussex.

01-00:08:30

Redman: So in what we would call kindergarten through first or second grade, did you attend a school nearby?

01-00:08:42

Carmichael: Yes.

01-00:08:43

Redman: OK.

01-00:08:44

Carmichael: But I can't — I've forgotten the name of the school. I don't remember, but then I went to boarding school. So I think that's what happened, so I was eight or nine when I went to boarding school, and the name of that school was Peterborough Lodge.

01-00:09:00

Redman: And your family moved to Scotland originally in '38, but you only spent like a year there.

01-00:09:10

Carmichael:

No. The war crisis only lasted for about six weeks, and so we moved out there for six weeks and then we were back in London again, everybody came back again. It was the time when Chamberlain was negotiating with Hitler about Czechoslovakia and so on, and they avoided going to war.

01-00:09:31

Redman:

Right. So your memories from this time period, obviously a lot of it is you know, going to be informed by what you learned later on about things like Chamberlain and what was going on in Europe, and the rising threat in Europe. But as a child, what did you think of it?

01-00:09:50

Carmichael:

Oh you had no idea of what it was. They talked about the crisis and as a seven or eight year old, you don't know what a crisis is, and you're told what a crisis is; other people living in another country want to do you down. Don't forget in Britain, Europe is, the continent is what Europe is, and the British don't see themselves as being part of the continent. So everyone talked about oh, there's a crisis on the continent, and so they shrugged their shoulders and moved on, but they knew that war was coming, sooner or later war was going to come. Hitler had a very aggressive policy in Europe, so they knew that sooner or later there would be a conflict.

01-00:10:38

Redman:

Right. And so you just, at this point, I mean as a child would typically do, you're traveling around. Maybe did you see this more as exciting than anything else?

01-00:10:51

Carmichael:

School. I liked the school because it gave me friends. I'm not sure I was a very good scholar, but that's where I got my friends from.

01-00:11:02

Redman:

And so your family — I'm sorry, did you say six, eight weeks in Scotland.

01-00:11:09

Carmichael:

Yes.

01-00:11:10

Redman:

Then you moved back to Sussex.

01-00:11:11

Carmichael:

Right. No, we moved back to London. The crisis was over, we moved back to London, and then in 1939, September 3rd, war was declared between Britain and Germany, and it was about the invasion of Poland. Britain had tried to guarantee the integrity of Poland. How it intended to do that, God only knows, but they did it, and war was declared on September 3, 1939.

01-00:11:45

Redman:

So how old would you have been in 1939?

01-00:11:47

Carmichael:

Nine. And then my father moved my mother, my brother and myself down to a house that they rented in Sussex. So he would have a daily commute. You had to have a good rail connection to London so you could commute every day. We would be away from the anticipated main center of the bombing, when everybody knew it was coming. One city that was going to get bombed by the Germans it would be London, and smack in the middle of London, we were going to get it. So the government persuaded as many people as they could to move, and they asked all the kids to go anyhow, even if your parents couldn't go. They evacuated the kids of the country so that they wouldn't get damaged or impacted by the bombing.

01-00:12:40

Redman:

So by nine years old, did you have a vastly different impression of the places that you had lived? Did you associate Scotland with your grandparents?

01-00:12:52

Carmichael:

Yes. Scotland was associated with my grandparents and London was my parents, and the accents are quite different. I cannot speak quite like my grandfather used to do it, but it was a lilting Scottish accent, which is very familiar. Actually, every now and again, I listen to it on a TV movie or something like that today and I can't understand it.

01-00:13:16

Redman:

Oh really?

01-00:13:17

Carmichael:

A really strong Scottish accent is beyond me now.

01-00:13:19

Redman:

But as a child, those were the things that really stood out.

01-00:13:22

Carmichael:

Yes, absolutely, the different accent and the different diet.

01-00:13:30

Redman:

Oh, really, OK.

01-00:13:31

Carmichael:

Oh yes. Scots have a very different diet than the English. The Scots have porridge everywhere and oak cakes and stuff like that, and the English didn't eat a lot of porridge.

01-00:13:42

Redman:

So when you went up to go visit your grandparents, I mean in this case because of the crisis, did — sorry. A better way to phrase this would be so when your father moved to England, did he adopt the diet or did he —

01-00:14:01

Carmichael:

He never lost his accent.

01-00:14:04

Redman: Did he intentionally try to hang on to some of the Scottish?

01-00:14:06

Carmichael: I couldn't tell you that he intentionally did it. I think his attitude was a small Scottish accent was much more successful with ill people than an English accent.

01-00:14:17

Redman: Interesting.

01-00:14:19

Carmichael: And my mother used to say, if you went gray early, it would be seen as an asset, because patients would like a doctor who obviously looked as if he'd had experience and wisdom than someone else, and that tended to go with gray hair. So my father went gray early. I didn't but he did, and I think it benefited his relationships with his patients, who were always in a hospital. His parents were seen at the hospital. He's quite a specialist. He has an interest in neurology.

01-00:14:54

Redman: So when he did research, you said he wouldn't do house calls. Would he go visits patients or was he based in a laboratory?

01-00:15:05

Carmichael: Based in a laboratory in a hospital. He was given one. The Medical Research Council give you, for like I think it is, and they pay for a unit, and the unit can be based in a hospital or based in a lab or wherever it was. In his case it was based in a hospital, and I think he was given six or eight staff members to work with him. It was a wonderful opportunity for somebody in that field.

01-00:15:32

Redman: And when you were a child, did you ever go to his place of work?

01-00:15:34

Carmichael: Oh yes, all the time.

01-00:15:37

Redman: And what did you think of that?

01-00:15:38

Carmichael: Well I liked, I just liked hanging around his hospital. It seemed to me that you know, he had interesting pieces of equipment, and he was interested in muscle. He was really interested in damage to the central nervous system, and so he was looking at the nerves of frogs and nerves of this, that and the other, and trying to understand how the central nervous system could repair itself. It's still a big issue, even today. If you damage your central — your spinal column, you know, you're usually paralyzed for life. Maybe one day we'll learn how to repair it, but in those days we had no idea. Of course, we didn't know anything about DNA when I was a kid. They certainly knew how a

nerve transmitted its signal through the migration potassium, at least that's how I remember him telling me back in 1939 or 1940 or whenever it was. Yes, I used to love hanging around his lab. I loved it.

01-00:16:44

Redman: So were you maybe more attracted, at that early age, to the laboratory environment as opposed to the medical research that was going on.

01-00:16:55

Carmichael: Yes, I liked the lab environment. I liked the post docs or the graduate students who worked with him. I was very much more intrigued with them.

01-00:17:02

Redman: Because they were younger?

01-00:17:04

Carmichael: They were younger. They didn't demand that I worked. My father was very insistent that if I had an A, I must get an A-plus. He was never very supportive of anything other than the highest grade. He thought As were you know, I should do more work. He was a Scot, he was a Puritan. He was Presbyterian by training and the Scots have this very Puritan outlook, which is hard work and dedication is everything about life, and if you don't subscribe to that, you in some way are either English or lazy.

01-00:17:44

Redman: Now what about your mother? Did your mother encourage a specific scientific sort of route? Did you go to your mother for different things?

01-00:17:59

Carmichael: Sam, that's an interesting question. I've revised my opinion of my mother in the last five years. She died — well I'm not sure exactly when she died. I can find out. She died about eight years ago, and I think during all my time I lived with her, I was very critical of her. But in the last five years, I realized she was a much shrewder woman than I ever gave her credit for. I won't say I miss her because we never got on terribly well, I didn't think, but on the other hand, I somehow or other, I think, I denigrated her in some ways. But you know, thinking back on all the things she told me when I was young, I think today that she had a wisdom which was not clear to me then. So I didn't have a lot to do with my mother. My mother seemed to me to be a person who followed in my father's footsteps. You know, if I wanted to do something, she always used to say, "Ask your father." So she never seemed to have an independent life of her own.

01-00:19:00

Redman: Now when you were nine years old is when you entered your first boarding school, is that correct?

01-00:19:05

Carmichael: Right.

01-00:19:06

Redman: Could you tell me a little bit about that? I'd be curious to know a little bit about the sort of behind the scenes decision making there. Do you know why your parents decided to do that? It was a much more common practice in England.

01-00:19:20

Carmichael: It's much more common.

01-00:19:21

Redman: And then I'd also be curious to know what you thought about that, as a boy of nine years old.

01-00:19:29

Carmichael: I don't know what England's class structure is nowadays. I imagine it's far less muted than it was when I was young. I'm going back 70 years now essentially. So 70 years ago, despite the fact that the Second World War had just started, there was a very evident class structure in positions of you know, in the '30s and so on, and before that, and one was the middle class sent their children away to be educated. They went to boarding school, and they usually went at the age of six or seven, something in that. The whole idea of a good education was to send your sons away to boarding school. I don't know what the girls did. Girls were terribly foreign to my life. Other than my mother, I didn't have any contact with females, until I came to the United States.

01-00:20:21

Redman: So when you arrived at boarding school, you weren't the youngest or you weren't of a group of youngest?

01-00:20:26

Carmichael: No, no. So you had — you didn't know any friends but by the time vacation came along, you had a lot of friends but the trouble is they all went home, and you went to your home and you had no friends, because they were all left at school. So after about a week of being at home, the thing you wanted to do most of all is go back to school, because that's where your friends were.

01-00:20:49

Redman: OK. And so tell me about your early education in boarding school.

01-00:20:59

Carmichael: I don't remember very much about it, I really don't. What changed was, I was very badly burned in boarding school, and I was removed from boarding school into a burn hospital.

01-00:21:16

Redman: Can you tell me how you were burned?

01-00:21:17

Carmichael: In those days they had something which you had to inhale, because I was — in those days I had bronchitis or something. And it was some balsam or

something, which is put in hot water, and you had to inhale it with a towel over your head. Well the nurse, the school matron, told me to take this into my bed, and it was boiling hot water. It spilled all over my midsection and I was in the hospital nine months for that, for two reasons. I went to a burn unit, which is very interesting in its own right, and secondly, don't forget, the drugs which we have today, the sulfur drugs and so on, had been discovered, but they weren't in general use. Say you were subjected to a hot wax treatment, which they painted hot wax on you every day, and so I was 11, I suppose, ten or eleven when this happened. And so I was removed from boarding school, and I spent nine months in the hospital. Now, this must have been about 1940-41, something in that region, and the other people in this burn unit were pilots in the Royal Air Force or Germans who had been captured, who had been shot down. In those days, the airplanes were all gasoline, they weren't jet fuel. So they were very likely — most of them caught fire in the battle of Britain, or many of them did, and people were badly burned, particularly pilots, fighter pilots and things. Their faces were very badly burned. So there was a great deal of plastic surgery going on and I had plastic surgery on my midsection. The man who was foremost in looking after these badly burned fighter pilots and so on was a friend of my father's, a surgeon. I was there for nine months, eleven months maybe, in this hospital, and I could never get used to the rustling at night. I could never understand it. I mean, these fighter pilots were what 20, 21 or something. I could never understand what they were doing with these girls. Here was I, eleven years old, and they did give me a little room by myself, I think, just to shut, you know. Clearly, things were happening between the nurses and the men, which I didn't understand at all at ten or eleven years old, except the fighter pilots were always very friendly to me.

Looking back, it was a time in which I sort of first crossed the boundary or noticed the boundary between being a ten year old or an eleven year old, what it is, and being an adult. An adult, in those days, was a hero to me. If you're 12 or 15 and in school, the people who were your heroes were the fighter pilots in the air force, and they had their own distinctive ways of talking and their own distinctive ways of looking. In those days, everybody had a moustache. The bigger the moustache you had, the better off you were. I forgot what the jargon was, but a piece of cake was something which was easy. I've forgotten it all now, but I enjoyed that, looking back, and the nurses were good to me. My mother used to visit me on the weekends, but the rest of the time I was by myself. And the only time I can remember now is every morning they used to paint hot wax all across my midsection, and that really got me down, and I used to scream the place down. But then eventually I got better and my father took me home, and I had to go to a day school then.

01-00:25:00  
Redman:

Can you describe a little bit about what the day school was like?

01-00:25:06

Carmichael: What I can remember about day school is the headmaster beat me.

01-00:25:09

Redman: Oh really?

01-00:25:10

Carmichael: Yes. I've forgotten what I had done, but he told me I had to go upstairs, I had to bend over, and he gave me six of the best on my backside, with a big can about the size of a — I don't know what it was the size of, but it was about half an inch in diameter. It really stung. I hated it. I can't even remember what I did.

01-00:25:36

Redman: You just remember the punishment.

01-00:25:37

Carmichael: I just remember the punishment. I'm sure there was some nefarious activity I got up to or something. It was an interesting school, it no longer exists. And then my father obviously thought that it wasn't good enough, so he moved us, he changed the schools and I started to commute up to London. It was very interesting for me, to commute to London, because by that time the bombing had been going on night after night after night. As we went up to London, to this day school, the flying bombs started, and you could watch these flying bombs sort of parallel on the road, and then all of a sudden the engine would stop and then you knew the —

01-00:26:18

Redman: Then you'd duck.

01-00:26:19

Carmichael: You ducked right, because then you knew it was going to come down. My father was rather sanguine about it. He was quite prepared for me to go to day school in London, where these things were dropping around all over the place, and never seemed to worry too much about whether I'd survive or not. I think by that time he realized that you know, he had a son who was determined to do what he wanted to do, and that was the way he treated me, looking back. If I could give him a good argument about why I wanted to do something, he would always listen to the argument, and if he thought it had validity or power, he would allow me to go do it. I wanted to go to school in London because other kids were doing that, it was a good school and I thought you know, if ordinary people can survive the bombing why can't I. Life was, looking back on those days, I think the people who got London through the blitz were women. Every day they got their kids up and gave them breakfast, and then sent them off to school, and every time in the afternoon, they work and their kid's back. And then every night they went to the bomb shelters and had to spend the nights there. It was the men were mainly either in heavy rescue or in the armed forces. So what impressed me looking back nowadays,

is how women got Britain through the worst days of the blitz. It was a great tribute to them.

01-00:27:48

Redman: So at this age, did you start reading at all on your own, as a child?

01-00:27:53

Carmichael: Reading?

01-00:27:54

Redman: Yeah.

01-00:27:55

Carmichael: Oh yes. Reading was the only activity you could do. Radio was a main form of entertainment, because that was the way they gave you the news. Television was shut down. Britain had television in 1930 or '39 or something, but apparently if you broadcast television, it can be used as a homing beacon for bombers. It's OK if they're your bombers but that's not a good idea if it was their bombers.

01-00:28:27

Redman: OK, right.

01-00:28:28

Carmichael: So they shut down television.

01-00:28:30

Redman: So for instance, when you're commuting back and forth and when you're in the hospital bed, you're reading, listening to the radio?

01-00:28:41

Carmichael: In the hospital, now that you've asked about it, I used to do a lot of, what do they call that? I think you take bamboo and you put it in water, and you thread it into — and make baskets and stuff like that.

01-00:28:58

Redman: Oh really, OK.

01-00:29:00

Carmichael: So I made baskets. I learned how to knit. I did all those sorts of things. The baskets you know were never — they worked. As the bamboo or the cane dried, it provided a little basket to hold things, which I gave my mother I suppose, hold candies and stuff like that. The knitting never worked very well. I started with what, sixty stitches in a scarf and ended up with three or something. So the thing had a triangular look to it you know. I was never really good at doing that, but it was good activity. I learned how to do that. It paid off when I went into the Army, because then I had to go — I had nobody else to sort of knit for you or repair your socks, so I had already learned how to do that when I was in the hospital.

01-00:29:48

Redman:

Right. And so you had started reading a little bit. Can you tell me about the stuff as a child that you liked to read?

01-00:29:58

Carmichael:

Well the main thing in England, there are two sets. Everybody read the newspaper. The newspaper is — I don't know whether you've been to the UK, but everybody seems to read the newspaper, even today. There's a morning newspaper and there's an evening newspaper and of course with a war on, there's news all the time. So when I was commuting, I used to read the newspaper going up and read the newspaper coming back at night. So that was part of my — even at the age of what, 12, 13, something like that, I used to read that newspaper very avidly.

01-00:30:32

Redman:

Did you have a particular newspaper that you preferred?

01-00:30:36

Carmichael:

There were only — there was two evening newspapers; one was a small format and one was a large format. I found as a kid, sitting with other adults going home on the train at night, a large format newspaper, when you did this, was very unpopular, so you go the small format one. It was called the *Evening Standard*. And the evening news is the big format one, so you didn't take that.

01-00:31:04

Redman:

Were there other things that interested you growing up?

01-00:31:08

Carmichael:

Oh yes. My father had an interesting library. He is a fan of John Buchan. John Buchan was a novelist who was a naturalist. He was a novelist who wrote stories of Africa and so on, and then later became the Governor General of Canada. I had all his novels, I read all of those. I became fascinated with the Arctic and Antarctic exploration and read as many of the books I could in those days. I loved that. Walter Scott. My father, being a Scot, made me read Sir Walter Scott and all his novels, and I enjoyed those too. I enjoyed particularly, *Tales of a Grandfather*. It was a very compelling time actually. Reading was the principal way of occupying yourself in those days, that and staying outside and watching the fighting.

01-00:32:12

Redman:

Oh really?

01-00:32:12

Carmichael:

Sitting outside and watching the air fighting going on, and watching people jump out of the planes and land in parachutes, both British and German. During the Battle of Britain in the 1940/41, most kids used to do that. The next thing that used to happen is that if an airplane crashed near you, you would go there as quickly as you could and see if you could take off some piece of equipment that you could take home, because kids collected you know, like a compass or a machine gun or something like that.

01-00:32:48

Redman: Wow!

01-00:32:49

Carmichael: And we took all that, and we used to swap it. When bombing started, we used to collect shrapnel from the bombs. That's all gone now I mean, but you know, a big piece of steel was, you know, it was something worth collecting. Every kid collected this stuff. The trouble is that we often got to the planes before the police did, and the police wanted to protect the planes, particularly the Germans, so the Air Force could see what the Germans were doing with their equipment. And if the kids got there first the equipment had gone. I mean, we were really good at doing that. We could strip an airplane fairly quickly. But finally, the police found out how much we stored in our house, and my father was told to tell his children, you know. I think he even prosecuted, and we had to get rid of it all.

01-00:33:40

Redman: So was this the case in London, with the V1 and later the V2 rockets? Were you watching these come in?

01-00:33:49

Carmichael: The V1s you could watch, the V2s you never knew.

01-00:33:52

Redman: OK, it was just there.

01-00:33:54

Carmichael: The V1s were there, and the V1s had this ramjet motor, and they were something you could see and they traveled at what, about 300 miles an hour? But the V2s were these rockets, and they all of a sudden there's a huge explosion, and you knew that was a V2. You never heard anything.

01-00:34:09

Redman: My grandfather actually was a triple-A gunner, an Anti-Aircraft Gunner in Belgium, shooting down V1 and V2 rockets.

01-00:34:18

Carmichael: Right.

01-00:34:18

Redman: So he used to describe —

01-00:34:20

Carmichael: Yeah, you can shoot down the V1. The V2 is very hard and you'd be lucky to do that. But you could see the V1s, the planes used to come and try and shoot them down.

01-00:34:29

Redman: Right.

01-00:34:29  
Carmichael: And I lived in Sussex in those days, and Sussex is where they could trap the planes coming in, the German planes coming over, the V1s coming in, before they got to London. So we were this, if you like, a sort of killing field. The Wield of Sussex between the south towns and the north towns was a place where you could, where the RAF, the Royal Air Force, tried to eliminate the attacks on London.

01-00:34:57  
Redman: So how long were you going to the day school in London?

01-00:35:02  
Carmichael: I'd say for two years, and then it was evacuated from London because of the V1s.

01-00:35:09  
Redman: Oh it was evacuated from?

01-00:35:11  
Carmichael: Itself, from London. So I went and became a boarder again. I went back into the countryside, in a part of England near the Welsh border. There I met two significant friends, who stayed friends with me for the rest of my life.

01-00:35:31  
Redman: Ivan and Ronald?

01-00:35:33  
Carmichael: Yes. Ivan I had lunch with yesterday at the Claremont Hotel.

01-00:35:36  
Redman: Oh really? And what's Ivan's last name, how do you say that?

01-00:35:40  
Carmichael: His father was the Bulgarian Ambassador to the Brits at the time of the Second World War. Bulgaria, threw its lot in with Hitler and he decided to stay. He didn't want to do that, so he quit the Bulgarian Foreign Service and just took a job in London as a refugee, if you like. He was an economist by training and he was a rather successful one. His son went to school with me and became an engineer and an economist too.

01-00:36:16  
Redman: OK, and how do you say his last name?

01-00:36:18  
Carmichael: M-O-M-T-C-H-I-L-O-F-F, Momtchiloff.

01-00:36:27  
Redman: And then Ronald Anderson?

01-00:36:28  
Carmichael: Yes.

01-00:36:29

Redman: Tell me a little bit about —

01-00:36:31

Carmichael: Ronald Anderson's father was a Scot. He had a practice in London, where he subsequently became a family doctor for me and my wife and children. He was a wonderful, tall doctor, 6'4" or 6'5" I think he was, and lived in a small area of London called Clapham.

01-00:36:57

Redman: And now, at this stage of your life, it seems as though some of your classes start to become a little bit more memorable and influential.

01-00:37:06

Carmichael: Right.

01-00:37:06

Redman: And including, you had a physics teacher, J.S. Rudwick. Can you tell me a little bit about that course or those courses that you took with him.

01-00:37:15

Carmichael: Well, he always wore a white jacket. He had a mannerism, often rubbing his chin like this, and he taught us physics and we loved physics, and we were good at physics. At least I thought we were good at physics. I think a professional physicist would say you know, we were OK, we were competent, at the high school level. I enjoyed it immensely. Chemistry I didn't, and funny enough, when I went to Cambridge, I became interested in doing chemistry and not physics at all. But I did chemistry and biology. So in those days at school I focused — the English education is very specialized. After the age of about what would it be, 15, you take a school certificate or something? I think at the age of 15, and there were about nine subjects, and then thereafter, you just specialize in three. It's an extremely specialized curriculum, and I think wrong compared to what you can do in the United States. I think the curriculum, the school education here is so much better in so many ways, in its diversity and its opportunity. In England, so I specialized as a scientist at the age of about 16 or something, and took math, chemistry and biology, and that's all I did. In order to take that initial subject, the school certificate, you gained your entrance to Cambridge, and you had to take nine subjects, one of which was Latin. In order to get into Cambridge, you had to take an oral exam in Latin, and it didn't matter what your major was going to be; engineering, medicine, whatever, everybody had to take this Latin oral exam. And so when the time came for me to go to Cambridge, for me to get into Cambridge, I had to take this beastly Latin oral exam. I can remember one thing about it. I was asked to describe a rugby ball. A rugby ball has the same sort of shape as an American football. I don't know whether you know any Latin. I just made it up, straightaway. I called it a pillar elliptica, and the guy roared. I've never forgotten it. It was the only thing I could think of. On that basis, finding out how to describe a rugby, you know, that sort of shape of a ball, got me into Cambridge University.

01-00:39:45

Redman:

Oh funny, funny. In your autobiographical sketch that I looked at in preparing for this interview, you spent a fair amount of time talking about your time at Choate in the United States. I'd like to tell a little bit about what brought you to school at Choate, and what did you think of the United States when you got there? What did you think of Choate when you got there?

01-00:40:12

Carmichael:

Well, it was quite a revolution at home first. Here I was at the age of 17.

01-00:40:21

Redman:

So the war is over now.

01-00:40:22

Carmichael:

The war is over.

01-00:40:26

Redman:

And that must have changed things.

01-00:40:27

Carmichael:

It did, but for some reason or other, Britain still had food rationing. I don't quite know why it was, but I suspect you know, the agricultural — The food sources of Britain were not — hadn't been reestablished or something, so food was rationed. I applied to an English-Speaking Union Scholarship, to go to the United States for one year to a high school, a prep school they called them. I'd been at what the English call a public school. A public school is anything but public. It's one of these very flossy private schools, and the particular one I went to, it's one of the three most distinguished in England. There's three of them; Eaton, Winchester and Westminster, and I went to Westminster, right next to the Abbey. In fact, for prayers every day, we went into the Westminster Abbey and sang, and listened to the dean and so on talk about you know, whatever deans talk about to the school kids, at afternoon prayers or evening prayers, and morning prayers. Anyhow, for some reason or other, I decided that I didn't want to spend my last year at school... I was restless, and here was an opportunity to apply for a scholarship, so I did, and I got one. Here was the opportunity to go to the United States, and everything was paid for, the fees, the transportation, everything. So about 20 of us, I think, came to the United States that year. We were the first batch of English-Speaking Union Scholars since before the war. So I think the last batch had come in 1937, and we were here in 1947, ten years later. The ship that took us was the Royal Mail Ship, Aquitania, and we got on at South Hampton, I think it was, and we got off at Halifax. In Halifax we got on a train, and the train went from Halifax, I'm sure it went to somewhere like Montreal, and from Montreal we got on another train and went to New York. When we got to New York, American Customs made us take all our trunks and open them out on the railroad platform, which I thought was singularly unusual. So here are all these clothes and whatever it is we had in these big metal trunks, out on the train platform. I suppose it was Grand Union Station. I don't know which one it would be, Grand Union Station. Then we packed them all up again, and I

was put on a New Haven train to go to Wallingford, Connecticut, and there I was destined to go to Choate. So I said goodbye to all the people I had been on the boat with and only one have I got a distant connection to, but the rest I essentially never saw again. I went to Choate, and I was met at the train station by one of the school masters there, and he was the football coach, the soccer coach. He asked me if I played soccer and I said yes, and he said right, I want you to try out tomorrow, and so I did. I was quite good at the game, and so I became friends with this guy. His name was Barron, Blue Barron. And then, I must have got there before the actual classes had started. It was a boarding school, Choate, and it was all boys in those days.

01-00:43:52

Redman: Did you know about Choate before?

01-00:43:55

Carmichael: No, never heard about it. They had a connection for new boys from old boys, and they called it Substances and Shadows. That's right. I was the shadow, and I had a substance, and he was a boy that was already there, and he wrote to me in England. He wrote to me and told me this is what the school did, and it was a very thoughtful letter actually, but very American. I responded, and I have tiny writing, and he told me when I met him that he expected somebody about this high, because my writing is very small. He essentially looked after me. He was my substance and I was his shadow when I got to Choate, and I had a really good time at Choate.

01-00:44:42

Redman: Do you remember his name?

01-00:44:44

Carmichael: Yes. Mack Morrison. I've communicated with him ever since, periodically. Then they put me, because I was a rarity, number one. The rarity was that I had several interesting experiences. Firstly, you're all given rooms and you shared with another boy, and everybody couldn't get used to my accent. It was a very English accent in those days. They never heard one and their attitude was, if they woke me up in the middle of the night quickly, I would speak American before I remembered to speak English. And so for the first week, I was being woken up in the middle of the night by all these American kids who said, "Oh you don't speak American after all." It was simply because they thought I spoke just like they was, and it was just for a put on that I spoke differently. I was good at sports. I was good at soccer. I was a good athlete actually, when I was at school in England. So that helped an enormous amount when I was a school boy, and I think that contributed to getting a scholarship frankly, or that exchange scholarship. And I was a good student too. Not a top flight student. I wasn't an A-plus student, I was an A student, and quite good at physics, and quite good at chemistry and quite good at biology, and there's where my interests lay.

01-00:46:12

Redman:

So at Choate then, as opposed to the public school system in England, you were taking perhaps a more diverse —

01-00:46:22

Carmichael:

Yes. I took American History and loved it. I loved American History. I was so fed up with the goddamned kings and queens and God knows what of England, and how Cardinal Richelieu did this, you know, when he was Cardinal of France, and all those French kings. This struck me as a wonderful system, a president who served for four years, no more, and you know, you could learn that and I learned it, and I loved American History, and I did quite well at it too. At least I got an A in the class. In fact, I got all As and graduated summa cum laude from Choate when I finally completed my year's course there. I had a wonderful time there.

01-00:47:06

Redman:

Can you talk a bit about the difference of the student body? You also mentioned the food was quite different.

01-00:47:16

Carmichael:

The student body, they were bigger. The average Englishman in those days didn't strike me as — they were 5'6", 5'8", something like that. I'd say the average height of the average school kid in Choate was probably 5'10", 6'0", something like that. They seemed to be bigger. As I was tall, it suited me just fine, and I was just impressed with that. But I was also impressed with their massiveness. People who weighed 120 pounds seemed to be common in Britain. People who weighed 120 pounds in Choate were not very common. They were sort of 160 or something like that. So I was impressed with their size, and the other thing, I was impressed with the color of the ties. I've never forgotten that. Americans wear very colorful ties. Britains who had ties, or they used to wear ties, that meant something, which have a signal, and you can either learn to interpret that signal or not, but there was always — they usually have a message contained, insignia on the tie or the stripes on the tie, or one thing or another. And they're very fond of all these. I mean, you have tie shops in England which sell these enormous array of ties. I've got one or two actually next door, which signify something, a regiment you were in or the Navy you were in, or something like that. So here were these wonderfully colored ties all these boys were wearing, wonderfully colored sports jackets, compared to what I was used to, which everything was Harris Tweed. Harris Tweed, as you know, is rather — is like doing basket weaving in dull colors. There are grays and greens and things like that, but sports jackets in the United States, they were so colorful. And then every now and again, people who I'd never really seen before appeared. These people were called girls, and they were totally unknown to me. The only people I'd known in my life up to now were my mother and the school matron. And when you were small, at boarding school you know, six or eight, the school matron used to you know, here you were sick or something and sniffing and so on, and you wanted some maternal attention. She used to sit one of us on one knee and one of us

on the other knee, and she had a starched apron over her what in those days seemed to be a big bosom, and you were held like that, two sniveling little nine year olds, and it worked. So that and my mother were my total experience with women until the age of seventeen and a half, when I went to Choate. Choate opened up my eyes to a whole bunch of things. Secondly, food was not rationed in the United States, and I had a candy shop like I've never had a candy shop before. Oh, I loved that.

01-00:50:12

Redman: So just the overall quality of life.

01-00:50:14

Carmichael: Is so different.

01-00:50:15

Redman: It was different.

01-00:50:16

Carmichael: Yes. The United States was you know, had recovered from that [rationing during war time] and Britain never had, and it was still in an economic downturn, and it was dull and gray and everything else. And here was this lively, wonderful society, and I enjoyed every minute of it. I loved Choate, but I hadn't contributed to it since I've left. And I should I suppose, but I haven't.

01-00:50:48

Redman: So this is at about the end of our first tape, so I'm going to switch tapes, and then we'll continue on and maybe talk just a little bit more about Choate and your time there, and then we will move on from there.

## Audio File 2

02-00:00:07

Redman: I am here with Ian Carmichael. My name is Sam Redman, and this is our second tape of our first session. You had said that you had recalled something about the war that you'd like to go back to.

02-00:00:23

Carmichael: Yes. There was an instance during the World War II that has amused me ever since. When I was thinking about my mother, who as I said earlier, is someone that I've come to respect greatly. One of these Heinkel bombers was on fire, had been shot down I suppose, by the Air Force, and it crashed just in the lower part of our garden. I was ten or eleven or something, and went out to watch this. This was a wonderful spectacle for me. It was the other side, number one, so it was one of the enemies being shot down. Anyhow, it crashed and then about 20 minutes later, two of the crew walked out and survived, and they were young men. Looking back, I didn't know them as young men then, they looked like big giants, and they had on their flying suits and so on. They walked up towards me and said hello, and so I took them to my mother, and my mother said "Ooh, what do I do with them?" She said I

know what, I'll brew them a cup of tea. Both of them spoke English, both these Germans spoke English, and she asked them if they'd like a cup of tea. They sat down in the kitchen and had a cup of tea, and then the police came to take them away. But I suppose that's — it reminds me that to her, was a gesture of hospitality, and she wasn't going to be (inaudible) just because they were Germans and they'd been trying to bomb London into oblivion. It showed her presence of mind, I think. She wasn't scared, nor was I, and yet these young men I suppose, could have caused a great deal of trouble had they wished to do it.

02-00:02:19

Redman: Certainly, certainly.

02-00:02:20

Carmichael: But we were — I imagine they were told as our aircrew were told that you know, once you landed there, you mine as well try to be as friendly as you can with the natives, because they could do nasty thing to you. Anyhow, the police took them away and I went back to — the fire was put out in the bomber and I and the other kids of course, went down there to see what spare parts we could collect for liberate, the express was in those days, from it as souvenirs. OK, so let's go back to Choate.

02-00:02:53

Redman: All right sounds good. So we talked a little bit about the people and the food. Do you remember — and we talked about the courses that you were taking were more diverse —

02-00:03:05

Carmichael: Very.

02-00:03:06

Redman: — than the specialization that you had in England. I'd like to ask you about the quality of education, and whether or not you felt that the quality of education was different, or was it on par with what you felt as though you were used to?

02-00:03:24

Carmichael: When I went to Choate, I never took the courses I'd taken in the last two years at Westminster in England. So I never took any chemistry or math or physics there. What I did is I took things which I wanted to take, which I had had to forsake if you like, in the English system. So I took an English course, two English courses, and history. American History, I took several courses in that.

02-00:03:49

Redman: Latin? Did you take Latin?

02-00:03:50

Carmichael: No. I had done that. I didn't want to do that again.

02-00:03:54

Redman: You didn't want to take Latin, OK.

02-00:03:58

Carmichael: It came in useful, as I'll tell you later, much later in my life, but I didn't want to do Latin there. I can't remember what other courses I did take, but I was allowed a free range. I can remember the English courses and the history courses, because I liked to write, and they gave me the opportunity to write and I enjoyed that.

02-00:04:17

Redman: Interesting.

02-00:04:20

Carmichael: Oh I took a geology course.

02-00:04:22

Redman: Really?

02-00:04:22

Carmichael: I took a geology course, that's right. I remember now, and that introduced me to geology, and that fascinated me. In fact, I became really enamored with that. We went up and down the Connecticut River Valley. I remember being taken on a field trip. So the time came for my term at Choate to conclude.

02-00:04:48

Redman: Now before we get into that, you spent that Christmas with a friend.

02-00:04:54

Carmichael: Oh yes. The Americans were incredibly hospitable, and I was a freak. I was the only person there with this crazy accent. Nobody had known any Englishmen before. It was ten years before Choate had had a previous visitor, so I was considered the sort of person from outer space, and they were incredibly hospitable. I went to — at Christmastime, I went to spend some time in Moline, Illinois, with a guy called Bud Crampton. I don't know what he's doing these days. I looked him up on Google but he's not there. And then Louis Busch, who is of the Anheuser-Busch family. Then I went to Boston. For Thanksgiving I had gone to Boston with my substance, of which I was a shadow. Mack Morrison's father was a doctor, and I had a wonderful time up in Boston. I think he lived in Woburn. That's the holidays I remember. But as my time was — it was clear that after Christmas, I had to decide what I was going to do at the end of the term or semester or whatever they call them. I decided I'd like to become a geologist, and so I went to the school guidance counselor and he said OK, if you want to become a geologist, you should apply to the Colorado School of Mines. So I applied to the Colorado School of Mines and I got a fellowship there, they gave me a fellowship. In the intervening period — so that would start in September let's say, and the intervening period from when school ended in June, let's say, and between June and September, I decided I needed a job.

So Choate got me a job with one of their alumni, and their alumni lived in Varadero Beach in Havana, or just outside Havana, in Cuba. So I went down to teach his two sons how to speak English, and I spent some time learning Spanish, of which I remember absolutely nothing, and had a most interesting time down there. I wasn't a very good babysitter. I was what, 17 or 18 by then I suppose. The two kids were Fernando and Jorge, and they were nice enough kids. He was a very wealthy Cuban. I suspect his money was made in sugar. I've forgotten what his name is, if he's even still alive, but anyhow, he lived in this lovely beach house on Varadero Beach. I met one or two other Americans there, and they were fun. I spent six or eight weeks there and got a check, a salary check, and then I took a flight from Havana to New Orleans, and went to the train station to get a train up to Denver, because that's where I going, the Colorado School of Mines, and I met three American sailors. I don't know how I met them but I met these three American sailors, and they said hey, why don't you come with us. We've got meal tickets for four people, and the fourth has opted out. They said, you can have free meals with us all the way to Denver. I thought that was terrific, wonderful. I don't know what their names were. So I sat next to these four American sailors, they were in the U.S. Navy, and went all the way out to Denver with them. I said goodbye in Denver railroad station and then took an interurban from Denver to Golden, and somehow or other, I can't remember the next few days but ultimately, I became a pledge in a fraternity house.

02-00:09:01

Redman:

I'd like to ask two questions. The first is, when you were talking to your school counselor, did they recommend other schools or it was just a natural to them that you should go to Colorado School of Mines. And then also, what did your parents think of this? Were you corresponding?

02-00:09:21

Carmichael:

Most of the kids, most of my contemporaries at Choate were going to Harvard, Yale, Princeton. Where else would they be? Those east coast schools, Williams, whatever. But by the time I wanted to go to college, it was sort of too late to apply. So the school counselor said OK, you're interested in geology, I can get you into the Colorado School of Mines. That's what he did and I took his word for it. I did very little research. I mean, I was stupid. I did very little research on it.

02-00:10:00

Redman:

And your school counselor never thought oh, you should go to Oxford, you should go to Cambridge.

02-00:10:05

Carmichael:

No, he never said that. He thought, well, maybe he's going to... In those days, what interests me, I don't know what sort of visa I had. It obviously allowed me to stay. I think in those days, there was a visa which was a quota, and I think the quota was based probably on the percentage of the population in the 1920s in the United States, and I think the English quota was never full,

because although they were the largest proportion of the — a very large proportion of the population in the 1920s, that large number didn't want to emigrate subsequent to the 1920s. So the English quota was never full, so it was always available if you wanted it. So I imagine I came on the English quota. I certainly came when I finished Cambridge and came back here in the 1960s. So I imagine I came on an immigrant visa then, in the 1940s, but I don't remember. So I wasn't ever encouraged to go back to Oxford or Cambridge. I noticed in the yearbook from Choate, it says I'm going to Cambridge.

02-00:11:25

Redman: Oh really?

02-00:11:26

Carmichael: Yes.

02-00:11:27

Redman: Now that's interesting. Do you know how that happened?

02-00:11:31

Carmichael: I don't know. I imagine when you filled in the things, where you were going to go to university, I had every intention of going to Cambridge —

02-00:11:39

Redman: Interesting.

02-00:11:40

Carmichael: — when I went to Choate. That was my intention, but then I got so enamored with this country and its outside and you know, and the very open spaces and geology and all the rest of it, that I thought no, I'm not going to go to Cambridge, I'll go to the Colorado School of Mines. It caused a riot at home for two reasons. Firstly, how was I going to finance it and secondly, why was I giving up Cambridge University which, after all, was not a bad university, and I've never heard of the Colorado School of Mines, says my MD father, who is you know, pulls himself up and sort of says hmm, Colorado School of Mines? Doesn't sound too good to me compared to Cambridge University. He was very antagonistic to it. And then he had to devise a way in which he could get money to me, because there were sort of currency restrictions in those days. It was an interesting exchange rate. The exchange rate, when I was at the Colorado School of Mines and at Choate, was the old prewar one of four dollars to the pound, which of course soon collapsed. After about the 1950s, it went down to \$2.20 or something, but it was four dollars in those days, which is the prewar rate. So my father had many American post-docs working with him, so I used to get strange checks in the mail from people I never knew, but I heard about, which were his American post-docs sending me money on their bank accounts. My father reimbursed them in England, and so I got money that way.

02-00:13:16

Redman: Oh wow, is that right?

02-00:13:17

Carmichael: That's how it was done.

02-00:13:18

Redman: Fascinating. And I'd like to ask, your interest in geology, a little bit more about. You had told me that you'd seen mining and engineering as striking you as interesting and worthwhile, partially because of the travel element. It seems as though...

02-00:13:41

Carmichael: Well that goes back to the evening newspaper. Remember I told you in England, I used to read the evening newspaper every day on traveling home. Well, in England, the evening newspapers used to publish the wills of people, you know, people who were deceased, and the money they left and their occupations. For about two or three years, I kept a sort of little running account of who was dying and leaving the most money, whose jobs seemed to fascinate me. The people that left the most money, whose jobs seemed to fascinate me, were mining engineers. So I thought mining engineer sounds good to me. They leave the most money and they obviously travel to many different places of the world, that sounds great. So in the back of my mind was an economic sustenance, if you like, that came from being a mining engineer. So the Colorado School of Mines sounded good to me. I didn't know what Cambridge University was ever going to lead to, but clearly a school of mines would lead you to becoming a mining engineer, and these were the people who, in Britain anyhow, had left lots of money when they deceased, died.

02-00:14:51

Redman: Right. Now the Colorado School of Mines, and I'm curious what that — I mean, because now obviously, it has a reputation of being a place where you can go and become an academic geologist as well as getting a pragmatic geological mining education. So I'm curious what it was like back then.

02-00:15:17

Carmichael: It was a good — well, I was there for one semester. I didn't even complete one semester. I was in a fraternity house, and they made sure that we did our studies well. They were very good. It was a very good experience living in a fraternity house, and I met a lot of people there I liked a lot, and by chance, I ran into one 30 years later. I remember taking math and geology and physics, which I enjoyed, and chemistry, and they seemed to take the fundamental subjects. They were on the semester system, so when Christmas came, the semester wasn't over. I'd taken my midterms and my other tests and quizzes and things and done very well, and then when Christmas came, my father said, I will find the money to fly you back to England. So this would be Christmas of '48, and there were no jet planes then, they were all propeller. So it took quite a time just to get to New York, but I've never forgotten the flight

attendant. It was two days before Christmas or something like that, and I'd never seen — these flight attendants, it was United Airways from Denver to probably Omaha, from Omaha to somewhere else to somewhere else, and to New York. It wasn't nonstop to New York. She said, "Are you going to London, my goodness." So when I got to New York, the stewardess, I guess they were called then, said "Well, have a good trip, merry Christmas" and all the rest of it, and I held out my hand and said, "Happy Christmas." She said, "Is that how you Brits say it—'happy Christmas'?" I said yes and she said, "Well we don't." And she gave me a huge hug on the top of the steps when I left off the plane. I've never forgotten that. So I left United Airlines and I got on a TWA super constellation, and it flew to Ghanda, and then to somewhere in Ireland and then Heathrow in London. But I had done so many ups and downs, and I had a cold, that my sinuses were blocked the ups and downs, and they never cleared. So by the time I got to London, I was deaf, and my father being a doctor said I needed antibiotic treatment straightaway. So it didn't clear up very quickly and so I had to go and see a specialist, and because I had to see the specialist, I missed the flight home, home being therefore, the Colorado School of Mines. One thing led to another and six weeks later I was in the British Army.

02-00:18:07

Redman:

Now, I'd like you to tell me a little bit more about what you sort of felt about your career path at Colorado School of Mines. You seemed to have enjoyed your experience there.

02-00:18:26

Carmichael:

I did, immensely so. I wanted to go back. I was really disappointed I couldn't go back. I had a good social life there, and I had a good social life at Choate too. I remember you know, several — I was introduced to this tradition of pinning. You probably know more about it than I do actually.

02-00:18:49

Redman:

I feel like I've heard of it.

02-00:18:51

Carmichael:

You give your fraternity pin to a girl, right?

02-00:18:53

Redman:

Right, yeah.

02-00:18:55

Carmichael:

And it's sort of engaged to be engaged, I believe. It's something like that, but apparently, if you were pinned, that meant you were regularly — you were an item. We didn't use that in those days, and so you were pinned. I wasn't pinned but a lot of girls asked me if I would pin them, and I wasn't that anxious to do that. I was much more anxious to — my taste was so uncertain, and everything was so new to me.

02-00:19:24

Redman: And what about —

02-00:19:26

Carmichael: So I enjoyed the Colorado School of Mines. I was a good student there, you know, for the time I was there. I played American football. I loved that because I was a good athlete, and enjoyed it a lot, but they put me in the wrong position. Once I got in the position where I could use my rugby background, then I was better. So I enjoyed being a freshman there a lot. I didn't like the hazing that I went through for fraternity, I thought that was pretty miserable, but I enjoyed the people I was being hazed with, the other pledges or whatever they're called.

02-00:20:09

Redman: Now what about the surrounding geology in Colorado? Obviously Golden, Colorado is a lot different from —

02-00:20:14

Carmichael: Oh yes, I loved that. A friend of mine, he had an old car, and on the weekends we used to go out and travel around the dinosaur tracks and the incredible red rock theaters and so on. It's the front range of the Rockies, and it's unbelievably picturesque. It's also what I thought about as the old Wild West, you know, and people were on horses with guns and things, I mean, even in those days. So it lived up to my dreams. In the past, when I was at school in England, I'd always loved these western movies. To me it was — they were great. *Shane*, I think, was one of the great movies of my youth. It's not something you've ever seen before. By change, the actor in that, a guy called Alan Ladd, made a movie in a subsequent life about British paratroops, and I was his stand-in, because they wouldn't allow — I had to jump for him, because they wouldn't allow him to jump because he was too valuable. So I met the hero of *Shane*, I met ultimately and we just spoke once or twice and then never met again. So here, I loved Colorado. I thought it was a wonderful place and I was terribly disappointed when I wasn't going to get back. But then you know, I got wrapped up in doing a good job in the British Army, and once I was there, it was a miserable experience to start with, but I got on with it. But I regretted the Colorado School of Mines, but you know, I've never been back.

02-00:21:54

Redman: Oh you've never been back to —

02-00:21:55

Carmichael: Never been back.

02-00:21:56

Redman: — Colorado at all?

02-00:21:58

Carmichael: Oh I've been to Colorado. I've never even visited the Colorado School of Mines again, and I don't know why I haven't. I mean, you know.

02-00:22:08

Redman: It's interesting that there hasn't been a conference there or something that would bring you back.

02-00:22:13

Carmichael: A regional conference, and I tended not to go to the regional conferences. I went to the national conferences, and they were big cities, and so I went to Denver a lot. The big conference would be held in Denver.

02-00:22:25

Redman: That makes sense. Now, when you arrive back in England, your father put you on antibiotics. How long did it take for your health and hearing to return?

02-00:22:37

Carmichael: Oh I think in a matter of a few weeks, but you see, in order to get fed, English food was rationed then, my mother said to me, would you please go and get a ration book. So I went to get a ration book from wherever you got a ration from, some ministry of food or something, and the man said, how come I didn't have one. He said, what do you do? I said, well I'm a student at the Colorado School of Mines. And he looked at me as if I'd come from Mars, because it wasn't a very common thing to do. So he said I'll tell you what, you give me your passport and I'll give you a ration book. So he took my passport, which meant I couldn't leave the country. Then, as a consequence of signing up for my ration book, that went to the ministry of national service or something, and I was called up for national service. I've forgotten the exact dates but I can look them up. I'd say probably in March. So I'd recovered enough from Christmastime in March to survive the medical, which the medical for entrance to the British Army was stick your tongue out, how many fingers am I holding up, and that was it. It was very, very sort of superficial.

02-00:23:52

Redman: OK. So there was no problem as far as health getting in?

02-00:23:56

Carmichael: No, no, no. The Brits were so desperate for young people to stick in their army that if you could breath, you were alive and ready to go.

02-00:24:05

Redman: So tell me a little bit about the early days in the Army then. You had to go through basic —

02-00:24:14

Carmichael: Oh you go through basic training. It's a shock. It's a total shock. First, no matter what you do, it's wrong. Everything is wrong, you were stupid. The standard Army response to anything when you've done wrong, is corporal I thought or sir, I thought. You're not paid to think, you're just paid to that. That's a standard response. I don't know if it would work in the American Army, but I've never forgotten that; you're not paid to think. So here we were, a bunch of raw recruits from a huge number of educational backgrounds in Britain. I'd say about 150 of us, thrown into recruit training, and I suppose you

were there for probably four months, and that four month period, they really managed to sort out the wheat from the straw. They decided we had to take a whole bunch of tests because some of us were officer cadet material, and so we were destined to go off to cadet school.

02-00:25:23

Redman: And so you think they separated that out by?

02-00:25:27

Carmichael: I think they separated that out at the end of the first two months. I remember, an English boarding school was probably the best way of running a big colonial empire, where you're not used to the company of women, where you are used to living alone or having to deal for yourself, which is what happened if you were a young person in the 19th century and early 20th century, if you were sent out to administer the colonial empire. And you were used to sort of hardship and this, that and the other. So the people that came from the public schools, which were not public as I said, were much more used to the Army, and had done what we called army service at school actually. There was a part-time equivalent of ROTC. Do you have that here, ROTC?

02-00:26:20

Redman: Yeah.

02-00:26:21

Carmichael: Yeah, ROTC. We have that at the school and we all had to do that. So we had already been prepared for that, whereas the state schools didn't have that. So we were half — I won't say halfway along, but somewhere along this business of getting used to the Army tradition. But you know, they want to break your spirit, and they do. The mode of heating was coal fire, and you've got one fire for about 20 of you in this horrible, cold barrack room. You've got one cold tap for 20 of you, to shave with in the morning, and then they come out and inspect the coal to make sure it's clean. Have you ever known such a ridiculous thing? So we had to wash the bloody coal and make sure it was clean, as part of our recruit training, and we did that. Everything had to be dusted and everything had to be clean and ultimately, I suppose they induced discipline on us, and it taught me something. If ever I was going to be in command of somebody, at least I'd been through it, and I think that's very important in life.

02-00:27:23

Redman: Interesting.

02-00:27:24

Carmichael: You know, you can't expect anybody to do something you're not prepared to do yourself, and it became very important to the laws of science actually.

02-00:27:36

Redman: All right.

02-00:27:40

Carmichael:

The barracks I was at was built in 1795, I think it was, for the Napoleonic Wars, and hadn't been modernized since. It's probably still there. To my horror, when I went and took my daughter to visit Australia not long ago, they looked at some English prison colony which had been in disrepute, and you know, all the Australians are looking at it and thinking how ghastly the conditions were to live. That place had been built in 1805, and that was far better off, although it was a prison, then what I went through as a recruit in those barracks. The Shorn Cliff Barracks in Kent, which had been built for the famous Light Division against — in the Napoleonic Wars. You know, we survived. We were hearty young men, and we were soft. The food was abysmal but we got used to that too. I don't have any — I have no fault in what I learned in the British Army, and I'm sure the same would be to my training in American Army too. It taught me to do things which I hadn't been used to doing. They taught me, I think, very significant things which I found useful in later life.

02-00:29:06

Redman:

At what stage did they — you said rather early on, they put you into officer training school. At what point did they decide that they were going to throw you out of planes, and you were going to become a paratrooper?

02-00:29:20

Carmichael:

Oh that wasn't until I left Egypt, so that was a year and a half later.

02-00:29:25

Redman:

Oh really, that far off?

02-00:29:27

Carmichael:

Yeah.

02-00:29:28

Redman:

So can you describe a little bit more about your duties in Egypt.

02-00:29:33

Carmichael:

OK. In Egypt, I was posted — I went on a troop ship, and I was posted — I went on a troop ship in I think Southampton. I got the feeling it was called Empire Windrush. I was put in charge of sports activities, so that the officer commanding the troop ship said you're to look after the sports activities. So I had to find sports activities to keep everybody, all the men and all the officers fit and interested, which I found pretty hard work, but I did it. We arrived at — where did we arrive at? The north end of the canal, Port Said, I guess. Yeah, Port Said it is. I had never been to Egypt before, and we were all put into a transit camp at Port Said, and we visited Port Said's bazaars and all the rest of it. It was the head of the — it's the top end of the Suez Canal, and big liners were going through every day you know, on their way to India I suppose, and Australia and New Zealand, because airline hadn't taken over completely. The canal was incredible to me, construction. I used to sit and watch on the banks, and sort of watch these big ships go through it. If you sat

a little far back, you could see these huge masts and funnels and things in the sand in front of you and you know, it looked like a mirage. It was incredible. So the Suez Canal was while we were there. The Brits had decided they were going to guard or have a big army base all around the Suez Canal, and so I was sent from the north end of the Suez Canal down to the south end of the Suez Canal, and spent a year there.

02-00:31:22

Redman:

In organizing sports activities, you said you found it hard work. Did you also learn a bit about leadership skills?

02-00:31:35

Carmichael:

Well I suppose.

02-00:31:38

Redman:

But nothing quite as obvious would you say?

02-00:31:40

Carmichael:

No. If you're a second lieutenant, which is the lowest of the low, I mean you are just cannon fodder to the officer corps right? And you're expected to entertain and find entertainment and physical exercise for colonels on downwards. Believe you me, it has to be done with a personality. You can't throw your weight around. Now, when you go and meet the troops you know, you can get some sergeants and sergeant majors to help you, and you've got some authority there. But you don't have any authority when it deals with more senior officers than you are, and there's nothing so green and nothing so useless to the officer corps as a second lieutenant, which is what I was. In the American Army, you have I think it's one bar, and in the English Army you have one star on your shoulder, and they still have that I notice today. So I don't say I enjoyed it. All I remember about it actually was I discovered what a Pims number one was. The British Army has never been dry, nor has the British Navy, unlike the American services, so you can always have alcoholic drinks. But being intoxicated is a court-marshal offense, so you were expected to drink and drink sensibly, and you could do it. And so I never had Pims number one or Pims number two or Pims number three. So I used to sit in the officers' club on the officers' mess on this troop ship, and I had Pims number one in the evenings, and that was my introduction to essentially that sort of drinking.

02-00:33:18

Redman:

Interesting. And so at the end of that year in Egypt... Actually, I'd like to go back. That must have been an interesting cultural experience for you as well.

02-00:33:32

Carmichael:

Oh yes it was.

02-00:33:35

Redman:

But even that you probably didn't have a lot of time to interact with Egyptians.

02-00:33:44

Carmichael:

Well the British Army didn't — don't forget, I was 18, and what we were taught then is Egyptians are vile, Oriental gentlemen, known by their shorthand version, Wogs, and that's how the British Army treated them. We treated Egyptians miserably, despicably, looking back. But every now and again, there was an opportunity to get to know them. Once I went to a vacation, I took a truck and some friends of mine down to a monastery, and I took some Egyptians with me, and that was interesting. I learned a lot about their culture then and a lot about geology too, which fascinated me. So I won't say it was a waste of time, but it wasn't — we were just on guard duty in the Suez Canal zone, doing time, keeping I don't know, keeping part of the sinews of empire going I suppose. Then I went down to Sudan, and that was interesting because I was transferred to the Sudan Camel Corps, and the Camel Corps was made of these northern, I suppose they're northern Sudanese African Americans. I was called little White one, because I was the shortest of the lot. But camels are the most beastly animals on God's earth to travel on. Both legs go together and you get seasick. I used to get horribly seasick on these beastly things, and they spit and they bite and everything else. So I was quite prepared to leave the Camel Corps after my four weeks down there, but it was an interesting experience looking back, but not one I ever want to repeat. Those Camel Corps soldiers were used to living in the desert, and they could live on a gallon of water a day for everything; shaving, washing, drinking, cooking, everything. It was amazing what they could do, those African American soldiers.

02-00:35:54

Redman:

Now tell me a little bit about what you learned firsthand with the geology in Sudan and Egypt.

02-00:36:03

Carmichael:

Oh, it seemed to me it was a continuation of what I'd seen in Colorado. Here were these fantastic sandstones. There was very little vegetation, so you can see a lot. Don't forget, I come from a country, England, where unless you're in Scotland, there's a lot of vegetation, so you don't see a great deal. In Scotland, which is why I used to go there a lot, the rocks are very well displayed. But in Colorado it's wonderful, the front range of the Rockies. The same is true down the Red Sea. It's a rather desert area, so there's not a lot of vegetation to cover up the rocks, and so I used to scramble around the rocks, trying to understand what I could from them, and that was an interesting sort of prelude to my becoming a university student.

02-00:36:50

Redman:

So did you find yourself applying that knowledge that you had learned from —

02-00:36:55

Carmichael:

Oh I had got so little in one semester.

02-00:36:57  
Redman: Right and then I mean, just a little bit, a taste of it at Choate.

02-00:37:00  
Carmichael: Oh yes, oh yes.

02-00:37:01  
Redman: But it was just enough to spark —

02-00:37:03  
Carmichael: It was just enough to keep me interested, and just enough so I could say to my companions, hey this is a sandstone or this is this or this is that, but that's about as far as it went. It was pretty superficial stuff.

02-00:37:18  
Redman: But now, and I'll jump ahead a little bit here, but when you were back at university, were there moments when you were learning about things where you'd say, Hey, I saw that in Colorado or I saw this —

02-00:37:32  
Carmichael: Only in Colorado. And sometimes, as you say, I saw this in Colorado. Colorado is a very good geology course, for an introductory geology course. I learned a great deal from that, plus the hazing. They used to drop you in the hills at night at dark, blindfolded, and then expect you to find your way back.

02-00:37:54  
Redman: Oh my goodness.

02-00:37:56  
Carmichael: Yeah, without a compass at night. Oh it was miserable. So you know, you manage to find your way around. So I got to know the Colorado geology a bit, and I enjoyed it a lot.

02-00:38:12  
Redman: And so when you left — and so you were in Egypt for a year, roughly.

02-00:38:18  
Carmichael: More I think.

02-00:38:19  
Redman: A little more than a year.

02-00:38:20  
Carmichael: About a year I suppose.

02-00:38:21  
Redman: And then after that you returned to England?

02-00:38:24  
Carmichael: Right.

02-00:38:26

Redman: And were you done with military service at that point?

02-00:38:28

Carmichael: No. I was done with the foreign part of it. I then had the reserve part, and that's when I did my paratrooper training. I came back to England and did my paratrooper training.

02-00:38:42

Redman: OK. And could you tell me a little bit about that?

02-00:38:46

Carmichael: Huh. Well I did it because it was something to do, and when I did my first jump, I wondered what in God's name got me up doing that, and because I was an officer, I was expected to go first. But the exhilaration when your parachute opened was amazing, and when you hit the ground oh, you just felt as if you were kind of the you know. It was a wonderful experience. In Britain — I don't know how it is in the U.S., but in Britain you had to do eight jumps, including one water jump, which was the most difficult of all, and one night jump to get your wings. Your wings are sort of interesting. Every country in the world, except the British Army, wears their wings on their — here, but the Brits don't. They wear it on their sleeve up here, and the reason for that is that when they have to give wings, the Royal Air Force said no, we're the only people that are allowed to wear wings up here, and the king has said so. So everybody else has to wear their wings here. So we wear our parachute wings here, but Americans will wear their wings here. I noticed them the other day on Petraeus. He wears his parachute wings there, but the Brits wear them on their right shoulder. So then I did what, eight jumps then, and I did I think 56 all total, by the time I was done. The water jump is the worst, and I did two of those. They were really bad, and the reason is, they're easy if in fact there's some wind and you can see where the surface of the water is. But if there's no wind and you're really not quite certain where the surface of the water is, it's very — you anticipate you're going to hit the water before you actually do. And the drill for getting out of a water jump is that you get out of your harness, and the reason is that once you're in the water, it's really hard to get out of your harness, and you can get smothered by all of the rigging lines and all the rest of that, the canopy and all the rest of it. So what they want you to do is the moment your feet touch the water, you straighten up and get out of your harness, and that blows away. Well, people think mm, my feet are just going to touch, and then when you're down there yourself, you realize that some people who think they're just going to touch are 150, 200 feet up, and they come down with a horrible thud. Hitting water from that high up is like hitting the ground, it's messy. So a water jump without any wind is very tricky, it's very disillusioning, and calls for some skill and a good deal of luck. But once again, we survived, and we got ten shillings a day extra.

02-00:41:45

Redman: Oh really, OK, so that was an advantage.

02-00:41:47

Carmichael: Yes. I think it was ten shillings a day. No, four shillings a day, I beg your pardon. Ten shillings I got as a second lieutenant and four shillings after. So I got 14 shillings a day as the second lieutenant.

02-00:41:58

Redman: So tell me a little bit about life in England then, when you were back in the Reserves.

02-00:42:07

Carmichael: By that time I got to Cambridge.

02-00:42:11

Redman: And we'll have to talk a little bit about that. What I'd like to do is for our next session, I'd like to talk more about your education at Cambridge, but we can finish up a little bit, talking about —

02-00:42:22

Carmichael: OK, the Reserves then?

02-00:42:23

Redman: Yeah.

02-00:42:25

Carmichael: The Reserves. I enjoyed that because they paid well. I went on courses and I was available to go and do all sorts of things because in the university time, Cambridge courses are rather short. The terms were rather short, so there was plenty of time to go on these Army courses. The most memorable one, I think, was I went on a NATO exercise in North Germany, and they dropped us in North Germany, the paratroopers in, and then I was asked to build a bridge. I crossed the river Weser. The reason I was asked to build a bridge is that it was a floating bridge, and the way you build a floating bridge, if you've got — if you're on both shores, is you build the bridges from both sides of the river and you — the midsection you build upstream and you floated in and you fill the gap.

02-00:43:14

Redman: Wow, OK.

02-00:43:16

Carmichael: That's if you occupy both shores. If it's an opposed landing, if the enemy occupies that shore, you've got to build the whole bridge and so, move it across. So this was not an opposed landing, so this is both shores and the part coming in. So the colonel of the regiment said Ian, I would like you to look after building the bridge. And then it occurred to me, here I was a lieutenant by then and I thought that's good, I'll enjoy that. Then I wondered why, and I wondered why because it occurred to me, I measured the thing carefully, I started building the center section up, and people came up to me and said Ian, are you sure the center section is going to fit? And it worried me that maybe it wouldn't. Of course there are two disasters that could happen. One is that the

gap is too small and the center section actually won't fit in there, or the gap is too big and the center section flies all the way through. Well as the bridge was getting more and more complete, I saw more and more heavy-duty NATO officers standing on the banks watching this. So obviously the word had gone out that British engineers were building a bridge across the river Weser in North Germany, and it was about to be completed, and before the tanks could go, they wanted to see it completed. So there must have been I don't know, American Army generals, German generals, everything from NATO you could believe was there, a lot of Army brats. And I filled the center section in and as luck would have it, it fitted perfectly. It couldn't have been better. I mean literally within about this much, and you've always got about that much latitude. And within 30 seconds, the tanks were running across the bridge, and the colonel came up and said, well done. Now I can imagine if I was a regular soldier, my career would have been really — you know, regular career soldier, my career would have been very much frowned on had I not successfully completed that bridge in the presence of so many brats from the NATO. Anyhow, that was my one experience I can remember, I think, from my days in the Reserves. I spent what, five years in the Reserves, something like that. I did 56 jumps in the Reserves.

02-00:45:40

Redman:

And you saw that as — now my question is, those five years, were they required of your service or did you stay in to help pay...

02-00:45:51

Carmichael:

I think some of it was required, my service, but I think I stayed in for more, and then when I started becoming a graduate student I left.

02-00:46:00

Redman:

So you saw that maybe as an opportunity to pay the bills?

02-00:46:03

Carmichael:

Pay the bills. I enjoyed the company. I learned a lot too. I was in the engineers, which is — so I was always building things or blowing things up, or you know. It was not — I wasn't just the poor bloody infantry, as the British called it, cannon fodder, there were some skills involved, and I enjoyed learning those skills. I enjoyed officer cadet school a lot because of that.

02-00:46:30

Redman:

And probably many of those things came in useful then subsequently, when you're conducting fieldwork.

02-00:46:37

Carmichael:

Yes. And interesting thing is, I went to officer cadet school in a place called Ripon in Yorkshire, and I passed status as the second lieutenant on that program in 1948 some time I suppose. I went back to Ripon in Yorkshire two years ago and I asked the town whether there's still an army base outside, and they said yes there is. So I drove up to the army base and of course there were

guards there and they stopped me, and I said you know, I have a strange story to tell you. I was commissioned as a second lieutenant on this parade ground in 1948. I would like very much to drive around if you wouldn't mind and they said, no problem at all. They gave me a pass and I drove all the way around, and this was what, 55 years later. And then when I left to leave, they pulled all the guard out and gave me a magnificent salute. It was wonderful.

02-00:47:41

Redman: Oh funny, that's great.

02-00:47:42

Carmichael: It was really wonderful. That was 55 years after I'd become a second lieutenant there.

02-00:47:48

Redman: And so you really enjoyed —

02-00:47:55

Carmichael: I didn't really enjoy at all the Army, because looking back, I learned a lot of things, and I've forgotten about the bad time. What I realize now, now that you've made me think about it, is that the Army supports a lot of fools, and the fools get in the way. You know, rank is anything and IQ is not related to rank at all, and so you can run into a totally foolish, stupid, thick, you know colonel whose life — your life is held in the balance of his hands and there is nothing you can do about it, but that's the way it is.

02-00:48:41

Redman: Do you think that's in any way analogous to a university administration?

02-00:48:44

Carmichael: Oh no.

02-00:48:46

Redman: How is it different?

02-00:48:48

Carmichael: Well I can't talk about any other university administration but the Berkeley one. The Berkeley administration, I'm talking about the faculty now, who get into the administration. In the years that I was there, the chancellors always demanded that the faculty be scholars in their own right, and he wanted — Tien anyhow, wanted the best scholars. I don't know that Bowker was so interested about that, but Tien always wanted, he said I want you to keep doing your scholarship. He said you only get promoted on your scholarship or your research. You're not going to get promoted only being an administrator.

02-00:49:21

Redman: OK so whereas, you know, as you said IQ wasn't a consideration in rank in the military, it was very much a consideration.

02-00:49:31

Carmichael: You're only going to become an academic administrator if in fact your colleagues think that you're one of them. It won't work otherwise. They'll look you up, they'll find out what your citation are doing and all the rest of it, and if they think you're not above a reasonable threshold, they'll just dismiss what you say as not worth listening to.

02-00:49:55

Redman: Right.

02-00:49:56

Carmichael: I had 17 years as a dean of doing that.

02-00:50:00

Redman: But in the Army, you don't have the opportunity to look somebody up.

02-00:50:03

Carmichael: Listen, it's what you've got on your shoulder, that's what counts right?

02-00:50:07

Redman: Right.

02-00:50:07

Carmichael: And if you've got it on your shoulder, that goes.

02-00:50:11

Redman: OK, OK. So —

02-00:50:13

Carmichael: Just the opposite at the university.

02-00:50:15

Redman: OK. Interesting.

02-00:50:17

Carmichael: The best ideas come from the young people, and that's graduate students and probably your young faculty. I mean, if you don't have good graduate students, really bright graduate students, this place is dead. Its future is very much less than its past, and because in the past it's had wonderful graduate students. I don't know now, but I suspect it's still getting really good graduate students, if you're an example of them.

02-00:50:42

Redman: Well thank you.

02-00:50:45

Carmichael: And it must continue to do that because you can get the best faculty, but unless you have the best graduate students, you've got one side of a coin, and that doesn't work. Berkeley's been, since I've come here and in the 45 years I've been here, Berkeley has been very likely in getting slightly more than its fair share, and I hope it continues to get slightly more than its fair share. That's

where the new things come from, is the young people. That's the problem with the Army, because the new things will come from the young people, who have got little rank up here, and the old things, the old ways of doing things come from the senior generals who are fighting last year's, you know, today's war on the last war's conditions. That's where it all goes wrong.

02-00:51:31

Redman: And so it's too conservative.

02-00:51:34

Carmichael: Yes, but on the other hand it has to be. I mean, I don't think you can design an army that does anything other than that. So what you tend to find is in wartime, you get the rogues and the imaginative people that rise to the top. In peacetime, they're a pain in the ass and they get their promotions held and they get asked to leave and get out, and go back into civilian life.

02-00:52:00

Redman: And this might be — and we're winding down on our tape here, but I'm curious. Real quick, as kind of a final question in drawing this analogy with the Army leadership. You just said, talked a little bit about wartime versus peacetime. Is it similar, do you think, in times of crisis versus normal times at the university, or has the university always sort of seen itself as being in a time of crisis? Has there never been enough funding?

02-00:52:32

Carmichael: I think the university has been through crises every five or ten years since I've been here. It's always had a crisis. I might say, if you get in the administration here, your colleagues will say oh, you know, he's obviously run out of ideas. That's the attitude of your colleagues if you go into administration and become a dean. They tend to look askance at you and think that you've surrendered in some way. But you know, most of us have got back to research, or did after we stopped being deans. You know, I mean, given the time interval and given the increase in age, most of us did pretty, you know, we fulfilled our function, I think, when we got back. I like Tien's idea, emphasis, that he only wanted the top-flight scholars having a say at how this university is directed. And some of those were young people. We had a lot of young people doing it, which is great. That's how a university should run. It should be a meritocracy.

02-00:53:33

Redman: OK.

02-00:53:35

Carmichael: Don't you think?

02-00:53:36

Redman: I think, yeah.

02-00:53:37

Carmichael: I do too, I do too. I would like to go to lunch soon if you wouldn't mind.

02-00:53:44

Redman: We're all done. If there are any other things that you'd like to mention on these topics, you can think of things later on. You're comfortable with this?

02-00:53:53

Carmichael: Yes.

02-00:53:53

Redman: OK very good. All right, thank you.

02-00:53:54

Carmichael: Are you comfortable with this?

02-00:53:55

Redman: Oh yeah. This is going very well so far, great.

**Interview 2: April 20, 2007**

## Audio File 3

03-00:00:07

Redman:

All right. My name is Sam Redman, and I'm a graduate student, working for the Regional Oral History Office, and I'm sitting down for my second interview with Professor Ian Carmichael. Today is April 20, 2007. We left off speaking a bit about the military and your time in the Army, and making this transition between your time in the full-time Army, then back into the Reserves. You were explaining that as you were going through — or parachuting, that's essentially how you were paying the bills at Cambridge. So I'd like to first ask you, before we move on from there, if you feel as though there is anything that you'd like to add about your time in the military, or about your early life and childhood that we discussed before.

03-00:01:07

Carmichael:

Well something about the end of or between, coming out of the military and going to Cambridge, which I like to reflect on, and that is, I came out of the military but it was after the term had started in Cambridge. So I couldn't go, and I had to hang around for a year. During that time, it was a time of some internal reflection, I think. What does one do? One of the things I decided to do was consider whether I should become a regular, you know, I should join the Army as a professional. That really horrified my parents. They had got me out of the Colorado School of Mines, they thought they got me into Cambridge University, and here was I actually saying I don't want to, you know, I'd like to go on with life. Why don't I go join the Army as a professional? And they were horrified. I think the reason they were horrified is that they thought there's no basis for any employment once you reach the age of 40 or something. Most professionals end up being discarded by the Army at age 40 or whatever it is. Furthermore, my father thought that I had no real inkling of how technical the armies were or had become, and I seemed to show no interest in the technical branch of the Army, and he was dismayed by that. Then I announced that I was going to take parachute training, and he got even more dismayed, not because he thought he was going to lose me, but he thought it was one more emphasis away from academia and academic things, which he held so dearly to. So I decided that I would go and take some courses before I went to Cambridge, and I took them at a local junior college in London called Kingston Technical College, and I took mechanics and geology and one or two other things, chemistry I think, just to prepare for my way to get into Cambridge, because I had essentially nine months to kill, if that's the right word, or to occupy myself with, before I actually enrolled in Cambridge.

Cambridge terms are very short. I think they're only eight weeks long, and there are three eight week terms, and that's all you spend at Cambridge. And they don't start until October, the middle of October, and then they go on to

December, and then there's one from January to March or something like that, and then another one from April to June. So there are just three eight week terms, and they have their own Cambridge names, though I've forgotten what they are now. One of them is Michaelmas, but I don't know which one that is. Oh, Michaelmas, Lent and I don't know what the third one would be. Anyhow, so here was I at this junior college, equivalent to junior college in London, and I made friends with a guy who had also just come out of the Army, and he discovered how you make money on betting on horses. And so I became an enthusiast betting on the horses, because it seemed to me that if I took his advice, I always seemed to make a small profit. When I discarded his advice, I seemed to lose horribly. So I kept myself going by — out of interest and bet on — horse betting, horse racing. I knew nothing about it whatsoever, nothing, but after a bit, I learned the difference between somebody whose handicap is this and all the rest of it. Looking back on it, and I haven't thought about it since I did it really, which is almost 50 or 60 years ago now, it was a time of great enjoyment for me. I lived in digs or a little bedsitter or whatever they call it, in London, in South Kensington. I enjoyed this technical college very much. I enjoyed the friends I met there or made there, and the weekends and term intervals, the end of the term, I went and earned my keep through my reserve training with the British Army, which was parachute training. So when I went to Cambridge, it was after an interval, if you like, of ten months or so, in which I'd been out of the Army, and I'd lost my sort of enthusiasm for the Army because I realized that it really was a dead end professionally, unless one had formal university training.

I remember in those days in England, a university training was not sought by everybody. It wasn't universal to the extent it is in the United States. It's much more universal now, but it wasn't then. In fact, the universities in England or the United Kingdom are split into two groups; the two ancient universities, Oxford and Cambridge, and the rest, which are called red brick universities because they were essentially built during the industrial revolution or sort of starting from that, in the 19th Century, late 18th Century. Those universities, the two main residential universities, Oxford and Cambridge, had a cache to them, which was quite unlike what the other ones did, and the other ones were desperately trying to catch up. They were the big civic universities and they were just as good, but nevertheless, Cambridge and Oxford had this cache. They had this idea that in fact you educated the very bright. But I must admit, looking back on my Cambridge days, I think Cambridge had probably three out of the brightest ten students in Britain at any year, and it also had nine out of the ten most dumb students every year, and they did this on the basis of they wanted to keep a balance of their undergraduate population. They wanted to make sure that the alumni were served. I think the legacy students were there.

So I looked forward to going to Cambridge in some ways but when I got there, there were difficulties. One was I found it very difficult to exceed to the regulations of keeping nights. This is a technical expression at Cambridge,

which comes from every time you're there, you have to sleep in the college Sunday nights, and they enforce that by closing down the college at 10:00 at night, after which time you can't get in unless you were prepared to climb in. And they deterred all but the most intrepid from climbing in by having spikes and all sorts of things around the walls, but nevertheless, most people could learn how to climb in late at night, but you always had to go through somebody's room, which wasn't very pleasant for him. Someone else's bedroom, that was the best way into my college, which was Trinity Hall. You went up a drainpipe, and the drainpipe showed evidence of people climbing up it, because it had been pulled away from the wall. We'd hop through this guy's bedroom and we always left him a tip because we felt that it was poor form to interrupt his sleep or something. So we always left him a shilling or two shillings or something, just to make his night somewhat more meaningful to it than it would otherwise be. I'd find myself climbing in quite a bit. At May Ball times, people used to get their dates to climb in too, and that was always rather ludicrous because — or funny because very often, these ball dresses got in the way of climbing in. So you used to find girls taking their dresses off at the bottom of the drainpipes, climbing up, and then making sure that her guy followed with the dress, and hoped that in the interval, that they weren't caught by the local police or something and therefore, your date and her dress disappeared as they were taken away by the police, because climbing in was an offense.

Cambridge had much to offer, and looking back on my days at Cambridge, the whole bunch of us were from the service, had been in the service. We were still in the Reserves and really relished that. The scientists had a really hard time doing athletics, because the science labs were almost every afternoon, and that's when most of the sports are played. So if you were an interested rugby player or a soccer player or a runner or wanted to do crew or something, and you wanted to participate at the university level, which meant against Oxford, and get "a blue", you had to forsake — usually during science courses, you had to change your major. I wasn't keen to change my major, and I was quite happy not to give up my afternoons. At school, I had been a reasonable athlete and interested in it, but when I got to Cambridge, I really became interested in the science and the science labs and so on, and really relished them in the afternoons. I found that I was learning a lot. Funny enough, the lab I loathed most of all, there were two, one was the metallurgy and the other was in chemistry. In later life, I became a fanatic analytical chemist but I sure didn't like to learn chemistry at the University of Cambridge, but I enjoyed it later on when I became a graduate student, and I learned it at Imperial College. But at Cambridge, I found it very difficult, but the other labs were fascinating and I stayed with those — being any real athletic activity, which looking back was so silly once you'd done something.

Most of one's social life was related to, in Cambridge, because there were very few women undergraduates there. I think Cambridge had just officially admitted women to Cambridge probably about 1947, and I was there in '51.

So it was still fairly rare, although they had two women's colleges. I can give you a little story about the traditional Don, that's a faculty member's, attitude to women. We were taking an elementary chemistry class or a physical chemistry class and the professor walked in and always every morning used to say, "Good morning, gentlemen." And scattered amongst the 40 or something men were about five women. First off, this seemed to be to us an oversight, and then it seemed to be rude. So what we decided to do is to put all the women in the front row, so there must have been eight or nine of them, so he couldn't miss them when he walked in and said, "Good morning gentlemen." But indeed, having put them all — suggest they all sit in the front row, which they did, he walked in and said good morning gentlemen again. Well, we thought we would escalate, and how did we escalate? We decided that no men would go in for the lecture and just the women would, and see how he'd greet with that. And he walked in, looked around and said, "I see there's no one here today. I won't give my lecture." And walked out. Now this was in 1952, and you could get away with that at Cambridge in those days because he was eccentric and Cambridge viewed eccentricity beyond almost everything else. It was absurd but it wasn't, if you like, the sin that has become and it should have become in my experience since I've been in Berkeley.

Nowadays, one could never — would never want to do that. I mean, the best students on the Berkeley campus always have a high population of women, and most of the students seem to be women anyhow. So going from what, four or five, I suppose about 5% at Cambridge in my undergraduate days, there must be about what, 52% on the Berkeley campus at the moment? That's a very different environment and by and large, the women students seem to be amongst the smartest we have. In Cambridge, they were very smart, there's no question about it. They were well trained. They had to be in order to get there because there was so many barriers for them going there. There were just two residential colleges in which they could occupy so that by and large, the number of women undergraduates, which the male graduates could sort of seek dates among were very few and very limited, and one didn't do that. So most of one's dates came from London, and London was about a two hour train journey from Cambridge in those days and rather expensive, but everybody did that on the weekends, went down to London to go to parties and things like that. In my case, I used to go down and play around the Reserves, and then I could get paid to do that and then come back again. On the Reserves on Saturday evening, I could go around the various nightclubs and so on in London, with my buddies and sort of find out, you know, go and meet people that way.

03-00:14:33

Redman:

I'd like to ask two questions. First, you talked about how the universities had kind of — I mean, it was Cambridge and Oxford and everything else as far as cache. So why Cambridge as opposed to Oxford for you? Was there a specific reason there?

03-00:14:52

Carmichael:

My father was a scientist too, and he had friends apparently in Cambridge. Cambridge then didn't have quite the outstanding science reputation it has now. At least it wasn't so distinctive in its difference from Oxford. Nowadays, in the 21st century, Cambridge has an incredibly powerful array of science faculty. It's amazing in my view. They dominate the fellows of the royal society, and Oxford has, its reputation seems to be more in the humanities and the arts and so on, but the scientists they have are extremely competent. They just don't seem to have anything like the same number that Cambridge does. So Cambridge has become an extremely dominant scientific university, and I think they've always done that, probably since the days of the Cavendish Lab, when it became so famous as Rutherford and so on. So physics at Cambridge has always been — and math, mathematical physics, has always been very, very high on the reputation of the world. Oxford, I think probably to a lesser extent but you know, that's not a really balanced judgment. It was just the feeling I think my father had, and I followed his feeling in the 1950s, when I went to Cambridge.

03-00:16:24

Redman:

And why Trinity?

03-00:16:30

Carmichael:

When you gain admittance to Cambridge, you have to pass a university entrance exam, which is hilarious because it included an oral exam in Latin, which as I said before, everybody had to take, be you a potential engineer or a doctor or whatever. You also had to gain admission to a college, because that's where you lived. The colleges were residential and they were also responsible for your tutorials, so that you had to gain admission to colleges. So what happened in those days is that you were given the choice of a cluster of colleges. My father had some connection to Trinity Hall and so I applied to go to Trinity Hall, and went. Its traditions are largely in the legal professional. It's produced more Lord Chief Justices than any other college apparently, or something like that. It's a small college, small residential college. I met some very good friends there. Its interest in science was somewhat less evident than say one of the neighboring colleges like Trinity, but I didn't suffer as a consequence. In fact, I gained as a consequence because I met my research advisor there or my tutorial adviser there, and I stayed friends with him essentially until he died, all throughout my career in Berkeley.

03-00:17:56

Redman:

And so you told me, in our initial interview, that you were somewhat of a difficult student your first year at Cambridge, and it took you a while to settle down. Can you tell me a little bit about that process?

03-00:18:07

Carmichael:

Well, part of that process is because it was this business of keeping nights and having to be in at 10:00. I found that having been in command of what, 250 men for a time in the Reserves, and jumping out of airplanes and all the rest of

it, and then to be told by a bunch of crusty, fusty old Dons and gatekeepers that I had to be in at 10:00, I found that very invasive of my freedom. What intrigues me now, apparently those regulations are gone. Cambridge couldn't maintain that arcane and sort of disciplinary activity. But after a bit we succumbed to it and we found our ways around it, and our way around it was to climb in. We took notice of — I mean, it didn't, in any way, deter our activities. It just changed the way that you entered. Instead of entering through the front door, just before 10:00 when it was bolted and shut, if you were going to be late, you realized you had to climb in, and I had to leave a tip in the guy's bedroom. So we adjusted to it. I enjoyed my first year of classes, and I enjoyed that a lot. I found those were very intriguing.

03-00:19:18

Redman:

And what courses were you taking? Do you remember?

03-00:19:20

Carmichael:

I don't remember. I think one was geology and another was chemistry, I suspect. Geology, chemistry, those are the only two I remember but there must have been more than that. But I enjoyed them and I think when I took my first year exams, I got quite — from that part of it, I got a first class degree, so I was doing fine. My second year I had more trouble. Now I don't know why I had more trouble but I did. I know that I walked out of an exam because it just bored me, and I walked out of the exam and I just said, this bores me and I'm off to see a movie. I've never forgotten the movie. I went to go and see the *Battleship Potemkin*, which was playing for the last day in town. So I never took the metallurgy exam, which was the stupidest thing to do, and I failed metallurgy, but I managed to eventually graduate from Cambridge with an upper second-class degree, which is quite a rarity, in a sense, if you fail one exam, and I did and I just failed it because I walked out. It was stupid, looking back, but one was immortal, one was 22 or 23, life was pressing in every dimension, and one didn't look to the future, and one thought no matter what the future brought, one could cope with it. One's immortality took over, and so I did stupid things like that. In fact, when you think about it, what does the undergraduate career supposed to do? To give one a knowledge of one's own limitations. One of my limitations is I'm not a very patient person. Impatience has become both a strength and a weakness in me. It's certainly been evident in my dealing with the students and faculty members when I became an administrator. On the other hand, it is a virtue too. I mean, you don't have to let things just slide and go by, and I've never been able to do that very easily, and Cambridge gave me many opportunities to display my impatience and to develop it, but to realize that it had drawbacks as well as strengths. Looking back, Cambridge and the Army together gave me a sense of what was important in life, and how to deal with other people, and that's a very, very important lesson, one which I've valued ever since, and more and more as I've got older and I've had more and more people to deal with.

I made my first donation two weeks ago, to Cambridge University. I've been a very disloyal alum, if you like, mainly because they haven't got anything like the alumni groups which Berkeley and the like university does. But now they've had to do it because of finance reasons there, so I sent my first contribution to my college, after graduating from them in 1954, and I sent it in 2000; 52 years later. Better late than never, I suspect, is the — but I'm pleased to do it now. I realize how much they did give me and how much I benefited from two people there.

03-00:22:40

Redman:

Again, I'd like to talk a little bit about your notion, already by this time, about how the education system differed between the United States and Britain. You had taken courses at the Colorado School of Mines and then now coming back to Cambridge. What were your initial impressions of that?

03-00:23:01

Carmichael:

Well, everybody in the United States — I came to learn this later, when I had to go an appeal to a curriculum change for my department of Berkeley, and I went in front of the College of Letters and Science Exec Committee, and their major concern seemed to be, if you're going to do this, do they do that at Oxford and Cambridge and everywhere else. And when I think about it, Cambridge's education was extremely narrow. It was very much focused on a particular branch of science or whatever it is you chose, but it was a very narrow education with no breadth requirements of the type that we have in Berkeley. In that sense, that responsibility for the breadth and so on is left to the high schools, or it was in my day. So one was expected to acquire knowledge of the classics and literature and Languages and so on, in high schools, but once you got to Cambridge, unless you wanted to specialize in literature or Languages or science or engineering, the opportunity to sort of browse or graze among such, you know, different subjects was very restricted because of time mainly, I think, and the short terms. So Cambridge offered you an opportunity to specialize, but it didn't offer you the opportunity to browse very widely. One did not, by talking to fellow students in a residential way, because it was a residence, so talking in the evenings and all the interactions one has in a residential college, which is so valuable, actually produced the sorts of things which one might get if one had breadth requirements in a more formal way.

The students in Britain are much more highly prepared, I suspect, up to the age of 18. I read, when I became Director of Arts and Science, somebody told me there that at the end of an American school kid's career, having graduated from high school at the end of the 12th grade, he or she will spend two years less time in school than they will in Europe, and that is partly because of the length of the terms. In the United States we have this long summer term, which is I presume, a historical accident from the days when it was a rural community and people got the harvests in, but now no longer do so. But that long summer term still exists in the United States, and I believe to a much less

extent they exist in Europe. That means that the school terms are much longer and if you've — the days seem to be longer too. I mean, my school day doesn't seem to start at 8:00 in the morning, it doesn't finish until 5:00, and then I used to do my homework. Or at least 4:00 anyhow, but usually 5:00. I'm sort of drifting off now, but the high school times were very intense, very highly occupied, and when I watched my own children go through Berkeley High, they seemed to be far less intense than the English equivalent. Whether that's true today, I have no idea, but it certainly was true then. So while I acquired much of the breadth which one likes to have in educated people, when I was in high school, and Cambridge really didn't add to that in any way. What it added was the depth which one desperately needs I think, if you're going to pursue a scientific career, and they do that really well.

03-00:26:53

Redman:

I'd like to ask for a little bit more information about being a major adviser and then your — you take a tutorial at Cambridge, is that right?

03-00:27:04

Carmichael:

Yes. The Cambridge system is sort of — it's extremely expensive, and it goes this way. Every undergraduate has to go and meet with a tutor in every subject he's taking. Now most people take three or four subjects a term, that's all you can take. Every week then, you've got to go and see four tutors, and every tutor asks you — usually asks you to write an essay or develop a theme or something in preparation of the following week, and you have that one hour alone, so it's fairly concentrated. That tutor actually, has got a very good idea of whether you're making any progress or not. I had a really good tutor, who was an Australian, who was a graduate student in chemistry, and he was very good for me. The other tutor I had was —

03-00:27:59

Redman:

Do you remember the Australian tutor's name?

03-00:28:01

Carmichael:

No. I don't remember his name at all, but the other tutor I had was a faculty member and a lecturer there, and I stayed friends with him essentially until he died.

03-00:28:11

Redman:

And this was?

03-00:28:12

Carmichael:

His name was Dr. S. Agrell. He was a lecturer in mineralogy and petrology at the University of Cambridge. He was an aesthetic looking person but not aesthetic in his tastes, a pipe smoker beyond belief of Swedish origins. Every week I had to go and meet with him and talk to him about whatever I had learned in that subject, which he would choose me in, which was some aspects of geology. My tutorials often lasted two hours, and it's just one way you can learn or you're forced to learn, is having to face your tutor every week in every subject you take. It's a very expensive way of dealing with it. In those

days they were paid separately, and you had to pay your tutor at the end of every term. I think they got I don't know, it was something like a dollar an hour or something. It was something trivially small in those days, I suspect, but it seemed like that. Nevertheless, it was consequential when you had to pay the bill at the end of the term anyhow, but it was a wonderful way in which to train students. I think Oxford and Cambridge still have it, but it's extremely expensive. When you think about the number of tutors you've got to have for what, 10,000 undergraduates in all subjects, that's a huge workload, but it works. Professors, people actually carrying the title professor were not allowed to be tutors. I don't know why not but they weren't allowed to. You had to be a lecturer or somebody junior to that of a professor. Remember in Britain, professors were only one in every — or two in every department, and there's a hierarchy there in which they were the apex of the triangle, a rather shallow triangle.

03-00:30:12

Redman:

Now did this experience of — obviously there's clearly a lot to be gained from one on one session with tutors, but the downside is that it's a very expensive and time consuming process for these individuals. Were there any lessons there that you hoped to translate to Berkeley later on?

03-00:30:35

Carmichael:

Yeah. What impressed me is that when I first came to Berkeley, I thought OK, office hours are the equivalent. Here you are, you're waiting for the students to come and talk to you. They never did. I'd say in my 40 years at Berkeley, I would say my office hours were used less than 1% of the time. Few students rarely came. Now it's not because of the brilliance of my lectures or the lucidity of them, because every student has some problems, but possibly because the TAs were excellent. I think the older you become, the more accessible or the less accessible professors seem to be at Berkeley, and I think the students were more at home with somebody closer to their own age. So as the years went by, the attendance and office hours dropped off more and more and more, but the TAs always got the students, I didn't. It was silly. It was an awful waste of resource, but I used to sit there. I used to write manuscripts or do whatever it is I wanted to do, and I was very prepared to meet students if they would turn up, but they never turned up. Whereas you were compelled to do it in Cambridge. If you like, you were compelled for one hour every week, you had to go and see your tutor, and there's no way out of it. If there was a way out, they fined you. That was the universal fine in Cambridge.

I remember being caught climbing in and they'd fine me, so I had to go see some university official, and he had the compendium of university regulations under his arm, which brings me to another story. And he said, “Oh, Ian, before we get to this, would you like a sherry?” I said, “Yes, I would like a sherry.” He said, “Good, I'll join you in a sherry.” Now this is a punishment hearing, right? So here were these two — I had to wear my gown because I was meeting with him officially. He wore his gown and he saw me pour out from a

nice decanter, some sherry, and it wasn't particularly dry sherry it was, you know, it was a rather sweet one, but we had a sherry each. And then he said you know, being caught climbing in is not the best thing that could happen to you, but he said, perhaps we can agree on the fine. He said, would you accept ten shillings? I said yes sir. Would you like it put on the bill at the end of the term? Yes sir, right. Would you like another sherry? And that was the end of my punishment session, and that's what happens. It was done in a very gentlemanly and rather low key way.

Once in an exam, a science exam — there was a lot of exams that went over a mealtime. Now under university regulations, at least what we thought were university regulations, if it went over a mealtime, the university had to provide a meal, and the meal could be of the student's choosing. So when lunchtime came, we held up our hands and we said to the man there that was looking after the exam, invigilating the exam, I would like oysters and something or other, and someone else said he would like smoked salmon. And the guy looked absolutely nonplussed. Then we said look, under university regulations, this exam is taken over a mealtime, and you're supposed to provide a lunch of our own choosing, and this is what we choose. So he, with great presence of mind, decided he'd make a list of what was happening, and off he went and left, and somebody else came in to take his position. About a half an hour later, back came somebody with a huge book called the *Compendium of University Regulations*. I've forgotten what his title is but he's somebody who knew the university regulations. He was like the university's top academic cop if you look, and said we understand you've made a claim to be fed over lunch because the exam goes over lunch. Your claim is indeed well founded, but there's a contrary claim which the university has to make, and that is it requires that you be properly dressed, and we notice that none of you are wearing swords. So we feel that your claim is null and void. However, to show our generosity, we've provided sandwiches for you. So we got sandwiches and we got something to drink, but the fact that we didn't wear swords, which must have gone back what 300 years or something, says that the university regulations haven't changed a great deal. OK, I'm way off from where you expect me to go.

03-00:35:36

Redman:

It's an interesting anecdote because no doubt, your experience of the rules at Cambridge, in some ways these old fashioned and outmoded rules, but that might be kind of quaint. I mean, that must have been a very —

03-00:35:52

Carmichael:

Quaint is the right word. That's a very good word. They are quaint. You sort of wrestled with them but there were all sorts of — after a bit, you realize you could get around them, and they were levied, if that's the right word, in a very generous and thoughtful way. They were never harshly applied. But mind you, we never had — you know, firearms is not a big issue in Britain. I mean, they're not allowed by and large so the sorts of tragedies we saw in Virginia

Tech this week or last week would never occur at Cambridge, or it hasn't. The big problems Cambridge used to have were people committing suicide, and that was because they thought they were not going to get a first class degree, and everything was, in their minds, everything was related to getting a first class degree and if they weren't going to get it then life was clearly not worth living. And there must have been three or four people every year, I think, who committed suicide, and that was a tragedy too. What the university did about it officially I don't know.

03-00:37:05

Redman:

Just one last question about comparing. Did you see the rules, as applied in the United States or — you've described, and we'll get into this a little bit later on. You described the program at Toronto as being very rigid. Did you find that at Berkeley, maybe things were a bit more malleable?

03-00:37:26

Carmichael:

I was on a different side of the table at Berkeley, but I did take courses at Berkeley, which were fascinating to me. I thought they were extremely well taught, but I think they were chosen because of that. They were chemistry and material science and so, and I thought they were very well done. Discipline in the United States is rather a different issue. One of the rules of the University of Cambridge is you couldn't keep a car, and the reason you couldn't have a car is because there's nowhere to park it. Whereas that rule would never work at an American university. You have to provide parking, not only for your faculty but also for the students. Everybody in Cambridge in my day either used to walk or get around on a bicycle. So there were different — because the standard of living was different and because the standard of living has gone up in huge amounts... I mean, if you look at the student parking lots around our residences, you wouldn't think that in fact they were poor, you know, students having a hard time making ends meet. I mean, there are a lot of BMWs there. So life has changed. The big issue I understand now, listening to my colleagues, is plagiarism in Berkeley. Now I don't think it's any different at any other university, and it's brought about largely because you can get so much off the internet, whereas plagiarism, in my view, when I was a student, was never an issue at all. Every now and again you could hear people whispering on an exam, but you were usually so busy trying to do what you were trying to get done in an exam that you were immune to that. You just put your head down again and go on with it. Plagiarism has definitely become an issue here, as I talk to my colleagues in the humanities and in the social sciences, because you can get so much off the internet, you know, and pretend it is your own, whereas in the sciences that's more difficult to do, and because there was no internet in those days, it was not available to you.

Our disciplinary problems, I think were largely those of undergraduates. Don't forget in England you can drink when you're 18, so there was probably a lot more drunkenness or alcoholism than there is here, because the legal age is lower. On the other hand, the local police in the colleges and so on have ways

of dealing with that. They used to take you home, put you under a cold shower and leave you there if you were ever inebriated. So the disciplinary problem, I think, was very different. If you were caught with a girl in your room, apparently that was a bad thing to do. I never was, but you could be caught I think, if she stayed overnight, and they didn't like that, and I think they fined you. If you did it more than once, they probably threw you out. Their argument was listen, we turned down 15 people to take you at Cambridge, so we're quite willing to throw you out and give one of those 14 rejects or 15 rejects an opportunity to come in your place. So you knew perfectly well that if you did something really too bad, they would just get rid of you or they would "rusticate you" which mean they'd send you away for two terms and you'd have to come back. In the worst case, they'd "send you down" as it was called, which meant they'd just eliminate you from the university, they just send you away. I mean, I don't know what would happen here, but you could always get back again and you could never get back again in Cambridge.

03-00:41:32

Redman: Let me ask, what was your family life like? Were you communicating with your parents?

03-00:41:40

Carmichael: Looking back — that's a good question to ask. Looking back, I think I got a letter from my father or my mother maybe once every two or three weeks. Telephones weren't all that available that I can remember. I don't remember using one very much, so I suspect the amount of correspondence I had with my family was rather small. The terms are eight weeks long and at the end of eight weeks, one went back to one's family and then one took homework with one or work to do because you didn't know anybody there. I didn't meet a single undergraduate at Cambridge in my three years there that came from the same town that I came from.

03-00:42:30

Redman: Interesting. So was it a visiting professor at Cambridge that offered for you to return with him as a graduate student. Is that correct?

03-00:42:38

Carmichael: Right, right.

03-00:42:40

Redman: Could you talk a little bit about the development of that relationship?

03-00:42:44

Carmichael: Well it came because the visiting professor wanted to work as my tutor. My tutor was a distinguished lecturer in mineralogy and this guy on leave wanted to work with him. My tutor and I had become good friends and obviously he had some regard or respect for me, and he said — he told me at one of these tutorials, I just suggested that in fact you should — to this professor, and his name was Professor Morehouse. I suggested to Professor Morehouse that you should go you know, work with him at the University of Toronto as a graduate

student, and you'll be very suitable for that. So I said oh, that's very nice of you and I thought gosh, well, that solves my problem about what I was going to do when I was going to graduate. I had no idea what I was going to then.

So off I went to Canada to do that. It was arranged between two faculty members really, and I had very little to do with it, frankly which is what happens here. I mean, although you're applying as a graduate and you fill in these big paper forms and all the rest of it, and I think I filled in a paper form to go to Toronto. There's a lot of telephoning that goes on. Hey, how about this guy Sam? You know, you say he's really good, how good is he, you know. And I always used to do that when I was at Berkeley. You know, here are all these students who had high recommendations. I used to call — very often I used to call the people making recommendations and say just give me a sort of lowdown on this guy. You say he's really good at this, this and this, and I'm just wondering do you mean it and compared to how many other people. Very often you'd get an even more glowing account. I'd say look, I'm really thinking about it, and I think even more of the guy when I wrote the letter for him. But I often used to telephone, in those days.

03-00:44:41

Redman:

So what was he specifically interested in, and where did your interests —

03-00:44:48

Carmichael:

He was interested in — what was he interested in? He was interested in the way that — the three great families of rocks on earth. I suppose we should get into that now. There are rocks which have formed by cooling from a liquid, and they are called igneous rocks. There are rocks which are formed by deposits from water, and they are called sedimentary rocks, and there are rocks which were the sedimentary origin or igneous origin, which have been affected by heat and pressure or both, and they're called metamorphic rocks. This guy Morehouse is very interested in the igneous rocks, as I was, and he wanted me to go to Toronto to go and work with him on some igneous rocks. That was the idea. In the meantime, in order to give myself some pocket money, I was to go and work on this mining exploration camp.

03-00:45:56

Redman:

Now can you tell me a little bit about that, as far as what you were looking for. Actually, before we get into that, I'm going to backtrack a little bit and ask what your family thought about your going to Toronto. And then also too, was this a PhD program at Toronto that you were going to?

03-00:46:14

Carmichael:

Yes. Yes it was, but I knew very little about that PhD program. I did very little research into the PhD program.

03-00:46:27

Redman:

OK. And now with the PhD in geology program at this time, that wouldn't necessarily lead you into an academic career.

03-00:46:37

Carmichael:

No. In fact, that was — the Canadian professor said that so many of his PhDs actually go and work in the mining industry, and Canada was flourishing in those days, in the 1950s. I'd have been quite happy doing that. Remember, that hit a chord because I had been looking at mining geologists, and here was you know, and how they had died and left all this money, and they seemed to have an interesting career. Here was one step in that direction; a professor from Canada suggesting I should go and work in the Canadian Shield in one summer. I mean, this is travel, it was romance, it was all those things put together which I sort of dreamed about. So somewhat superficially, I got on a ship and went to Canada, and got on a train and went to Toronto, and ended up on the north shore of Lake Superior.

03-00:47:35

Redman:

So can you tell me a little bit about this expedition on the north shore?

03-00:47:41

Carmichael:

Well we went to Toronto, and then we had to — the two of us, the two people from Cambridge, myself and this guy Jim Tolbert, was his name, and we left... We went to Halifax and took a train to Toronto from Halifax, Nova Scotia, and we went to an office of this mining company you're going to work for called American Metals, I think it was. They had this big operation on the north shore of Lake Superior. It was in the Thunder Bay mining district, and I have to check this off my notes and so on, and it was near the town of Marathon. They've got this prospect in a town called — an Indian name — called Manitouwadge, and they were — they've got some aeromagnetics or something, which suggested there was some sort of anomaly there, which they wanted to examine on the ground, to see whether in fact this anomaly, electromagnetic anomaly, was caused by an oil body of economic importance. And indeed it was, but I don't think it was on their territory, although the town nowadays is a flourishing town there, with a big mine — or it had a big mine. It's probably worked out now, but it did exist and they put a railroad in and everything else. But I don't think the company I worked for had the high grade copper on their property. I think it was on the neighboring property, and I don't know whether they bought it or not. But anyhow, I surveyed this large amount of land and all I can remember about that is the black flies, the miserable black flies and how they used to — and one used to smoke to try and keep the black flies away. So every time you sat down, you lit a little [something] and used the smoke to keep the black flies away. You weren't allowed, in those days, to smoke cigarettes, which were called tailor-mades. You had to make your own, and the reason you had to make your own is if you dropped the tailor-mades, they were called, they would continue to burn, whereas if these ones you rolled yourself with tobacco, they don't continue to burn and they just go out. And that stops forest fires. If you're camping in the forest and you're not near a lake, they're very extremely dangerous, and the Canadians are really upset with the people who are, and they used to come and investigate. I think the fire department or the forestry department used to come and investigate, and look around to sort of see what sort of cigarettes

you were having and so on. They didn't like people with inappropriate cigarettes. I used to smoke them. I'd learned to smoke in the Army, which is where so many bad things occur I think, and I just continued to smoke. It was expensive, it's highly taxed in Britain, and I still smoked when I went to Canada.

03-00:50:52

Redman: OK. And a little bit more maybe about the equipment that you were using.

03-00:51:01

Carmichael: The equipment we were using in the Canada exploration was, we wanted to sort of get essentially, a rough idea of what the geology was. Let's imagine some — a formation which is dipping towards the north. In other words, you see it on the surface here and then it's sort of under the surface and it's dipping in this direction like this. So what you wanted to do is, to sort of see if it is underneath the surface, you put a drill here and you drill through it in that direction.

03-00:51:35

Redman: OK.

03-00:51:35

Carmichael: All right? So we were sighting drills and they're called diamond drills and they core the rocks, and they bring them up, and we had to log the cores, it's called, and just say what the rocks were made of and then hopefully, that they intersected some sulfides, which is of course what they were looking for economically. Very often however, because the geologists weren't very experienced, instead of setting the drill core across to intersect it this way, they did it this way and it would drill all the way down it. Of course they didn't know that, so they thought it was an immensely thick body, when in fact all they were doing, it could have been 20-ft thick and they're just going down to 20-ft, and it was quite a small body. There were a lot of boo-boos made in those days, in that part of the drilling program, as I remember. But it survived and somebody found a lot of — a couple in that region and it produced a mining town and a mine. You can look it up on the web and it's you know, it's still a big community.

03-00:52:42

Redman: So there's the potential there for accidentally thinking that you've discovered this huge —

03-00:52:50

Carmichael: I didn't discover it. Somebody else must have done the spade work. When I went to Canada, I found out that essentially, almost every ore deposit in Canada has not been found by the professionals, as it were, it's been found by prospectors.

03-00:53:05

Redman: Interesting.

03-00:53:06

Carmichael:

Prospectors, they give them quite a grub steak, which is their food and their tent and so on, and they're allowed to go out into the bush, and they go out and see what they can find. They come up with their rocks and their samples, and they bring them back to the headquarters, and that's how most of the ore deposits have been found in Canada. It's probably changed now but in those days, 50 years ago, that's how it was.

03-00:53:30

Redman:

OK, that's fascinating. OK very good. I'm going to change tapes here and then I'll come back in just a couple of minutes.

#### Audio File 4

04-00:00:06

Redman:

OK. My name is Sam Redman. I'm a graduate student in the Department of History, here at the University of California Berkeley, and I'm sitting down with Professor Ian Carmichael. We left off, we were just about to talk about your experiences at the University of Toronto, but in the interim, as we were changing tapes, we were talking a little bit about differences between higher education in the United States and Britain, and so I'd like to talk a little bit more about that.

04-00:00:33

Carmichael:

Well as we changed the tape, it occurred to me that one of the very big differences is in how you treat religion in a British university, in Cambridge, and how it's taught here. I think in the 1950s it was at Cambridge, there were either nine or ten professors of Christian theology and two professors of physics. It's much of a reflection of the hierarchy system they have there as anything else, but it also reflects the long term interests that the churches had in Cambridge, and its belief. In the early days of course, the only people that went to Cambridge were people who were going to become ministers or join the clergy, or lawyers or doctors. When you think about it, the issue of religion and its impact on undergraduate education was never an issue at Cambridge, but it is a big issue of course in the United States, so here's a separation of religion or the teaching of religion in a state university. I don't know whether it's a good thing or not. I was quite happy with how it was dealt with at Cambridge, in the sense that I didn't take a religion course there. I had been brought up to go to Sunday school, by my mother and father as a Presbyterian, if I was anything. I learned that if one was — when I had an accident. I was an undergraduate at Cambridge and I was taken to a hospital to be treated, I realized then how important religion was, because when I was asked what religion I was; was I a Roman Catholic, was I a Presbyterian or was I a Methodist or whatever it was, I said none of the above and they said well what are you? I said I don't really know, whereupon I was visited by a representative of each of the standard religions. I got more attention by being not in any sense, an accepted member of any of them, that I would have done otherwise. So Cambridge managed to, and the English university system,

seem to manage to deal with the teaching of religion without it impacting too much on the freedom of thought and the freedom of expression, which is a big issue here, or seems to be.

04-00:03:01

Redman: Now Cambridge also seems to — Cambridge and Oxford tow this line between being public institutions and somewhat private institutions. If you're trying to make an analogy to American higher education, where for example Cambridge and Oxford and the British Library are like the three institutions that receive every book printed in the United Kingdom, which seems like a public enterprise.

04-00:03:28

Carmichael: Right.

04-00:03:29

Redman: But yet you almost would — it would be in some ways easier to compare Cambridge and Oxford to Harvard and Yale traditionally, than University of Michigan and Berkeley.

04-00:03:40

Carmichael: Right.

04-00:03:40

Redman: So how do you see kind of those differences, because clearly people — as you've mentioned, people ask you later on, well how does this experience relate to what you —

04-00:03:51

Carmichael: Well don't forget. I mean, the very foundation of the United States goes back to the idea of religious freedom. I believe that they wanted to survive or survived an environment or department from an environment which they thought was no — enough or there was insufficient religious freedom, mainly that in the UK. The UK, in some way, continued to give whatever religious freedom it was but in the past historically, there have been enormous upsets in Britain between the Catholics and the Protestants. I mean it happened in the Stuart times and so on. To some extent it's continued say in Northern Ireland, I suppose, but it has an economic undertone as well. The Americans, when they wrote their Constitution, they wanted to avoid all this nonsense. From their experience of what the English were going through or had been through, they managed to avoid it, and in so doing, they said that the public institutions couldn't teach religion or there is to be no formal structure of religion. That's fine. I don't know that Harvard does it now does it?

04-00:05:02

Redman: It seems like it's a loose affiliation or a traditional affiliation, and many of these schools still have chapels, but it's not mandatory of course.

04-00:05:12

Carmichael:

And there are religious colleges in the United States, you know, Wheaton College in Illinois is one and I'm sure there are other ones as well. I think the state universities in the United Kingdom still teach religion or are allowed to teach religion without any trouble at all, whereas the state universities in this country are not. I think everybody's happy with the arrangements they have. My own view is, I like something which has a little less rigidity to it, and hope that a good form of behavior will follow if people are given the responsibility of behaving well, that they will behave well and they will not [proselytize] unnecessarily.

04-00:05:59

Redman:

I'd like to talk about your experience as a graduate student at Toronto. I'm assuming you started in the fall term, is that correct?

04-00:06:06

Carmichael:

Right.

04-00:06:07

Redman:

And you did not seem to have a very good experience.

04-00:06:13

Carmichael:

My experience at Toronto was almost universally bad, as a graduate student. I don't quite know what the reasons for it were. The university thought I had a very formal course requirement for all graduate students, and independent of one's past experience. There was one thing I knew quite well, and that was the way the rocks were put together, and yet I had to take a course on it, and I was just repeating what I had done as a second year undergraduate, let alone a third year undergraduate. So I asked to take the final exam and they said yes. I passed it after two weeks or something of being enrolled in the course, but I still had to take the course. I couldn't get out of it, I still was supposed to take it. That happened more and more and more. I couldn't find courses which suited my interest and I hadn't learned, at that stage, that I probably would have to get out of the department and get into a chemistry department or physics department or something else. So that when I went to Toronto, it's — there was a rigidity there, which I must admit, I have never seen in Berkeley, thank goodness. The curriculum of geology students was very much a curriculum which was taught by the geologists and so on. It was not contributed to in any substantial way by chemists or physicists or biologists or something like that. It may have changed now but in those days it seemed to me, unduly narrow and rigid.

I had a job offer. A job opportunity came, to work in the Canadian Arctic, starting essentially on January 1, and so I quit the University of Toronto and went up to the Canadian Arctic and stayed there until June, with a very large, tax-free salary, which I brought back and I got married on, and my life changed completely.

04-00:08?33

Redman:

Was your advisor at Toronto disappointed or did he understand?

04-00:08:39

Carmichael:

I think he was irritated beyond belief. I think he felt that he had put all that effort into persuading me to go there, and I walked out and didn't even complete the first year. The interesting thing is that I was asked to go back in later life as a chairman of a review committee at the University of Toronto, of all their physical sciences. So I went back with a physicist from Alberta and a chemist from Columbia, a mathematician from somewhere and a statistician from somewhere else. I don't remember at the moment where they came from. I was chairman of this committee and we had to review this cluster of physical sciences at Toronto. To my dismay, I hadn't seen a lot of change in the Department of Geology. It was still much — had much the rigidity it had when I had been there 40 or 50 years before, quite unlike UC at Berkeley, a major American university. We had changed a lot and we had followed the new developments and in fact led some of them, but Toronto had not done it. Their claim to fame was that they served the American mining industry, and I think that's probably true, but the mining industry is extremely conservative, they don't want to change, as long as they're successful finding ore, and ore is found, as I've said, not so much by professionals. It's developed by professionals but it's found by prospectors, but as long as the Canadian mining industry was getting its graduates, its workforce from the University of Toronto, it's very happy to do whatever it could to support the University of Toronto, and I think it influenced unduly the curriculum there. That's really where the problem lies. They were too beholden to the mining industry.

04-00:10:35

Redman:

So as a chairman of this committee and as a faculty member at the same time, training graduate students, how did that influence the way that you personally wanted to direct the geology department and other departments here at Berkeley?

04-00:11:03

Carmichael:

That has to come a little bit later, because I want to go through my own experience of getting my PhD. That had a big effect on me because I was left alone, to camp alone for six or eight weeks in Iceland. I was in Iceland for two field seasons and in those days, I was missing a kneecap, so I was — you know, my knees weren't as fully operational as they should have been, and the slopes there were large. I could have easily had an accident but there was nobody there to deal with that or help me recover from it. The local farmers knew I was in the area, but they didn't travel those valleys every day like I was traveling them. So I thought, my goodness, if ever I become a faculty member or a professor, I will never allow students to go out by themselves. That is just ridiculous. It's bad for their spirits, it's bad as a safety and it's bad for their professional development. Two heads are better than one in solving any problem, in my view, and you want somebody to talk to. As I said before, I was so lonely that I started arguing with myself and losing the arguments. It

was ridiculous, and that's why I was glad when it was time to go home. I'm not very good at camping by myself week after week after week. It wasn't a good time to go. I wasn't experienced enough as a geologist to understand what I was looking at some of the time, and I needed somebody else just to try out ideas on. Another graduate student would have been great, that would have been wonderful. That's what led me to realize that if I ever was in that position as a faculty professor, I would never allow that to happen. In all the years I've sent students all over the world here, I never allowed them to camp alone.

04-00:13:02

Redman: So the research state of your PhD program, that we'll talk about later, you'd say was much more influential than your brief time at Toronto.

04-00:13:12

Carmichael: Oh yes, yes. Toronto gave me a wife, if that's the right way of putting it. I acquired a wife at the university. She was a nurse, she was studying social welfare, and we got married in June and went back to the United Kingdom to introduce her to my mother and father.

04-00:13:37

Redman: What did your parents think about —

04-00:13:39

Carmichael: Getting married. Well looking back, I was so ill prepared for marriage. I didn't know anything about it, she didn't know anything about it. I think I got married on the basis that it would work, because she came from a similar background to mine. Her father was a professional engineer and he seemed a nice enough guy. She had two sisters which seemed to be very pleasant, and so it was the same sort of professional background as mine. So one thought well you know, this will probably work. Boy that was rubbish, but I mean, it took me about eight years to find that out. I mean, I was so ill prepared for it, as was she. I mean it's not to blame her in any way. Her interests were very different from mine. Her interests were very much in becoming a mother and having children and so on, and mine was sort of relative to hers, much more intellectual, which she didn't share at all.

04-00:14:38

Redman: OK. And so the two of you came back to the United Kingdom in that fall?

04-00:14:47

Carmichael: No, we went there in June, and then my father asked me what was I going to do and I said, I'm going to become a graduate student — they were called research students in those days — at an English university. So I went back to Cambridge and I went to meet with a professor there and he said, well what do you want to work on? I described my ideas and he thought that was ludicrous. I don't think he used the word ludicrous, but he certainly gave me no faith in my idea at all.

04-00:15:19

Redman: Was this the same professor that had been your major advisor before?

04-00:15:22

Carmichael: No. It was the professor, the [heregod?] professor, and he had to admit graduate students. He said no, I don't think it's a good idea and he said, I'll give you this idea. I didn't like that, so I went to another university, the University of London, and I met the [heregod?] professor there and he said oh yeah, that sounds interesting. So I went to University of London. The interesting thing is, in later life, when I go to Berkeley, I made my reputation on the very thing the professor, the [heregod?] professor at Cambridge said wouldn't work. It did work. It worked really well.

04-00:16:04

Redman: So you've never forgotten about that.

04-00:16:06

Carmichael: No. Actually, I became friends with him. We did become friends in later life.

04-00:16:14

Redman: Was it kind of a relationship where he had admitted that —

04-00:16:17

Carmichael: Oh no, we never went back over that. He was far too senior a character for me to taunt him with his rejection of my application. The only person I taunted with a professor at Oxford. As I came to the end of my graduate career at the University of London, I wanted a job as a faculty member, and Oxford had a vacancy. The ad appeared and so I applied, and I didn't get any recognition for my application at all, and then I found out that someone else had been appointed, somebody who had been an undergraduate with me at Cambridge. I wanted to find out why and they said oh, we didn't — the formal answer was we didn't know you. I said look, Oxford is about 16 miles from London by train, it costs about one pound. You could have easily found out what I was like you know. I mean, this was my Berkeley day sort of response now, but in those days, I could be rejected because they didn't know me. I don't know how they expected to know me if in fact they weren't prepared to interview me, but they didn't, I was rejected.

04-00:17:40

Redman: I'd like to talk a little bit, when you come back to the University of London and specifically imperial as a branch of the University of London.

04-00:17:51

Carmichael: The University of London is very much like the University of California. It has big constituent campuses, all of which happen to be in London, because London is a big city. The University of London has a very large — the preeminent science one is the Imperial College of Science, and then there's Kings College, University College, Birkbeck College and a few other colleges, and there are a lot of medical schools too, all in the University of London. What happened was that these colleges grew up over time and then

they got aggregated into the University of London. Each college, if you like, has its own particular strengths and weakness, and it was called the Imperial College of Science and Technology in those days, and it really had no humanities or anything else. It was just science and technology.

04-00:18:49

Redman: OK. And you had to apply to essentially, the head of the department.

04-00:18:55

Carmichael: Right.

04-00:18:57

Redman: Were you intent on working with that individual?

04-00:19:00

Carmichael: No. I was sort of somewhat apprehensive about offering up my idea. I'd just been blown out of the water by the guy at Cambridge, so I thought well, I'll keep quiet when I go to Imperial College. One of the people who made contact with me is the professor of mine geology, because he had heard about my experiences working in Canada, in the mining camp there, and thought that maybe I'd like to go and work with him in Rhodesia, Zimbabwe now, in the copper belt. I said I thought that was interesting, because what I had found out is my wife was pregnant, about three months after we got married, which should be an object lesson to you not to do. Actually when I think about it, that's interesting. The big development of my social life, when I was a young person, was the pill, when you think about it. It came out after I think we were married. So in all my social interactions at Cambridge, the big worry of all male undergraduates was that if they went out with their girlfriends, they got pregnant. It wasn't disease, it wasn't anything else, and when the pill came along of course, it got rid of that fear. It changed it dramatically. I was the benefit of it, I suppose, when my wife found out that she was pregnant with our first child. I think she took the pill probably then, but I don't think she was on the pill before. I have no idea. I don't know where I was going with this. All I know is that the pill was not available in general. We didn't know about it when we were undergraduate at Cambridge, and we were in our mid-twenties then. So it must have come in somewhat later.

04-00:21:07

Redman: Interesting. As you're going through your — as you're thinking about what you're going to do with your life, you're recently married. Were you still thinking about a career in mining and engineering, or —

04-00:21:21

Carmichael: Yes.

04-00:21:22

Redman: — by this time... So you hadn't made the shift yet.

04-00:21:24

Carmichael:

No. So here was the guy that said OK, I'm thinking of going — would you like to come work with me in the copper belt in Zimbabwe or Northern Rhodesia or Rhodesia it was called, and I said OK yes. He said well, we'll go next summer. Now that's when life changed. I proceeded to write up some of the work I'd thought I'd done when I was in Northern Canada, and I started looking into the literature, you know, trying to put what I observed together in a coherent form. In the meantime, I met this young guy who had just come back from Iceland and he said, what do you want to go to Rhodesia for? He said, why don't you come over and work with me in Iceland and do this, that and the other? So I said all right that sounds interesting, I will. So I told the senior professor I wasn't going to go to Zimbabwe. I decided I'd go with this young guy to Iceland.

04-00:22:20

Redman:

So this was a younger faculty member?

04-00:22:21

Carmichael:

Yes. He was a young faculty member.

04-00:22:22

Redman:

OK. And do you remember his name?

04-00:22:24

Carmichael:

Yes. George Walker.

04-00:22:25

Redman:

Now were you — when you came back from Canada and were writing up results and looking at the literature, you had kept detailed field notes?

04-00:22:35

Carmichael:

Yes, I had got some field notes.

04-00:22:39

Redman:

I'd like to ask just a little bit about that first time in the field and your coming back and engaging with the literature a little bit more. How have your field notes — I guess I'm thinking about how your field notes have changed over time. Were there things in that first experience in working in the field and then coming back and writing up results, did you learn anything about —

04-00:23:07

Carmichael:

Well when I was working up in (inaudible), I had to write reports every week. I think it was every week or every month anyhow, on the areas which I examined, which were to provide aggregate for making these airfields and so on. So I did write reports, and I put little maps in with those, sketch maps and so on. I was told by the people in — I don't know where the headquarters of the company was. Let's say it was in Toronto, the headquarters there. They were very useful. They found them very useful indeed for the planning of that subsequent summer work. So I knew a little bit about how to write reports. You write reports in the Army too, so I'd written reports, no question of that.

What I hadn't written was a sort of scientific paper. I never really had done that before you know, where you sort of set out the problem and then say how you solved it and what the problem was before you tackled it and so on. Now I started to do, with regard to that Canadian stuff, and the reason it was interesting in Canada is that the area I was in is called the copper mine country. The salts up there, the lavas up there have cooper, native copper in their [viscol] it's called, and there are a couple of implements from those. So it had been — archeologically it was an interesting area and geologically it was interesting because of this native copper, which is found there everywhere. So there was quite a literature on this. For the time when I was moving away from going to Zimbabwe, I was moving into — I used my time to sort of understand a little bit more about copper and so on. This is very similar to what's found in Minnesota actually, Michigan probably. It's the copper mining country up there right.

04-00:25:08

Redman:

I'm curious about engaging with the literature in archeology, did you find that there was a lot of geological work where people were saying this relates to this archeological phenomenon?

04-00:25:29

Carmichael:

When I was up there, I mean, it was a rather unexplored region, and they'd just had a survey done probably 30 years before, of somebody who just essentially walked along the arctic coast as I'd done and just surveyed in various, you know, various written sort of field notes, which were published by the Geological Survey of Canada. So that's all I had. I could add to those. Looking back, it never amount to a pile of beans. I didn't know enough. I had to go back and visit it several times before I could make a proper, decent publication out of it.

04-00:26:07

Redman:

Can you talk about the ultimate fate of your attempt at writing this?

04-00:26:11

Carmichael:

Yes. It taught me a lot. It taught me how to read the literature, the relevant literature. It taught me how to discard something when it's in effect — One of the most difficult things of all is when you put effort into a piece of work, should you keep it or should you discard it you know, and you could spend an awful lot of time. You may have the same trouble yourself. If I'd written a paragraph, I will spend a lot of time trying to improve the paragraph. What I should do is throw that paragraph out and start again. It doesn't matter how long you spend on it, it's got the wrong construction, it's got the wrong theme, it's got everything wrong about it and it really can't be repaired, which is all you're trying to do. And the same is true in a science paper. You tackle a problem and the problem frankly, isn't worthwhile, and it may take you a lot of time to find out whether it is worthwhile or not. What I found out when I went there isn't worthwhile. I didn't have enough data to solve the problem, and the problem probably had been solved in Michigan and not up here, way

out in the copper mine region. They were the same sort of salts and the same sort of lavas and the same sort of age, and probably the same sort of genesis, but I couldn't deal with that.

04-00:27:30

Redman: OK. Can you talk about this experience of deciding to go to Iceland, and the run up into what you were planning on researching there?

04-00:27:42

Carmichael: Well I didn't know what I was going to research but the guy said to me look, Iceland is the land of glaciers and active volcanoes. And he said, I'm looking at it and trying to understand a little bit about the structure of the country, so come and do it. And I went with him. He was a very quiet guy. He had a car, bought a car, and we put it on the ship at Leith, which is a port of Edinburgh, and he and I went, by ship, to Reykjavik in Iceland, and then we drove around to Eastern Iceland, and we looked upon you know, several things on the way there. I learned a lot. And then he said why don't you look at this range of mountains here, and I said OK. So I sort of — I didn't have a lot of experience in those days and so he said I'll come pick you up eight or nine weeks later. It seemed about that, and I was — I think I was 15 or 11 miles to the nearest town. I think I have a map here somewhere. I thought I'd get it out for you but I don't know where it is. I'll go find it for you for next time.

04-00:29:10

Redman: OK, no problem. So you were 15 miles from the —

04-00:29:14

Carmichael: Nearest town, eleven miles from the nearest town, down a dirt road.

04-00:29:18

Redman: How well developed was Iceland?

04-00:29:20

Carmichael: I had a tent and I had a stove, a heating stove, and some pots and pans. If I wanted water, I just used to go to the snow bank and melt it and so on. What did I live on? I lived on spaghetti and cheese, as I can remember, and every now and again I put a can of meat in there, but that was what my meal was at night when I came back. During the day I didn't eat very much. I was a smoker, so I used to smoke cigarettes. So I bought those, but I had to walk up to this town, which was 11 miles away, and then I had a bath at a local hotel, and then I bought my supplies, put them on my backpack and walked back again. So to walk 22 miles a day is a long way, and I got very fit. Every now and again I used to get a lift down the dirt road, a farmer on one of his trucks or a tractor or something gave me a lift, and that made a world of difference to me. Otherwise, it was a long, lonely walk. But don't forget it never got dark in the summer, Iceland is so far — so the sun just goes down and it just touches the horizon. If you set off at 5:00 in the afternoon or something, you could walk until midnight and it's still fairly light. But it was a lonely existence, and I used to pick up my mail there. My wife was in London and I used to send

my letters from there, and she used to write me letters and I used to pick them up in the post office.

04-00:31:17

Redman: Had your child been born by this time?

04-00:31:20

Carmichael: No.

04-00:31:23

Redman: Talk about what you were doing on a day-to-day basis.

04-00:31:28

Carmichael: Well, the weather was largely fine. Every now and again it used to rain, but it used to rain, when the front used to come in and it used to rain for two or three days, in which case I just stayed in my tent and read a book or something. The rest of the time, I used to get up I suppose when the sun was up. So I'd get up about 6:00 in the morning or 7:00 in the morning. I used to travel up the stream gullies, mapping the rocks that I found in the stream gullies, because the stream gullies would give me the best section, if you like, for this extinct volcano. It took me a time to learn how to make the technique work, of field geology. It is a technique which requires insight and skill and experience, and I didn't have any of those when I started off. So I used to rattle around you know, and waste time and all the rest of it, but slowly but surely, I used to collect specimens and thought this was important and that was important, and make measurements and so on, and I got together a small dataset, plus some specimens, and these were put in his car and taken back to London at the end, when he picked me up. I don't think I achieved a lot in my first year. My second year I really achieved a lot. I knew what I was doing.

04-00:32:54

Redman: And this was another session of?

04-00:32:56

Carmichael: On the same area.

04-00:32:58

Redman: And again was it about eight, nine weeks?

04-00:33:00

Carmichael: Yes. I really achieved a lot. I walked a lot. I expected to walk a lot. I wasn't worrying about heights so much on the slopes, so I walked all over the place. I achieved a lot.

04-00:33:17

Redman: And now, the process of bringing these specimens back to London, did you then do your best to write results up or were you still working on your —

04-00:33:30

Carmichael:

What you have is a map and of course your map... There are different rock bodies and what you're trying to do is to determine the composition of them and the age of them, relative one to the other and so on, to sort of see how this volcano had evolved in time. So one took one's specimens back to London and the first thing one did was cut — we were cutting out a thin section. I should show you one actually. You can cut rocks up with a diamond saw, and you can make a thin section of it, which you can see down a microscope and you can look at all the minerals which make up that rock. That's very diagnostic. It's the most powerful weapon for analyzing rocks there is. From those assemblage of minerals which make up the rock, you can tell about the origin of the rock and so much about it. So that's what I did.

04-00:34:32

Redman:

OK. And at some point you came back and your child would have been born. Is that correct?

04-00:34:40

Carmichael:

Right.

04-00:34:41

Redman:

Before you left again.

04-00:34:41

Carmichael:

Yes.

04-00:34:42

Redman:

OK. Can you talk about that experience a little bit?

04-00:34:44

Carmichael:

Well she was born on September 25th.

04-00:34:50

Redman:

And your daughter's name was?

04-00:34:52

Carmichael:

Debbie.

04-00:34:52

Redman:

Debbie, OK.

04-00:34:57

Carmichael:

And she was born September 25th. I think, in looking back, when I found out she was a girl, I was a little disappointed, to be honest. I'd never thought about it until just now. I think somehow or other I wanted a son initially, but after about three or four weeks, when I realized what an adorable character she was, all that went away. Now I'm — I never thought about it until just now, but I think I remember that initial feeling of oh, a girl you know? But she was brought home and she started to grow, and she lived in a carry bag or something with us, in our apartment, and things went — you know, she was a

lively soul and things went very well. Two years later her brother was born, two years to the day.

04-00:36:01

Redman: Oh wow, OK. Can you talk a little bit about your living arrangements in London. Were you doing all right as far as —

04-00:36:15

Carmichael: Well I had some money, I think, to go to Iceland. The University of London provided that. And then I had money — I think I got a grant or something probably, to stay there, and I think my wife worked. She couldn't have worked, I suppose, when the child was young, but I think she was a schoolteacher and she wanted to become a schoolteacher, so she worked part-time. We managed to make ends meet. It could have been my parents helped a bit. I don't know that they helped a lot. We lived in a cheap apartment with an outside toilet.

04-00:36:58

Redman: That must have been an adventure.

04-00:37:00

Carmichael: It was when it rained. It was awful, it was awful, but when the kids got older, that's the only privacy you got in the place, you know. So you made it to the outside toilet when the kids were young. When you wanted some privacy to go and read or something, you headed to the outside toilet. You got used to it. Looking back, it was not something that anyone ever imagined. Sometimes you see movies in England, and you see these royal houses and between the royal houses you see these little sheds or something between them, and you know those are the outside toilets, you know, they were all on one sewer or something. That's how they did it in those Victorian days or when they put this housing up. So I got used to that.

04-00:37:57

Redman: And you weren't living very far from your —

04-00:38:01

Carmichael: I used to take a bus every day. It must have been a 40 minute trip or something like that.

04-00:38:10

Redman: And so were you teaching at all?

04-00:38:15

Carmichael: No. I didn't teach the first year or two, I think, one didn't have to. Now I'd become a TA, a teaching assistant, or a GSI. I don't know what they called them then there, but not for the first two years.

04-00:38:35

Redman:

OK. And did that experience, and obviously here at Berkeley, you know, it varies from program to program. Some have people teaching right off the bat and some programs seem to avoid having students teach.

04-00:38:53

Carmichael:

I think in my department here, I think they took students to the elementary — ah, TAs, first year graduate students in for the elementary courses, the beginning courses, but they wouldn't take them in for the upper division courses until they've taken them themselves or sort of done something like that. You would use TAs in the elementary courses, your first year students, and I think that's right you know, by and large why not. You've got to support them.

04-00:39:28

Redman:

So your coursework here was a little more flexible?

04-00:39:32

Carmichael:

OK, you're in London. In London, yes. I took some courses in London and that really pleased me. I took courses in analytical chemistry and loved it, and that became a very essential part of my training actually, analytical chemistry. What else did I do? That was it, now that I look back. The training in England is very much — oh well, you could figure it out. There's not a lot of — there's very little interaction or by and large, not very much interaction between your research advisor and you. They sort of leave you alone to come up with a story, get the data, come up with a story and do the best you can, and it really is throwing you in the deep end. So I had to teach myself analytical chemistry, though I did take a course in it, in order to understand the composition of rocks, because that was the most important characteristic of a volcanic terrain. That took a lot of time and trouble, but eventually I did it. The lab was set up and I could use that, but I would say that took a year at least, to master that technique, and then I realized the technique really hadn't been mastered properly and before I graduated, I had to go and change a lot or re-determine so much of the stuff. At least making a start. So after the first year of going to Iceland, I could come back and I could make a start on doing the various things in the lab which I had to do to make a thesis complete.

04-00:41:17

Redman:

And also you, as you're building up a collection of samples —

04-00:41:21

Carmichael:

Right.

04-00:41:22

Redman:

— that would be something that, even if the topics changed a little bit, you could —

04-00:41:26

Carmichael:

So I was busy, I was really busy. I used to get to work about 9:00, I suppose, and leave about 6:00, and it was an hour journey either way let's say. So you

know, we didn't have dinner until 7:30 or 8:00, and I used to get up at 7:00 and get the bus by 8:30 or 8:15 or something like that. My days were full and then I'd go on Saturdays. Sometimes I used to go in on Saturdays, yes.

04-00:41:59

Redman: And so did you feel like you were spending an adequate amount of time with your family or an inadequate amount of time with your family?

04-00:42:06

Carmichael: You'd have to go and talk to her about that, but I don't want you to. I used to go out and feed the children at night, so I contributed a bit. But there's no doubt, the majority of the domestic load fell on her, no question of it. She enabled me to become a competent graduate student. She helped a lot in that. She was so dedicated in looking after the children, that enabled me to do it. It was great.

04-00:42:50

Redman: And this put some stress on your relationship then?

04-00:42:56

Carmichael: We were so tired. I think that put stress on the relationship. I think we were very tired. It's hard to share. You know, when you're really immersed in trying to solve a scientific problem and the person you're living with is not a scientist, it's very difficult to share that, and things don't go right all the time. I mean, what I was doing, in order to analyze the composition of a rock, it used to take me two weeks to do six. I used to do them in batches of six. So about Friday or Saturday of the second week, you make your last determination and they should add up to 100. Sometimes they didn't. Sometimes they added up to 105 and sometimes 95, and you'd wonder what the hell you had done wrong. Was it a mistake in some technique? Was it a mistake in the calculations? Whatever it was, your whole weekend was spent in misery, trying to understand what had gone wrong. I've never forgotten that, it really was miserable and I don't think — you know, she never understood that. She had made a lot of friends, local friends, so there were friends with children of the same age and that made life a lot easier for her.

04-00:44:21

Redman: OK, so her ability to connect with the community —

04-00:44:25

Carmichael: Yes. I think when you've got young children, mothers meet other mothers with young children, and that's a medium of exchange or communication.

04-00:44:34

Redman: Right.

04-00:44:34

Carmichael: And the fathers just go along as ancillary units.

04-00:44:38

Redman: And so did you find it — I mean obviously it's difficult in a lot of professions to avoid bringing work home with you.

04-00:44:49

Carmichael: Oh no, you had to bring work home.

04-00:44:50

Redman: OK, so that was a necessity.

04-00:44:55

Carmichael: Yes.

04-00:44:55

Redman: Either mentally or —

04-00:44:56

Carmichael: I used to bring reprints home, you know, reprints of papers which had been published you know, and read those. Oh yes, I had to do that.

04-00:45:06

Redman: Did this bother her?

04-00:45:08

Carmichael: I don't know whether it bothered her or not looking back. I don't think it did. I was there and that counted. It's much better to have someone there than you know, then not there as it were. You don't have to interact the whole time to be there, as it were, right?

04-00:45:27

Redman: Right, exactly.

04-00:45:34

Carmichael: I think we used to get a babysitter and go to the movies and things like that every now and again, or go out to dinner with our friends. She had met some friends, and that was — yes, we went out to dinner with them or went to the movies with them or something like that.

04-00:45:50

Redman: What was your relationship like with other graduate students?

04-00:45:53

Carmichael: Oh I enjoyed them, oh yes.

04-00:45:56

Redman: Were you about the same age as most of them?

04-00:45:58

Carmichael: Yes, because we'd all had military service. We had all come from you know, other universities, and so we're all about the same age, plus or minus two years, so we were in mid-twenties, late twenties. Oh yes, I became great friends with some of them. Two of them who I became particularly good

friends with, one immigrated to Australia and I lost contact with him, and the other went to work in Ireland and I lost contact with him. But the third one stayed on as a faculty member as I did and we used to write occasionally. He's retired now in France. We still write and have some sort of interaction. So yes, our social interactions were great. The graduate students were a really good group of people. I loved them. They were all men, now that I think about it.

04-00:46:54

Redman: Interesting.

04-00:46:55

Carmichael: There wasn't a single woman there.

04-00:47:00

Redman: Was this a noticeable fact at the time? Well obviously not, since you didn't really notice it.

04-00:47:04

Carmichael: No, I didn't really notice it. I noticed it now.

04-00:47:13

Redman: I mean the undergraduate, the —

04-00:47:14

Carmichael: The undergraduates had — because there were no women geologists when I was an undergraduate at Cambridge.

04-00:47:21

Redman: But the population, you indicated, was starting to change a little bit.

04-00:47:25

Carmichael: A little bit, but most of those women were going to biology.

04-00:47:29

Redman: Do you have any thoughts or feeling as to why that was?

04-00:47:34

Carmichael: I suspect it's the same reason that Berkeley had its craziness with women, that you didn't know what to do with them in field camp and yet, Berkeley ran its first field camp I think in 1898 or something — there's a wonderful photograph of them — and half the students were women, in long dresses. Then they might have had a field camp the next three, four five years, about 1900 I suppose, but then they didn't start taking them until I came here in the mid '60s.

04-00:48:03

Redman: Interesting.

04-00:48:04

Carmichael: So for some reason or other women were not taken into field camp, not allowed to go to field camp until the mid '60s and now, you know. I don't know why that was.

04-00:48:16

Redman: That's fascinating.

04-00:48:20

Carmichael: So it wasn't — when looking back, there were no graduate students at Berkeley in the life science were women, that was true. The ones which were not in my department anyhow. The ones which were — the ones in the college were largely in biology. Biology, I think, has always attracted women, that's where the advance scholar women have been, in biology. I think it's a more interesting subject probably.

04-00:48:55

Redman: That's interesting to hear you say that. Why do you?

04-00:48:58

Carmichael: Because I think you can do more interesting experiments in biology. I don't know whether you did physics at school, but you can never do it well enough to make a significant measurement. You really can't, you know? And so although you make these measurements and you know, you get roughly what the answer is, but it's never precisely that. But you know, you can go and watch, you could take bulbs, and you put them in the soil and you can put them upside down and watch the things grow and then come up again. And you can wonder about what makes the leaves come up again. What is it that does that? You can do all sorts of experiments like that in the school and you can watch them almost daily, you know happening. So life science experiments, I think, in schools are really exciting. They catch on to kids. They certainly caught on to me and I wonder why I left it and went into geology, but I think it's the travel that got me.

04-00:49:55

Redman: So let's —

04-00:49:56

Carmichael: How much longer have we got?

04-00:49:57

Redman: Well, on this tape, just a few minutes. Let me ask quick about the early experiences in academic writing, and we talked about that a little bit. Did you think about publishing any of these early results, or were they just so clearly —

04-00:50:18

Carmichael: No, not the early results, but I thought about publishing pretty quickly after I got back from Iceland. I realized then that I used to go and listen to senior graduate students give their theses at the local Geological Society meetings,

and so I realized that certainly, I have to do that too. I was very nervous about doing it, but we used to go to the Geological Society London meetings, and I gave it. I presented well, by the time I graduated. Well you see, I stayed on as a faculty member, so I'm not sure. During the time I was actually a graduate student, I don't think I ever gave a paper. It was after — once I became a fellow I gave papers and yes, it was a rather daunting experience but I don't think I ever got — the whole thing got completed in polished enough form to actually give a paper when I was actually getting my PhD. PhDs are rather shortening, they take three years.

04-00:51:32

Redman: So clearly that's a different experience, and this is something we'll get into again a little bit later. It seems as though most graduate students now are expected to give conference papers.

04-00:51:44

Carmichael: Absolutely, they should do, I mean for lots of reasons.

04-00:51:49

Redman: OK. And so is that something that — so you feel strongly about that change but do you wish that somebody had told you at this time, that you should do that?

04-00:52:03

Carmichael: No. There was never any pressure on me put to do it. It sort of came naturally, that I got these results, I got this yes. I'm going to write it up and send it. So I'd write them up and it was passed to somebody else to read, and then he handed it back and it was sent to a journal. If the paper had to be read in public I'd do it. I was nervous, very nervous, because I was a junior, but I prepared you know, I'd like to do it.

04-00:52:37

Redman: So did you enjoy this process?

04-00:52:40

Carmichael: Yes.

04-00:52:41

Redman: OK. I mean, that seems like something that would be crucial.

04-00:52:44

Carmichael: Yes. I like the cut and thrust of oh, I don't agree with you, you know. Oh you don't, huh? Yes, I enjoy that now. I think I enjoyed it most of the time but you know, one's always rather nervous.

04-00:53:05

Redman: Right, OK.

04-00:53:07

Carmichael: And one doesn't know what the big shot who is sitting in the corner is going to say. When you're a young person starting off, you know that some of those sitting around are always in the front row. When you know that, he holds up his hand and you think, oh shit, what's he going to say?

04-00:53:23

Redman: How's he going to tear into this.

04-00:53:24

Carmichael: Yeah, how's he going to tear into this, and that always makes you nervous. But otherwise no, I've — not only that. I've always encouraged my own students to do it. In fact, their PhD theses have usually been really aggregate, so you know, of papers put together.

04-00:53:43

Redman: And it seems as though yeah, people are encouraged to do this process of putting a conference paper together and then turning that into a journal article.

04-00:53:54

Carmichael: Right.

04-00:53:55

Redman: And it seems as though we're almost moving towards the thought that if you don't have one or two journal articles when you hit the market, you're disadvantaged.

04-00:54:04

Carmichael: Right.

04-00:54:06

Redman: But that I mean clearly would be a little bit different.

04-00:54:09

Carmichael: No that's the same. It's always been the same. We don't go through the conference paper stage, we go straight to the journal articles. So we do that and by and large, I suppose most of my students have three or four by the time they've got their doctorates. The reason for that is that they've got to go and talk about them at conferences, number one. They've got to be seen to be — almost all my students initially wanted jobs in the universities, and in order to get that, you've got to be seen to be on the cutting edge of something and doing good work.

04-00:54:49

Redman: As opposed to like small liberal arts colleges.

04-00:54:52

Carmichael: Yeah. No, they went to get major research universities. None of them have ended up in small liberal arts colleges, I don't think. In order to give them the background to get there, my job frankly, looking ahead, was to get them to the interview. I could get them there as a consequence of training, of telling them

how to do it and what to do and all the rest of it. But once they got to the interview, then that was up to them, and whether or not they accepted the job is up to them as well. I didn't feel they had to accept the job, but I encouraged them to apply for several jobs so they got some experience of it. You need experience of being interviewed and interviewing and so on.

04-00:55:45

Redman: Right.

04-00:55:46

Carmichael: It's hard work actually, meeting ten faculty in the morning and ten more in the afternoon, giving your paper and then meeting some graduate students who want to chop it to pieces. That's hard work.

04-00:56:00

Redman: Yeah, and that's something we'll definitely get into.

04-00:56:04

Carmichael: Right.

**Interview 3: April 30, 2007**

## Audio File 5

05-00:00:10

Redman: My name is Sam Redman, and I'm sitting down today with Dr. Ian Carmichael. Today is I believe our third session together, and we've had several hours. Today is April 30th, and we're sitting in Berkeley, California. The last time — in between the last times that we have sat down together, you met with some old friends and some old colleagues, and you were reminded of a couple of stories that you wanted to add last time. So would you start by telling me a little bit about that.

05-00:00:53

Carmichael: Well last Friday, Nancy Caputo, who I think was the driving force for getting this oral history going, invited several people to go around and have wine and teas and so on, at her house, which is in Berkeley. No, it's in Albany actually, now that I think about it. So when I arrived, Linda Fabri was there and Trish Coscati or Trish Hoette, her name is. Susie Harano. There were five or six anyhow. I can go back and — have I got everybody?

05-00:01:37

Redman: Let's see Nancy, Linda, Susan, Trish and Susie.

05-00:01:44

Carmichael: Right, OK, and they're asking me how this oral history was going and how I was interacting with Sam, because they had — they've got an interest in what progress we were making. During the time I was telling them about what we were doing, they said, have you told him about this or have you told him about that? And I said no, I have not, I've forgotten all about it. And these were little events or vignettes in my life, which I'd told these ladies in the 15 or 17 or 20 years that I've been working with them. So there are a couple of ones which I will repeat here and that is, one of the initiation rites when I went into my English boarding school was the English had, in those days, very large laundry baskets, which were made of sort of dried leather and wicker and things like that, into which they could stuff a small boy, into which I was stuffed. Then the deal was you should throw these wicker baskets or roll them down the stairs and let them get all the way to the bottom. Well in reflection, it was a very bumpy, miserable 30 second experience, but as you'd seen someone else survive it, it made it less harsh in prospect. Anyhow, I did that and they were so fascinated that a kid could at the age of what, 11, be put into a laundry basket and then thrown down the stairs as an initiation right in an English public school, so it always intrigued them. So there's the document or there's the evidence for it. What else came up?

05-00:03:30

Redman:

I don't suppose that I'd have to ask you about you know, since your role later on becomes Dean of Research, so I don't suppose I have to ask you about hazing at fraternities at Berkeley.

05-00:03:47

Carmichael:

Well when I joined the fraternity in the Colorado School of Mines, I suppose there was — on looking back, there was a certain amount of hazing, sort of initiation rites I think they are. I remember having to sit in a shower and sit on a pile of ice and sing, that's one thing. The other thing is I was blindfolded, driven out in the country at nighttime, and then you had to find your own way home. Well that wasn't very hard for a geologist, because I knew where north was and I knew. So that was rather easy but I mean it was lonely. I never found the initiation rites that I can remember in this fraternity particularly Bastille or blood thirsty or anything like that, but they were — there was definitely a role for them in the sense of you're just a newcomer here and we're going to make you sort of tow the line, and I suppose we all did, the eight or nine pledges or whatever it was. It wasn't very different subsequently to what the Army did with you. The Army tries to break your spirit because then they reckon until they can break your spirit and recast it, then you will never be of any use them, and I think that's the fundamental basis of all armies all across the world, is break the incomers' spirit, retransform them into a coherent spirit, which is directed towards the army's aims and achievements, and go on from there. So they made us, as I remember, it was just as much a hazing, I suppose. They loaded us up with backpacks with a whole bunch of rocks and then made us go and run up and down a pebble beach carrying weapons. Well, you do that for more than 25 minutes and your first thought that comes is I'm never going to survive this and the second thought is, why do you even have to try, let's just drop out. But somehow or other discipline holds you there and finally the lance corporal or lieutenant or whoever was looking after us had some pity on us and we were all allowed to rest. But those sorts of hardships well, they're a good preparation for life. Not those particular ones but the role they serve, and that is every now and again you're going to have to do something in life which you don't like and you're rather unprepared to do. I think what you end up thinking about is if you can ask other people to do things which are unpleasant, you'd better be prepared to do them yourself and you'd better have some appreciation of what's involved with doing it. I think that's exactly what leadership's about, or a component of leadership anyhow.

And what was the last? Oh the last question is having — this came from the ladies during the Friday cocktail party was having been married three times, what am I going to say about my social life. My attitude to that is I don't think an oral history at Berkeley wants to delve into what a young faculty member who is on the loose socially, considered to be on the loose now that I think about it, you know, what did he or she learn from that. So unless my interrogator, Sam, is going to ask me specific questions, I was going to leave

alone my social life. It was rather tame, looking back. I was a smoker for a time and gave it up, and then somebody offered me some marijuana and I didn't want to jeopardize my non-smoking campaign, so I've never smoked anything and I've been terrified by drugs, maybe because I had not taken them but you know, many of them so much in my life. My father was a doctor and he disapproved of sort of drug addiction because when you really needed them, and you'd already become — whatever the affliction was you were suffering from had become resistant to drugs. So he was very much against over-drugging people, particularly the use of antibiotics like penicillin and so on.

05-00:08:06

Redman: OK.

05-00:08:07

Carmichael: So it was a dull life I've had.

05-00:08:09

Redman: Oh I doubt that very much. At the end of our last interview, we lost track just a bit, but I'd like to go back to the second year of graduate school. We touched on a lot of really interesting things but I lost focus a little bit maybe, and I'd like to talk about what you did your second year of graduate school and go from there.

05-00:08:39

Carmichael: Looking back, my years in graduate school were probably the most enjoyable period of my life. I had some people around me, faculty, who never asked me to do anything specific, were always there if I wanted a question answered, and I was left very much alone and I loved it. I could set my own working day, what I was working on in the general field, and I learned then that I functioned best when I didn't have somebody sitting on my shoulder all the time telling me what to do. I thought that I suppose that if ever I became a staff member or faculty member, I would do the same for my students. So the first sort of inklings of how you would treat graduate students arose from how you wanted to be treated yourself, which is a very obvious way of responding when you think about it. If you don't know what to do, you always respond in a way in which you would like to be treated under those circumstances, and that's essentially what governed it. So my opportunity to research was unfettered. In any direction, I could pick up what I wanted to get into and do what I wanted, as long as I could solve the general problem which was given to me in Iceland, which was, How did this volcano evolve? What were the products of its evolution? And how do those products illustrate what was happening at depth, which is where those lavas were born. Lava, before it's a lava is called a magma, and the magma is just hot, molten material composed of dissolved gasses. It's invariably made of oxide components of which silicon is the majority component, and it's also got some crystals in it. When it hits the surface of the earth, the dissolved gas comes out and it forms these little

vesicles you can see and scoria, and of course also essentially gives us our atmospheres, and it has done over time, geologic time.

So here was I with a whole bunch of volcanic rocks, from which I was going to deduce, I thought, what this material was like when it was hot. So one of the big problems was how do you estimate the temperature, and that would turn out to be a huge problem in those days. A trivial one today but huge in those days. Secondly, what was the composition of this material, also a trivial problem these days but in those days a very time consuming and skill demanding procedure, and that took me into the field of analytical chemistry. So my second year essentially as a graduate student at Imperial College was teaching myself the art of analytical chemistry and how you take a silicate rock, which is a pretty resistant material, and actually analyze it for its major components, and they are major oxides as they're found because almost all of the rocks of the earth are some combination of oxide with silica and iron and magnesium and calcium and sodium and potassium and so forth. So one has to find the concentrations of these, in these rocks, and do it with a fair degree of precision and one hopes accuracy. Therefore, as a consequence, you get some idea of what process has given rise to this diversity of composition in the volcano or in the source region, which may lie 100 kilometers underneath that volcano. So there was the problem as a whole. How this volcano evolved in terms of the composition of its products, what does the composition of the product tell you about the source region, and what influences, if you like, could also contribute to the diversity of composition which you saw and so on, on the surface of the earth.

Well, one of the reasons for going to Iceland is in those days, was a very substantial geologic one. Most of the crust of the earth is made up of salicylic material which we call, crudely speaking, granite. It's not really granite but it's crudely speaking called that. Iceland is devoid of that. Iceland does not have any granite. So whatever contributed to the composition of its lavas in no way could granite actually interfere with, contribute to or be the result of the diversification which occurs in Iceland. Geologists call it the absence of a salicylic crust or the absence of a continental crust in Iceland. So whatever you saw on the surface of the earth had to be generated by processes which were independent, if you like, of that continental crust. And that's a very, very important constraint, which has applications or effects of going to isotopes, all the common isotopes which are found in geology, and in the bulk compositions of the rocks themselves, so that what you found on the continent and what you found, if you like, in the ocean basin such as Iceland, are usually quite different. Some people can answer the absence of that common material, which has contributed in some way to the evolution of those liquid's origin as lava flows.

So here I was, a second-year student of Imperial College, very anxious to measure the composition or determine the composition of all this diversity of lava specimens which I'd got when I was out doing field work in Iceland. So

first of all you have to crush the rocks, and crushing the rocks themselves is not an easy thing to do because one of the major components of all silicate rocks is iron. So you can't just go and crush them with iron utensils or crush or anything like that. You have to find something else and so what I used, and it hadn't been used in Imperial College up to those days was tungsten carbide, but that was very expensive, but you could buy it, and so I had a special crushing apparatus made, which is made of tungsten carbide and therefore, the only contaminants which arose from the crushing apparatus would be tungsten, which is part of the binder of tungsten carbide, and the carbide component of tungsten carbide. So you could eliminate that. So no tungsten was reliable from anything that came from me, but at least it was free of iron, and that was a major contaminant if you used the normal steel crushing devices.

05-00:15:56

Redman: How large was the device that you used?

05-00:15:58

Carmichael: Oh, it was about ten pounds.

05-00:16:00

Redman: OK. So it wasn't a large piece of equipment.

05-00:16:02

Carmichael: No. You were tired at the end of the day of having used it and crushed up rocks all day. Then you powdered them up, you put them through a nylon sieve, you sift them to a particular grain size, so they were finer than that, and put them in little bottles and label the bottles, little glass bottles, some of which I still have now that I think about it. And then you therefore had to start analyzing that. Now there were no instrumental techniques in those days. You had to do it by wet chemistry, which means that you had to take that rock and somehow or other dissolve it, and make a liquid out of it of some sort or other, and then put that into a fixed volume flask, and then you could take aliquots out and determine, in each aliquot, what the particular concentration of iron was and the particular concentration of this, that and the other, and therefore work back and find out what the whole contribution of these various oxides was to the makeup of the rock as a whole, dissolved and kept in this big liquid bottle, bottle of liquid rock. So you had to dissolve them and one of the ways of dissolving a rock is to do it in the presence of hydrofluoric acid. Hydrofluoric acid is not a strong acid but it's a very nasty one, in the sense that the skin absorbs fluoride and you get a very nasty burn, but it takes about 24 hours to make itself known and you usually get it where the fluid, acid sort of aggregates, and that's usually under a fingernail. So you lose fingernails in this if you're not careful, and in those days nobody seemed to have rubber gloves or anything like that, and so we were a big sloppy compared to the modern day chemical practice in the labs, under OSHA agreements here. So we often acquired HF burns, like sort of once every two or three months or something. They're very painful and they take time to heal. But anyhow, you

can't get your rock into solution and then comes a whole bunch of techniques to determine the various components. Now that is a long and time-consuming business. Looking back, I suppose you could analyze six rocks every two weeks, and maybe you had 200 rocks to analyze. So you're looking at a very daunting amount of time, and you've got to make sure also that the technique doesn't change, your precision is not changing, so that all the time that you're analyzing your unknown rocks, you want to keep reanalyzing something which you use as a marker, as it were, to make sure that you sort of continue to get the same answer, using the same technique. So you've got to check up on yourself to make sure that you are precise, consistent and so on. So you only may do six rocks every two weeks, one of those was a repeat, so it was only five. So five every two weeks and maybe you had 200. So there you are, that's 80 weeks.

05-00:19:25

Redman:

So really, a summer field season could keep you going —

05-00:19:30

Carmichael:

For a long, long time. Nowadays, just to show the difference, I could hand those same 200 rocks or something to a technician here. He or she would crush them for me, such as the benefits of a professorial rank, then they would put it on an instrument and with two exceptions, they could turn out the results you want without ever having to go through the pains and tribulations of wet chemistry. You could get the results in, oh, I would say four days, because the machine could run over night.

05-00:20:10

Redman:

Of the same 200 rocks?

05-00:20:12

Carmichael:

Yes.

05-00:20:13

Redman:

That's incredible.

05-00:20:14

Carmichael:

That's incredible. So nowadays, wet chemistry no longer exists as an art or a practice in department of geology in this country, with one exception. If you really wanted to study the oxidation states of iron, which is very important, you have to use wet chemistry to do that at the moment. But it's a lost art.

05-00:20:40

Redman:

Does that mean that now, whereas back then you would come home with a couple of hundred rocks and be set for a long time. Is there pressure now for people to take larger samples?

05-00:20:53

Carmichael:

Right. You mean a larger number of samples.

05-00:20:55

Redman: Right, yes.

05-00:20:55

Carmichael: Yes there is, because there's no restriction on your time to get the numbers that you want. So you might analyze three or four hundred rocks nowadays if you did the same sort of thesis that I did. Whereas I analyzed maybe probably about 100, but that was a year's work. Then you find out, halfway through, that there's a still water that you thought was free of calcium and magnesium, and you were using to dilute your rocks was not indeed free of calcium and magnesium, and it had gotten completely contaminated, and so you had to go back and repeat the whole thing for the first however many rocks you've done up to that stage. So there's a continual — it was a large, huge effort looking back. Was it worth it? It taught you care, to be careful. It taught you to be careful and where you could be — I want to say sloppy, but where you didn't have to be so tense in making sure you were doing it that you made a mistake. So if things become too intense you become sort of tort and you can make mistakes more easily. So it was a very good practice in — what is it. Well firstly, understanding the background to what the numbers mean. Secondly, although we have instrumental techniques nowadays, they invariably need standards, and guess where those standards come from. They come from old fashioned, wet analytical chemists such as myself, because they're the only way in which you can actually get an absolute standard, where you know without question, how much A, B, C and D is in every rock. And so although we have these instrumental techniques nowadays, they depend to be effective on standards, and the standards always come from people such as myself. It's a dinosaur technique. It's no longer used, it no longer can be used. I suppose I'm the last in North America to use it in any large degree, or I was when I was — until I retired. But it did stand in extremely good stead, I'd say 25 years later, when I wanted to do a little experimental work. And then my students actually had an enormous benefit of my having being a reasonably experienced and meticulous wet analytical chemist able to analyze silicate materials. So that's my second year.

05-00:23:31

Redman: Can I ask how you were teaching yourself chemistry? What was that like?

05-00:23:38

Carmichael: Arduous and fraught with mistakes. You were always making mistakes, and so you hopped over to the chemistry department to find out if you could get some help, and you did, and they were very good about it that way. Slowly but surely you accumulated the experience and the techniques necessary to make the thing work. Those were the days in which the United States Geological Survey were sending out or preparing for analysis, so called standard rocks, which they were sending around the world. Are you coming to the end?

05-00:24:13

Redman: No, no. I'm just fine.

05-00:24:15

Carmichael:

And so I learned on these standard rocks. Looking back, it was a very interesting period of our life. I've never regretted it, but it was time-consuming. Could I have done more without it? No, I don't think so.

05-00:24:35

Redman:

You talked about how volcanoes can really speak to not only how the volcano itself evolved, but what was happening at depth and then the development of the atmosphere.

05-00:24:50

Carmichael:

Right.

05-00:24:51

Redman:

It seems to me that for instance, we haven't really talked about your necessarily being fascinated with something like the development of the atmosphere. Do people that get interested in studying volcanoes, like yourself, do they become interested in all aspects of studying volcanoes or was there one thing specifically within that?

05-00:25:14

Carmichael:

Well when I started off, it was very much most people did the sort of thing that I did probably. It was not so evident that it was affecting the atmosphere well until, I would say into the 1980s and '90s. So it took a time for that to take hold. Now it's universally accepted and now people study the output of volcanoes, looking at the gas clouds and so on, to see how it does affect the atmosphere and how it contributes to the atmosphere. For example, it was known that volcanic explosions do affect the atmosphere, because when Krakatoa went off, which is what I've forgotten now when it is but in 18 something or other, late 19th Century, the sunsets around the world were affected for a considerable number of weeks or period. So that was clearly caused by the ash up in the upper atmosphere. So it was known, obviously since people had been thinking about it, that some products of a volcano would get into the upper atmosphere. So it was not only in the particular matter when they thought about it but it also — some of that matter would dissolve and get into the atmosphere itself.

05-00:26:42

Redman:

You mentioned to me earlier that at one point you thought maybe you were going to work with David Williams, Professor of Economic Geology at Imperial, but then you eventually decided to work with George Walker. I'd like to ask you a little bit about choosing those people based on personality and how well you worked with those individuals, and not necessarily being one or another's area of study.

05-00:27:20

Carmichael:

David Williams was the head of the department at Imperial College of Science, and he's a marine geologist, he's a Welshman, and with all the charm of the Welsh. He loved to sing, as I remember. I never really understood what

he did as a geologist. He always seemed to be able to introduce you to people who did the work. So I think he was more a consultant of the mining companies in Rhodesia, in the copper belt, when he was a participant in actually exploring in the copper belt. So that's the impression I got and maybe I'm doing him a huge injustice. Now George Walker, on the other hand, had just started at Imperial College, as a staff member, and he'd been to Iceland the year before I went with him, and he said it was a wonderful, untapped resource, and those are the sort of problems he was interested in. That struck me as very exciting scientifically and although I didn't see — I couldn't see, if you like, the economic benefit of going to Iceland that I could from learning how to look for copper in the copper belt, nevertheless it held my attention and I really decided to do that.

Now my choice was reinforced at the end of my first field season because by the time you come back and analyze just 50 rocks, there's such an investment of time and patience and skill, that you don't want to change the subject of your thesis. Once you've done that you were committed. As time went on, I become more and more interested in the scientific problems which I uncovered, if you like, as a consequence of looking at this volcano become more and more exciting to me. Once I was committed I was committed, and I stayed committed to that same sort of scientific environment for the 40 years I've been at Berkeley. So I really haven't moved outside the broad limits which I discovered and imposed on myself or found for myself when I was a graduate student in Iceland.

05-00:29:40

Redman:

Now up until this point, as we've talked about before, it seems as though you were really interested in mining geology. You know, you were interested in that notion of travel and adventure, but then also there was the monetary rewards that was kind of interesting to you, that you'd read about in the newspaper, in these obituaries, that people had made some money doing mining geology. It seems like you're kind of divesting yourself at that stage.

05-00:30:10

Carmichael:

You're absolutely right Sam, but it wasn't quite as clear cut a decision as you've just said. I just let the future employment take care of itself, and that caused problems, actually. As I was married and we started a family, it was clearly a problem to think about, I won't say in the immediate future but close to the immediate future, about how I was going to get gainful employment as they say. Certainly, looking at the sorts of things that I did, scientifically you're very unlikely to get a job in anything else other than the university or something like that. I thought I could go to school and teach geology or chemistry or something like that, and that would have been fine, but that never occurred to me. I was so wrapped up in what I wanted to do. I wanted a job at the university after about the first two years of my being a graduate student. That was the ambition. Plus the fact, which is interesting, the major textbook which I had been using then was written by two Berkeley professors. It was

the most exciting textbook, the most comprehensive textbook I could find. It was used essentially by every geologist in my field in those days.

05-00:31:34

Redman: OK. Now were you teaching now at that point?

05-00:31:36

Carmichael: No. I was still a student.

05-00:31:39

Redman: That's right. As a research student in the UK, you're typically not expected to teach, is that right?

05-00:31:45

Carmichael: That's right.

05-00:31:46

Redman: And that's, I mean obviously —

05-00:31:47

Carmichael: That's — you're just not — that's it, I mean, and you don't expect to take courses. So the courses I took were much more accidental in the sense that when I went across to the chemistry department to ask for help, they gave me help by sort of saying why don't you sit in on a lecture on that subject, and the next two or three lectures, I used to go sit on those. So that's how I was rescued, if you like, from my wanderings around in my sort of blindfold way, in trying to develop techniques for the analysis of silicate rocks.

05-00:32:22

Redman: OK. And now was Dr. Walker, George Walker, was he around in London during the year?

05-00:32:30

Carmichael: Yeah, he was around. He was a teacher and he taught courses. But you know, he knew nothing about chemistry, analytical chemistry whatsoever, so he couldn't help me in any way there. He left me alone. He wasn't really interested in what I was — he knew it was important but he wasn't very interested in the acquisition of data. He was very interested in what I could conclude from the data when finally I got all my results put together and sort of analyzed and put together in a (inaudible) way.

05-00:33:09

Redman: That's going to lead me to a question far later on.

05-00:33:16

Carmichael: So then I went back to Iceland again, for my second field season, having spent the whole of that preceding time learning how to teach myself analytical chemistry. I went back to Iceland and then the fieldwork started to click. I really started to understand a little bit about what was happening in this volcano, and that excited me. I was thrilled to do that, although I didn't like

living alone up there anymore this time than I did the first time, but on the other hand, once you can predict what's happening in the volcano or you think you can, then you're not wandering around sort of with your mind in neutral and wondering what the hell the next outcrop is going to show. You've got a basis for prediction and then you've got to be able to follow that prediction, and then discard it if in fact it doesn't fit the data. It's a very difficult thing to do but you get used to doing it. Here you are, you expect when you reach this outcrop, you expect it to be at such and such a rock horizon, and you found out that it isn't. So your prediction about what was happening is clearly an error and you'd better get rid of it. You can't get rid of the rocks, you've got to get rid of the data. So I mean, field geology is ground truth. You've got to live with that and you've got to acquire the data, and you can't visit everything when you're out in a bush. It's just impossible to do, so you've got to do the best you can. It's somewhat frustrating because you can spend three years making a map of an area, you polish that map and of course you know where all the critical outcrops are and so on, and there are critical places where you go and see this, that and the other. Your successor comes along and he can visit the whole lot in let's say two weeks. So he or she is at where you were at the end of the three years, at the end of two weeks. So it doesn't seem, you know, it's pretty obvious that the next one along can make very substantial progress and may even in fact demolish what you think was, you know, your idea of how this whole thing was put together. So fieldwork has its own advantages and benefits, but it's very slow going and it's very subject to continual reappraisal, which is why geologists have learned to not go out and study other people's territory.

The territory imperative is extremely important in geology, that if you're working on a problem in the field and of course it gets known that you are, then nobody else will go and trespass on your territory because they know the extent to which you've already invested time and effort in it, and they're not going to go and reinvest, studying the same problem. If they're interested in the area for a different reason, they will wait for you to publish, use your map and then go and increase the knowledge base in the direction they choose. By and large there's a well acknowledged territory imperative. If Sam is working on this are you leave it alone. You can go right up to where his area is, and that's beneficial to him, and it's beneficial to you to know he's working there, but you never cross those lines. They are sacrosanct in geology.

05-00:36:54

Redman:

Now based on your lab work the first couple of years, coming back to Iceland, did that cause you to in some ways want to bring back more samples? By this time were you like wow, I can only take so much.

05-00:37:11

Carmichael:

No. I wanted more samples and took back more samples. I didn't feel any way bound by the samples I collected the first year. I went back and added to them with a good deal of enthusiasm.

05-00:37:42

Redman:

OK. Let's see, what was I going to ask next? The question I'd like to ask, to run a little bit with you're kind of the territorial geologist. Was this, at any times, problematic as far as waiting for other people to publish, if there was something that you were specifically wanting to look at or I mean, are there just enough — there were enough sites and enough interesting places that everybody could be content?

05-00:38:17

Carmichael:

Well the same problem exists today actually, which accounts for where I've worked very often. If you work in a small country like the United Kingdom, and you discover there is something there which is of interest, you must expect a swarm of people. If on the other hand you're working in Iceland in the 1950s, Iceland was not easy of access. It didn't have — it probably had an air transport between London and Reykjavik, but most people would go by ship I suppose. It was a big deal to go there camping. So although it's a big country, Iceland, or a very large country, anybody proposing to go work there would find out who else was working there and where they were working and say I'll leave that alone. So that's what happens. In later life, I didn't want to work in the Cascades, in the United States, because if I found anything interesting out there, that would bring swarms of geologists from all the west coast universities, plus the United States Geological Survey. So I thought I'd try a new territory, where people were less inclined to swarm to if there was anything interesting. They are starting to swarm now, but it's taken them 25 years to swarm, and that is Mexico.

05-00:39:47

Redman:

Interesting. Now did you grow progressively more confident from year to year that you'd made the proper decision in choosing to do research in Iceland, for the reasons that we have discussed here?

05-00:40:01

Carmichael:

Yes. It was clear that the end of my second year, second field season, I had something which is of substantial interest. Now substantial interest, not to the world of science as a whole but to geologists yes. Iceland was essentially an unknown quantity in any detailed sense, and it's made up of almost entire volcanic terrain. It's made up of nothing else but the products of volcanoes. I don't know, there may be a very small amount of sedimentary rocks there but there are no metamorphic rocks at all. So it really is just igneous rocks, mainly volcanic rocks. So it wasn't particularly well known because it takes a rather curious character to want to spend their life in igneous rocks or these volcanic rocks. Most people like to have much more variation than that, which is why you spend your life mapping in the west coast of North America, because there you can go from granites to this to that and the other, and you've got diversity and a whole degree of variation, which is so much fun. If you're going to do that in Iceland, you're going to be constrained to looking at a particular type of geological activity, and you've got to love it because the climate is harsh to live in. In the summer it's not so bad. There are a lot of flies

there and it can get quite cold at night. So it's very unlikely, given that, that anybody else would go there. So I felt free, and I didn't really understand this territory imperative actually until I got to the United States, where it was pretty obvious. I understood it a little bit in the UK because the UK is small and people do travel to see other people's results or the ground where the other people's results have been deduced.

05-00:42:08

Redman: So were you producing publications at this point?

05-00:42:10

Carmichael: No, oh no. I hadn't published anything. I was working in Iceland in what, 1955? '56 and '57 maybe or was it '55 and '56?

05-00:42:26

Redman: Yeah, up until '58 is when you were a lecturer.

05-00:42:32

Carmichael: Right. So I put together a first draft of a thesis, and I handed it to the head of the department, because that's how you did it in those days, in 1958. He handed it back the next day and said yes, he thought it was very well done, thank you Ian, would you like to have a job here? I said yes I would, and that was about the total interaction I had with him.

05-00:43:03

Redman: OK. So it was the first draft of your thesis?

05-00:43:05

Carmichael: It was the first draft.

05-00:43:07

Redman: And he —

05-00:43:09

Carmichael: He was very impressed. Now this is where the trouble starts. And then, having got a job, and I was worried about a job but I had previously applied for another university, and I think we've been into that — Oxford — and I was dismissed because I wasn't known.

05-00:43:30

Redman: Right.

05-00:43:32

Carmichael: So here was the head of the department offered me a job at Imperial College, as a young faculty member, and that gave me — firstly, I had to think about preparing lectures, that was a really big deal, so that took me away from completing my thesis. Secondly, I had a very immediate problem I wanted to tackle. It was the same problem that the head of the department of Cambridge University said he didn't think it was significant in any way, and he didn't want me to work on it if it went to Cambridge as a graduate student. That

problem had made itself even more important in my eyes, in my experience in Iceland, and it was associated with obsidian. Obsidian, as you know, is a naturally occurring glass. It's used to make — native peoples used to make implements like arrowheads and so on. You can find them all around the west of North America. I'm sort of getting hoarse.

05-00:44:32

Redman: Would you like to take a little break?

05-00:44:36

Carmichael: How near are we to the end of this thing?

05-00:44:37

Redman: Well we've got ten minutes on this.

05-00:44:39

Carmichael: OK. We'll do ten minutes and then break. And so these obsidians struck me as holding a really exciting geologic problem. I already mentioned this throughout the three years before that, to the head of the department of the University of Cambridge. He just poo-pooed it, dismissed it and said don't worry about it. Here I had the opportunity to do it. I had been given a job. I really didn't have to finish my thesis, which involved not working on these obsidians, and I had to get a lecture course going. So what did I do? I got a lecture course going, I abandoned my thesis and I got going on these obsidians. What's the story there? It's really a story which has essentially taken me all the way through the rest of my life actually. It's a story which starts in material science. Material scientists have studied what's known as a phase diagram, and a phase diagram is let's say you take one or two or three components and you melt them, and you study, if you like, where the liquid region is and where the solid region is, and what the particular nature of the solids are under particular conditions of temperature and composition. These are called phase diagrams, and so they are essentially a measure of liquid solid equilibria at a total pressure usually of just atmospheric pressure. And so I'd been brought up on how to read these phase diagrams, it's part of my undergraduate training at Cambridge, but nobody had ever looked at the natural occurring equivalent of one of these, which is a obsidian. Here is an obsidian, naturally occurring glass, it had a few crystals in it, is exactly what a phase diagram material scientist would do to prepare a phase diagram. I wanted to look at it and I thought there was a big story there. The professor at Cambridge, with some degree of insight, said you will never get temperature. And at those days he was right but actually, the means to get the temperature of which that obsidian had been quenched, was just around the corner about three years. Once you got that, life was booming. So here was I, I hadn't got that yet, the temperature part, but I was on my way to getting it. So I was let loose with obsidians and three things, I think came out of that.

05-00:47:13

Redman: When you say let loose, do you mean?

05-00:47:19

Carmichael:

I didn't worry about my PhD thesis. I went full steam ahead. I wanted to solve this problem, and it was a great problem it really was. How do you use a natural occurring example of liquid solid equilibria and try and match them together with what material scientists had found experimentally.

05-00:47:41

Redman:

So I'm sorry, three things that?

05-00:47:42

Carmichael:

Three things which I subsequently found out. Firstly, every obsidian has a chemical fingerprint, and that allows you to distinguish — if you can find an obsidian implement — where the source material is, and that proved to be extremely important to anthropologists. So everyone has a chemical fingerprint. Two is that although the obsidian actually looks as if it is extremely fresh and pristine and all the rest of it, actually they are very metastable, and so they absorb water and do a whole bunch of other things, which is a secondary impact on them. So you can't take everything you measure in an obsidian as being a function of the (inaudible) quenched on the surface of the earth. The third thing is, they are fascinating rocks in themselves. Everybody I know loves to go to an obsidian locality. Everybody goes up with a geologic hammer, smacks off a great big piece of obsidian and invariably gets themselves cut, because they are glass, and their comment is oh, this is just like glass. You tell the students it's just like glass, you say it's naturally occurring glass and yet, there's a big surprise when they hit it and they expect it to behave in some way other than glass. So they always get cut. The field trips including obsidian, sort of the exposures all out down in western North America are always very successful in field trips. They love it. And they glisten in the sun and you can see why they've attracted attention and of course, native peoples used them to make implements. I use them for a piece of physical chemistry, and it's kept me going for 20 years.

05-00:49:46

Redman:

Oh wow, OK. Once you got so excited about obsidians, was it really challenging then to come back to your PhD, to finish that?

05-00:49:57

Carmichael:

Yes. That's an interesting story. I was making so much progress on these obsidians and what I could deduce from them, that I'd written let's say a half a dozen papers and given several addresses, that some Americans said why don't you apply — we're going to put you up for a National Science Foundation Senior Foreign Scientist Fellowship. And I thought well that's very nice, that will be great, and then I read the fine print, and they would only be awarded to people with a PhD. So the impetus for me to get my PhD was actually the National Science Foundation of the United States saying they would not — if you were going to be nominated for a National Science Foundation Senior Foreign Scientist Fellowship, and that would have been in 1963.

05-00:51:02

Redman: So this is before coming to Chicago? Yeah, '63.

05-00:51:04

Carmichael: Yeah, that's right. It was on that fellowship that I went to Chicago. So I had to bust my ass and finish my PhD thesis and get examined by it, and I managed to do it all, and teach. I did it all.

05-00:51:23

Redman: We'll talk about this a little bit more, but the faculty members, they must have seen that you know, having done this project successfully, been hired on to the faculty and then taken up an entirely new project in many ways, and then found perhaps even more success with this, that you know, they probably saw that you were on your way at this point, to becoming a successful academic geologist. Is that the case, or were they still pretty hard on you with your PhD exams?

05-00:51:58

Carmichael: The final exam was very nice. I mean, they were hard on me and they said that they didn't agree about this, and I said well how about this, this and this? So it was a genuine academic debate and I liked it, and my two or three examiners were very pleasant. They shook my hand afterwards and said there's no question you've passed the exam, which was great. And then I knew I could apply for that National Science Foundation fellowship.

05-00:52:26

Redman: OK. So that's probably where we'll pick up the next tape. I'll take a little bit of a break here.

## Audio File 6

06-00:00:06

Redman: This is my second tape today, April 30th, with Ian Carmichael. Ian, I'd like to ask you about your children. By the time you got your first lectureship, you had three children. Is that correct?

06-00:00:23

Carmichael: Two.

06-00:00:24

Redman: Two, OK. But was it then that you had another child, between —

06-00:00:31

Carmichael: Yes. My lectureship came in 1958. My oldest child, a daughter, was born in 1956 and the next child was born in 1958, and the next child was born in 1961.

06-00:00:46

Redman: OK. So all that — well, and immediately before and during your time as a lecturer in the Department of Geology at Imperial College, correct?

06-00:00:58

Carmichael: That's right.

06-00:00:59

Redman: OK. Let me ask one final question before we talk about your fellowship. Some people have explained to me, and I obviously haven't gone through this process yet but that sometimes being hired by the institution where you teach can be problematic because sometimes you are viewed — sorry, where you're a graduate student being hired by the institution where you're a graduate student can be problematic because you're always viewed as a graduate student or you're viewed as junior, in that kind of state, and so that's sometimes why it's good to transfer. But it's not quite that same culture in this time in Britain is it?

06-00:01:39

Carmichael: No. Britain, in that era, would think it was a quite large disadvantage of having anybody from outside. Firstly, they don't know you, which means you don't know how to hold a knife and fork possibly. Secondly, to some extent you'd been house trained if you're one of their graduate students, and you know who counts and who doesn't count in the department. You're less likely to cause an upsetting debate about something because you know a little bit about where people stand on these issues. I think for the Brits in those days, in the 1960s, it was probably a very sensible thing to do, to hire your own products. I'm not sure. The emphasis in those days in Britain, and I have no idea what it's like now, but it was less on research than on teaching. You were hired to teach. You weren't hired to do research. Research as such really didn't come into the description. I'm just going to find my description but I was hired as a lecturer, which is interesting when you think about it. That was my title. You go from lecturer to senior lecturer and then to "reader," and then if you're lucky, you go hold a chair and you're a professor, if there's one available. Most people who were professors were heads of departments because that was the only professorship available. So we were lecturers. Although research was encouraged, it wasn't historically seen as the most important aspect about the job. The most important thing was to teach students.

06-00:03:28

Redman: And what were you teaching at this time?

06-00:03:31

Carmichael: I was teaching elementary geology and courses in the subfield of which I was doing my PhD thesis.

06-00:03:41

Redman: So you were teaching all undergraduates?

06-00:03:43

Carmichael: All undergraduates.

06-00:03:45

Redman: What was that experience like?

06-00:03:37

Carmichael:

I loved it. They were very smart, I thought, undergraduates. They were very congenial. I didn't feel that very much separated from them in years or in experience, and I thought they were a great group of people. I ran into one by chance and found a letter from him. He's a faculty member at Franklin & Marshall, and he'd been an undergraduate with me at Imperial College. He wrote, you know he said he looked back on — apparently I'd taken him home or something and I had a lecture course, and I had done it at home. I can't remember why I had done it at home but these guys were — I had taken the class home for something or other. I hadn't thought about it or remembered it as a consequence of about two years ago, when this faculty member at Franklin & Marshall, who is a Brit, reminded me of the days of sitting in my undergraduate classes. I found them very enjoyable to give.

06-00:04:47

Redman:

Were they small class sizes? Obviously, if you're bringing it home.

06-00:05:00

Carmichael:

Yes. I would say probably not more than 15.

06-00:05:04

Redman:

Not bad at all, not bad. And so actually one question, during your time at Imperial, and I'm not sure if this was in graduate school or while you were a lecturer, you got a visit from Bill Fife, who was affiliated with the UC Berkeley faculty.

06-00:05:22

Carmichael:

Right. That's when I was a lecturer.

06-00:05:24

Redman:

OK. Can you tell me a little bit about who he was?

06-00:05:27

Carmichael:

Bill Fife is a New Zealander. He's still alive. He must be in his eighties now. He came to the University of California Berkeley. My name had been given to him, I suppose, as you put it just now, as someone on the make. Is that how you put it? So he visited me and he had with him his wife and two children, and on the second visit here, I said well why don't you come and stay with us, it will save you some money staying in London. So he did. His wife and two children came to stay with us in our flat in South London, Clapham, and I got to know him well. He's a very imaginative scientist, I find him to be such. He was extolling the virtues of Berkeley and we became friends in that short period of time. I'll never forget, I was fascinated by Berkeley because the textbook that I was using, not only had I used as a student but I was now recommending should be used when I was a lecturer was indeed the Berkeley textbook. So I was fascinated to know a little bit more about who these two characters were that had written this textbook. At that stage, I don't think I ever considered that I would firstly ever go to visit Berkeley, secondly

become a faculty at Berkeley, and thirdly become a department chairman in a department which was clearly one of the leaders in the world.

06-00:07:11

Redman: And so what were some of the virtues that he was talking about that were attractive to him?

06-00:07:17

Carmichael: He was very good at designing and making experiments in which you could measure properties of materials under geologic conditions. He did that very well and they were imaginatively designed as experiments, and they solved big, important geologic problems. At least I thought they were big, important geologic problems. They were not in my field actually, but they were in a related field. He was a very imaginative experimentalist or scientist, geologic scientist who understood how to make the appropriate measurements of experiments, to measure the pressure, temperature and stability of minerals. He was really good at that and so when he talked about it, I became more and more enthused and thought wow, if I ever go to the United States, I would like to go visit Berkeley. Well, within a few months I found that I had been awarded the National Science Foundation Senior Foreign Fellowship to go to the University of Chicago. So I wrote to Bill and said you know, I'm going to Chicago for six months, and he fixed up so that I could come to Berkeley and visit for a short period of time too.

06-00:08:44

Redman: Now what were the guidelines of this scholarship? What were you expected to do?

06-00:08:52

Carmichael: You're expected to do nothing. It was tax free. So I got \$12,000 in 1964, tax free, so I was very well off with my three children.

06-00:09:12

Redman: And you brought everyone to Chicago?

06-00:09:13

Carmichael: Yes. We all lived in Chicago, and my children still remember Chicago. They don't remember England. They were all born there but they don't remember that at all, but they remember Chicago. I really enjoyed Chicago. It's very productive. Everybody was very friendly and hospitable. I enjoyed the city too. I don't know whether you know much about Chicago.

06-00:09:37

Redman: Sure. I lived in Chicago for a while.

06-00:09:39

Carmichael: Did you?

06-00:09:40

Redman: Yes.

06-00:09:41

Carmichael: I enjoyed a theater called the Second City.

06-00:09:42

Redman: Second City, yeah.

06-00:09:43

Carmichael: I really enjoyed that. That was the cleverest sort of theater. But then I would watch King Lear or something like that and the theater in Chicago was incredible. I haven't been to New York any, except as a very short-term visitor, so I never got to know New York and contrast it with Chicago. When I look back at my days in Chicago, it's really admirable to see how they manage to keep that waterfront as clear and as open and as park-like as they have is beyond me. I know they've got horrible slums in parts of it and the old stockyards must be horrible, but the parts of Chicago that I saw were very pleasant. [University of] Chicago is not in the best part of Chicago by any means. I think you know, they were going to go and sort of try and rejuvenate that part of the city anyhow.

06-00:10:42

Redman: Yeah, some of Hyde Park is quite nice and some of it —

06-00:10:47

Carmichael: Is rather dubious, is tough. I experience that one day, you know, there's a park there. I had my two young kids there and we became the object of excitement or derision to three or four local youths who were African American, and they sort of — it was unpleasant, but we survived.

06-00:11:12

Redman: So what type of research were you doing there?

06-00:11:17

Carmichael: The reason I had gone to Chicago was to use this new instrument, and it's called an electron microprobe, and one of the first ones had been installed at the University of Chicago, under the care of another Brit who had emigrated there, translated there. He translated from Britain to Pennsylvania State University and from Penn State to Chicago, and his name is J.V. Smith. He had this machine, but he decided that his own post ops would have it during the daytime, and I could have it from midnight until 8:00 in the morning. So I took it from midnight to 8:00 in the morning, but then my treatment sort of got very much improved because Joe Smith, he was testing the limits of the electron microprobe in those days or establishing the limits, and he needed well characterized or well analyzed mineral standards, and who but a wet chemist would have those? When I lent then to him, he was so impressed with the quality of the analyses and how it all fit on his straight lines, that I was allowed to move from the midnight to 8:00 in the morning, and now I got a decent share of a normal working hour, so I often used to go to work about 2:00 in the afternoon and came off at midnight or something like that.

06-00:12:47

Redman: OK, a little bit better.

06-00:12:49

Carmichael: Once again, it was a result of he found it enormously beneficial to take those minerals which I had analyzed by wet chemistry back in my days at Imperial College, and they were invaluable to him, as they were to Berkeley when I came to Berkeley, because they wanted the same standards.

06-00:13:10

Redman: For the same type of equipment?

06-00:13:11

Carmichael: Yeah, the same type of equipment.

06-00:13:13

Redman: You talked a little bit about your children remembering this move. Was the move hard for your family? I guess specifically for your wife, how did she —

06-00:13:23

Carmichael: Well not really. She liked it because she was Canadian and she had lived in Toronto. She liked living in London and Toronto is not very far from Chicago. So I think we went to Toronto for Christmas and then I came ahead to get somewhere to live, and then she followed with the kids I'd say a week later.

06-00:13:47

Redman: Oh wow, OK.

06-00:13:47

Carmichael: And then they went to a really good school there. The University of Chicago runs the Chicago Lab School, and they went there. So there was a transition for them. It was easily done and they were well taken care of.

06-00:14:11

Redman: And so when you arrived, did you envision yourself attempting, in any way, to stay in the United States?

06-00:14:20

Carmichael: No. I had every intention of going back.

06-00:14:26

Redman: Tell me a little bit about Professor Fife's — is that, I'm sorry that's how you say it correct?

06-00:14:33

Carmichael: Fife, that's right.

06-00:14:36

Redman: When he brought you out to Berkeley, do you essentially have that planned when you came to Chicago?

06-00:14:42

Carmichael:

No. What I'd done is I had come here on a green card. I thought that maybe I'd love to stay here but, you know, it seemed to be sensible to go do that. So we call came with green cards, so we could stay if we wanted to, and it was no problem getting them in those days because immigrating to the United States was under the old, I think it was 1921 or 1922 quota system, and the largest quota in those days were the Brits, and they weren't using the quota. So there was no question that you could have, you know, you could come. So we got our green cards. I think we found the questions somewhat intriguing because now let me see, this would have been '63. So my daughter would have been seven years old. Is that right? No, five years old. The United States immigration questionnaire then was, I thought, absolutely ridiculous. One of the things they didn't want you to import was people with TB, which was fine. People who were intending to or had already been prostitutes and people with tuberculosis. Did I say that, tuberculosis?

06-00:16:01

Redman:

Yes, and then venereal diseases?

06-00:16:02

Carmichael:

Venereal diseases, right. So the man, consul or something in the embassy in London saw it and he asked me five year-old daughter whether she had ever been a prostitute, which I thought was outrageous, and whether she was intending to become one. She didn't know what the word meant, as you would expect, but apparently he had to do that. I've never forgotten that. My wife was outraged, a Canadian. She was absolutely outraged that in fact such an offensive question should be asked in front of her and me of a five year old, you know our five year old. But apparently we must have convinced him that she wasn't either in the past or going to become a prostitute, and so we got our green cards. We went to Canada and we spent Christmas in Canada, and then I got on the train and took the train down from Toronto to Chicago. When the train got to Port — I forget. The train leaves Ontario and it goes into Michigan, and I've forgotten what it is, but so you're in United States territory. And then somebody from customs or immigration came and looked it over, my immigration papers and very thoughtfully and very nicely he said oh, you're coming to immigrate to the United States. He said, "Welcome to the United States, let me buy you a drink in the bar." So we walked around to the bar car in the train and he bought me a drink, which I thought — and he said, "Welcome to the United States." I thought that was a very nice way of welcoming. And then I would say another six hours later, the train pulled into Chicago and then I took a bus or whatever one does, and went down to the University of Chicago. Some arrangements had been made anyhow and everything was very nice. It was very well prepared and I enjoyed Chicago. It's a great university.

06-00:18:27

Redman:

So then, when you were invited to come out to Berkeley, were you invited out to make a presentation?

06-00:18:34

Carmichael: Yes.

06-00:18:35

Redman: Or just for a visit?

06-00:18:36

Carmichael: No. I came and I was to give a seminar.

06-00:18:39

Redman: And what was the topic of the seminar, do you remember?

06-00:18:41

Carmichael: No, I don't.

06-00:18:42

Redman: That's a pretty obscure question and I apologize.

06-00:18:45

Carmichael: No that's not an obscure question. That's a very sensible question, but I don't remember the topic of the seminar at all, but I came for a week. I left in February and I think American Airlines had just introduced jet travel from Chicago to San Francisco, so I got on one of their early jets. It must have been 1964, February, and the weather was just like it is here today and I was flabbergasted. I mean, I was dressed in all these horrible clothes which I had in Chicago, it was still the winter there, and I loved it. Then I came and did what I had to do and so on. I gave my talk. I don't think I did it very well but people seemed to be interested. Looking back, it was probably too narrow a topic. I can remember how narrow it was compared to what I got used to after I came here. On the other hand, it was involved with a series of things which nobody — some of the people were interested in but nobody had made any progress on. So I was already slightly ahead of the game. When I came here, my fellowship at Chicago was going to run out in June and so I went back to Chicago. Oh, Berkeley said to me, What are you going to do in June? I said well my fellowship runs out then at Chicago and I've got another six months to run, or something like that. I think it was the National Science Foundation and they said oh, why don't you come to Berkeley and I said I'd love to. That was the decision, I should come to Berkeley as a post-doc. As a post-doc you see. I was on leave from Imperial College.

06-00:20:55

Redman: OK.

06-00:20:57

Carmichael: OK now, I was due to get back — I'm in error there. I had another three months. I was due to go back to Imperial College in September of 1964 to teach. I wanted to spend time in Berkeley, so I wrote to my department chair, who is Professor David Williams, and asked if I could extend my sabbatical. It had only gone from Christmas time to June, I mean it was hardly a full sabbatical. It was a half sabbatical, so could I extend it because the instrument

which I was working on, although it was revolutionary, was not very reliable. The electronics in those days were totally unreliable. They weren't solid state or anything like that, and instead of having counters, we had to write down the numbers and all the rest of it. It was a much more tedious operation than it is today. Computers really hadn't been discovered then now that I think about it, in the 1960s, or they had been discovered but they weren't in general use. So I wrote to him and asked him if I could extend my leave. He said, "No, you can't, I'm sorry, you have to come back and teach." So I wrote to a friend of mine there and said, "Listen, I've got my lecture notes, would you mind teaching for me?" He said, "I'll teach for you for that semester if you want that time or whatever it is. Just do it." So I wrote back to the department head and said, "Look, I asked so and so if he wouldn't mind teaching for me, and I've given him my notes, so the teaching is taken care of." Well, back came a very snooty letter saying he was the head of the department, that I was not there as a young lecturer to arrange who taught what and to whom and why, that was not my darn job and it was his job to do it and to assign teaching duties as befits, you know, to make the maximum use of the staff members he's got. In other words, his decision was final. So that just shows you. I wrote back and said I would like to appeal his decision to the dean. He wrote back and said, "Oh, I forgot to tell you, I'm also the dean and I still deny it." I then thought OK, this is clearly not going in my favor at all, so I'll tell you what I'll do, I'll quit. So I had three kids, three months' salary ahead of me and I quit, and that caused an uproar in England. They didn't want that to happen apparently, but I only found out ten years later.

06-00:23:54

Redman:

Oh wow.

06-00:23:56

Carmichael:

Because I didn't — you know, I quit and I didn't go back there for two or three years. So I faced coming to Berkeley with three months' salary, but then Bill Fife said he had money in a research grant and he could support me for the whole year up until June of the following year. Then I got a job interview from Johns Hopkins, and Johns Hopkins asked me if I'd like to go as a staff member there, faculty member there. I interviewed there and gave two or three lectures and did the standard thing, and I was in Berkeley and I decided no, I'd rather stay in Berkeley. So I wrote back and it was you know, I hope a gracious letter saying no thank you, I think I'd like to stay at Berkeley. Mind you, I already had nine months' salary.

06-00:24:53

Redman:

Right. So this sounds like a pretty big risk here.

06-00:24:56

Carmichael:

It was a huge risk and I had three kids. Well, the outcome of all that was the professor of Berkeley whose field I was in, volcanology and that sort of igneous activity and so on, whose field I was closest to was retiring, and he was retiring in 1965, at the end of the year '64-65. It was almost agreed

generally, I don't know, by — the consensus was that it would go to one of his ex-students, who was a professor at Oregon. And in those days there was no faculty vote on who the next faculty member that was appointed. It was done by the chairman of the department and talking to a few of the senior faculty. It was far less democratic as it is today. So there weren't any teaching evaluations and there was no faculty vote on making new appointments. So anyhow, the professor was going to be retire and by chance, he's the twin brother of Professor David Williams back at Imperial College. They're the twins, brothers. One had come to the United States and made a huge reputation and the other stayed in the United Kingdom and made a reputation as a mining geologist, as an economic geologist. So when I came here then, there was a prospect after a bit that I could get this job because it was becoming vacant. Finally, the department chairman offered it to me and said, "We would like to keep you here." I was very grateful because things were you know, I had turned down Johns Hopkins and there wasn't much else to do you know. But I thought I'd go back to England you know, if Berkeley didn't work I'd go back to England because I thought I maybe could get a job at the University of Manchester or something like that. Luckily it came through. It took a long time and when it did come through, the department chairman and his number two took me to dinner at the older Trader Vic's, which is on San Pablo in Emeryville, and that was the way of celebrating the fact that I had just been appointed. When I later became chairman, I looked at the files, I was — they asked — apparently they tried to get a vote. I was appointed on an 8 to 3 vote against.

06-00:27:44

Redman: Wow.

06-00:27:45

Carmichael: Wow.

06-00:27:50

Redman: The question there, what about Williams? Did he get in touch with his brother?

06-00:27:56

Carmichael: Yeah, Williams voted for me.

06-00:27:58

Redman: Oh really?

06-00:27:59

Carmichael: Yes he did. He was very supportive because he had heard that you know, what I was going to do. It took a lot for him to support me because he was such good friends with this ex-student of his who was in Oregon, and he really wanted him to come here. So it said an awful lot for him, if you had to disengage from his favorite son and accept me, but it worked. So in 1965 —

06-00:28:25

Redman: And so wait. That was eight votes?

06-00:28:29

Carmichael: I think it was 8 to 3. It must have been 8 to 5, I think.

06-00:28:33

Redman: Eight votes in favor and —

06-00:28:35

Carmichael: No. Eight against and five for.

06-00:28:37

Redman: The senior —

06-00:28:38

Carmichael: But it was the senior five that counted, don't forget.

06-00:28:41

Redman: Right. And so now that's an interesting question because when you become chairperson, the first thing that you do is go straight to your own file to learn about what —

06-00:28:53

Carmichael: No, actually. You're not supposed to do that, and I got around it in a devious way. When I was appointed chairman, I had a vice chairman, and he was a good friend of mine too. I said Tom, would you please look in my file and take care of my file, but I would like to know what the vote was when I was appointed. So I got his word for it. I never looked at it myself. I wouldn't dare. Once you see your own file, you know, you find out all sorts of things that you'd rather not know, and so you don't look, or at least I didn't. So Tom told me it was 8 to 5 and I said oh, that's not so bad and he said, "No, it was eight against you." But that was later.

06-00:29:46

Redman: That's pretty terrifying.

06-00:29:47

Carmichael: That was later in the '70s.

06-00:29:51

Redman: So you're appointed. That must have been a huge relief.

06-00:29:54

Carmichael: Oh it was a huge relief, it was.

06-00:29:56

Redman: I guess your kids are how old at this point?

06-00:29:59

Carmichael: That would be '65, so one would have been — one was born in '56 so that would be nine, seven and four.

06-00:30:10

Redman: So yeah, old enough to remember this stage.

06-00:30:11

Carmichael: Right.

06-00:30:14

Redman: Tell me a little bit about your first impressions of the department and how closely your image of what Berkeley was, how closely did that align to reality?

06-00:30:31

Carmichael: Well I think the first thing that impacted me was how amazing rocks were available to you with such a short car trip. I mean California just oh, I thought California was wonderful, I still do. In two hours you can drive to into the most incredible country north of here and you wouldn't think you were living within a conurbation of what, five million people. In London, as you know, I mean the only rocks you've got nearby are the bits of beachy head and Dover and so on, and in order to get rocks you've got to go all the way out to Scotland, the rocks I was interested in. That's the first thing. Secondly, London is a commute campus whereas what fascinated me with my time here as a post-doc, before I got the faculty appointment, was how hard people worked. They were here in the evenings and they were here on the weekends, and you never see that in London. So the intensity with which they did science here was so much greater. They were so much more ambitious it seemed to me, and that suited me very well. I fit right into that. I absorbed it and became more ambitious myself I think.

06-00:31:53

Redman: OK. Was that also problematic in some senses, as far as like I mean you know, you had told me at one point that an important part of your weekends would be coming home and bringing home literature, and you would at least —

06-00:32:09

Carmichael: Oh I didn't do that anymore.

06-00:32:11

Redman: Now you were reading that same literature in the office.

06-00:32:13

Carmichael: Yes.

06-00:32:14

Redman: Now did that detract from your family life at all?

06-00:32:17

Carmichael: No. By the time in '55, my wife and I were on separate courses by then, and we got divorced soon after that. I don't know when, I'll have to look it up for you, when I got divorced. '68.

06-00:32:46

Redman: Yeah, 1968.

06-00:32:47

Carmichael: So we were divorced in '68, and I've forgotten about the time you had to wait. I think about a year in those days, so we were probably growing apart in '67. I just worked. I loved to work. I had this instrument here I could use. I had already got two or three graduate students working with me, and it was the most exciting time I'd ever come across. Everybody was thrilled with doing science, the lectures were good, you know, the weekly seminars for the visitors. It was a wonderful time. It was rather like I was a kid in a candy store.

06-00:33:33

Redman: OK. And you liked the town and the community. Being near San Francisco, was that a good thing?

06-00:33:40

Carmichael: San Francisco, I used to go there a lot. It wasn't like it was the hassle it is today, or particularly today, because that bridge has just been down, but I used to go there in the evenings. The climate in those times was an awful lot of department entertainment. You went out to dinner maybe two or three times a week to the faculty colleagues. I think the reason is that in those days, wives stayed at home and they entertained on behalf of their husbands. Therefore, there were lots of dinner parties. You'd go to dinner parties and that's how you go to know people, and it was very beneficial looking back now that I think about it. You could fight at a faculty meeting intensely about a particular issue, but if you went to dinner with that person that night, it was all forgotten. You talked as friends about some completely different issue and that stopped the burning in of the, or the permanent scarring, if you like, of disagreements in a faculty meeting in public.

06-00:34:56

Redman: Interesting.

06-00:34:57

Carmichael: The departments in those days were very congenial.

06-00:35:01

Redman: Oh, really?

06-00:35:02

Carmichael: Yeah because of that.

06-00:35:03

Redman: Do you think (overlapping dialogue)?

06-00:35:05

Carmichael: Well I don't know, but I sense there was far less home entertainment now because very often, a partner's working too.

06-00:35:21

Redman:

Right. Now who were some of the significant players in the field, in both geology itself and your subfield at this time, and how did you relate to them? How did you see yourself relating to them?

06-00:35:37

Carmichael:

The significant players. Well, the places I looked at for people who were doing I thought exciting work were Pennsylvania State University, Harvard and Berkeley. Stanford to some extent, but not really. What I was trying to do was really... This is going to make me feel uncomfortable, but if you suppress the discomfort. I started a whole — a field of, which really then pervasively went through the very curricula of the United States. There wasn't any competition to do that but in the ancillary fields which I used to bring this subject together, yes there were, and I would say it was Harvard which was great. MIT was good too. It's a standard bunch of characters, you know, but Penn State was probably the leader in those days.

06-00:37:18

Redman:

And we talked a little bit about the politics in the department at this time. I want to return to that in a little bit, but actually I'd like to ask about your early graduate students. You made a comment earlier that you really wanted to be left alone and discover a lot of these things on your own. My guess is that after a long career of teaching graduate students, there have probably been a lot of students that are more like you, but there are probably about a few students that really — I don't want to call them needy but really needed guidance and attention. With your early graduate students, were you looking for people that were like you personality-wise?

06-00:38:00

Carmichael:

No. I was just looking for anybody that wanted to work with me, because you know, when you walk into a department, in a sense the pathways have all been set. People have been here for ten or fifteen years, they've got students coming in to work with them. A new boy coming in, particularly like me, you know, there's no established pathways. So you have to establish those pathways, so my first graduate student, he was an Englishman, a Welshman actually, and my second one I really learned a lot from. Not so much from the first one but the second one yes.

06-00:38:40

Redman:

And who is this? Do you remember?

06-00:38:41

Carmichael:

Jim Nichols, I think his name is. I found that — let me get this right. Yes, my second one was Jim Nichols. The third one was a scholar from Australia, who came here on a Rotary Scholarship for one year, and he so liked it...

06-00:39:18

Redman:

OK.

06-00:39:20

Carmichael: That's all right. I've given you another copy of it. He so like it that he said he was going back to Australia, because he had to on the terms of his fellowship, but he'd like to come back and get his PhD here. His name was Gary Lauder, and he decided before he left that he wanted to go and work in New Guinea and will I go and supervise his work in New Guinea. So I thought I'd go and supervise his work in New Guinea. So that got me into the South Pacific.

06-00:39:53

Redman: Oh wow, OK.

06-00:39:55

Carmichael: And he married his wife and two weeks later he took her camping in New Guinea, and she did really well under those circumstances. It was miserable.

06-00:40:09

Redman: And so you had mentioned that —

06-00:40:15

Carmichael: After about a year or two actually Sam, I collected a group of maybe four or five graduate students, and they seemed to be a very lively, intellectually lively bunch, and they dominated the intellectual life of the geologists in the department. I was really lucky. I seemed to be able to recruit people who were really good and very exciting.

06-00:40:43

Redman: Now two follow-up questions with that. The first relates to the territorial geologists, but then also how you had mentioned that with your PhD supervisor, he had some passing interest in the things that you were doing but he wasn't directly interested. He was interested in the results but not directly in what you were interested in doing.

06-00:41:05

Carmichael: Right.

06-00:41:06

Redman: Was it the same relationship that you were building with many of your students?

06-00:41:13

Carmichael: My own research advisor is a very shy man, and so he wouldn't interfere. I'm less shy and my attitude was, I will be there for them if they want me at any time, but I always want — quality control is my responsibility. I want to know what they were doing to solve the problem. I used to just give them a problem and say look, I think this is a good problem or this is a good problem, this is a good problem, choose what you want to do, and they did it. I was supporting them don't forget now, which is rather different than the UK system. At the UK the students support themselves or the government supports them individually. So it doesn't make your dependence on your research advisor anything like as close that it is here. Here you're also an "employee" of your

research advisor. So I wanted to make sure that you know, they did roughly what I thought they should do. I ended up with close friends in almost all of them. Not all them but most of them all. So out of 30 or 35 or something, I'd say I'm on very good terms with 20. In fact, they called the other day. There are a group of them that works down on the peninsula in Menlo Park, and they called and they want their annual lunch, for me to go down there. They graduated 30 years ago. So I mean, those are guys in their late 50s, early 60s and you know, so we have stayed friends. There were times when there was considerable upset, oh yeah. I kept a guy around for another year and said no, it's not finished yet, but I paid him the salary. He wanted to go and I said no, you've got to do this. But now he thanks me, for it but then, he would kill me.

06-00:43:20

Redman:

Now, you had told me at the end of I believe our last session that your goal in training graduate students was to get them to the job interview.

06-00:43:31

Carmichael:

Right.

06-00:43:32

Redman:

And that once they got there, you couldn't really help them. But it seems that, I mean your first few years, that's a philosophy that kind of develops over time.

06-00:43:43

Carmichael:

Right.

06-00:43:44

Redman:

I mean your first few years, that must have been —

06-00:43:47

Carmichael:

That's right but you know, if there's a job interview... People used to call me and say have you got any good students, fairly early on. Then I became a stickler about making them practice their talks and sometimes — I think the record was 17 times until in my view. Don't forget that, and this may happen to you too, when you go to a university to give a talk as part of them recruiting you or hopefully recruiting you, by and large, all you're equipped to talk about is your subject. What you forget about is there's nobody in your subject in the audience, that's why they're recruiting you. So you've got to construct a general talk which will appeal to almost all of them there, and show you how this broad interest and versatility, and that is what sometimes took 17 sessions to introduce them to. Their tendency was to talk about the details of their own PhD research, but that was not the sort of thing that was going to catch fire in a faculty. When they're recruiting a specialist they know that but they want to know hey, what else can you teach? Are you a good field geologist? Can you do this? Can you do that? And that is where versatility is so important.

06-00:45:12

Redman:

And now what about sitting as a faculty member, I'd like to hear a little bit about the differences as far as your recruiting new faculty members, because it seems like as a lecturer, there would be a bit of a different role from being even a junior faculty member. But you came here with tenure, is that correct?

06-00:45:33

Carmichael:

Right.

06-00:45:34

Redman:

OK, so that would —

06-00:45:36

Carmichael:

My five years as a lecturer at Imperial College was counted as my assistant professorship, yes.

06-00:45:40

Redman:

OK. So that had sort of given you a little bit of clout as far as recruiting new faculty members at Berkeley.

06-00:45:46

Carmichael:

Oh but in those days, Berkeley had — Reagan had just become Governor, and I think there had been a huge cut in the number of faculty in Letters and Science, and I think there was no prospect of replacing anybody.

06-00:46:00

Redman:

Interesting, OK.

06-00:46:01

Carmichael:

Those were horrible years.

06-00:46:03

Redman:

As far as the health of the university?

06-00:46:05

Carmichael:

Right.

06-00:46:08

Redman:

So my next question would be actually about the Free Speech Movement. I'd like to talk a little bit about that. You said that that had made quite an impression.

06-00:46:36

Carmichael:

Well as you could imagine, the campus was afire with enthusiasm and debate. There were some very eloquent student members. Mario Savio was one, and he stood on top of a police car to address all the other students there, and I was there and I think a lot of young faculty were there, and we were very much in favor of the sorts of things he was talking about. What they were now I can't remember, except as a consequence of that movement, teaching evaluations came in, all faculty voting on their new appointments came in, both of which I'm told with absolute certainty by the old guard that they would destroy

Berkeley of course. Teaching evaluations worry me and I'll tell you why in a minute. I'm not sure that they came in in that era. I think that a lot of the great inflation as a consequence of teaching evaluations.

06-00:47:54

Redman: OK, interesting. Can you elaborate on that a little bit?

06-00:47:57

Carmichael: Well you know —

06-00:47:58

Redman: It's kind of a challenging topic.

06-00:48:00

Carmichael: If you're taking a course from me and you think that you're going to get a C-minus and you're not doing very well, you're not very likely to turn around and say, hey, I'm the second best teacher you'll ever come across, however it was.

06-00:48:13

Redman: Right.

06-00:48:17

Carmichael: There's this sort of you scratch my back and I'll scratch yours in this, at least that's my hypothesis. I'm not sure for certain but I would guess that as a consequence of teaching evaluations, the great inflation followed along pretty quickly, and is rampant at those — the undergraduate level, at the graduate level and in evaluation of faculty members. It's because you can see so much, so many documents now, honest opinions, in many cases they were slanderous, there's no doubt about it, are not often given.

06-00:49:00

Redman: OK, interesting. I'd like to get your thoughts on how the administration handled the Free Speech Movement.

06-00:49:09

Carmichael: Badly. In fact, the Chancellor lost his job. I can look it up, but he was a philosophy professor I think, but he lost his job because of — Reagan was the Governor or was about to become the Governor. The war. I mean Vietnam was what, in '65 was it?

06-00:49:36

Redman: Yeah.

06-00:49:38

Carmichael: I mean, there's a lot contributing to the unrest of young people.

06-00:49:44

Redman: And this is just before the civil rights movement.

06-00:49:47

Carmichael:

That's it. It was all part of that, yes. The students were concerned. They were really, you know, they're high energy, really devoted to their ideals, which those moments represented. That's when, as I remember but maybe this is an error, that's when out of state tuition was introduced. The legislature couldn't believe that all the troubles on the Berkeley campus, particularly the Berkeley campus, could be performed by all their good old boys parents as they knew, you know. I mean, the children from all the good parents that the legislature knew. They must have come from out of state, right. We'll charge them more if they come from out of state. That's where the out-of-state tuition came in originally. I'm not sure of the facts, but my impression is, that it's sort of punishment for what was happening at Berkeley.

06-00:50:43

Redman:

Interesting, OK. I didn't realize that. So did this — now it would be several years between the Free Speech Movement and when you really got into academic administration, but did this experience affect how you thought about administrative issues, and how so?

06-00:51:04

Carmichael:

Well, it wasn't that long when I think about it. I came here in '65. I became the graduate advisor, I'd say within two years, and then in '72, which is seven years after coming here, I was the chairman.

06-00:51:22

Redman:

Right, so quite quickly then.

06-00:51:23

Carmichael:

It was quite quickly. Did the Free Speech Movement and the filthy speech movement and the wars movements go on? Now, there's a student intensity in all political matters that I thought was great. I'm not sure that I always agreed with them but in general I did. Some of the silliest aspects were — there was a time when every student wanted a dog, and every student just about had a dog, and they would want to bring their dogs to class. Well, very often when you were lecturing, maybe 20 dogs were there, and somehow they'd start barking and all the rest of it. Then they thought that was an intrusion on their civil rights, to stop bringing dogs into the buildings. We overcame that but oh, dogs were a pain, they were a real pain.

06-00:52:18

Redman:

That's seems quite bizarre today.

06-00:52:20

Carmichael:

Doesn't it?

06-00:52:20

Redman:

Yeah.

06-00:52:21

Carmichael:

It does.

06-00:52:22

Redman:

It seems quite foreign. They're thinking about the way the administration handled it. You had mentioned that some of the things that stemmed from this was like kind of the democratic process of —

06-00:52:40

Carmichael:

Well, I went to some event at the Greek Theater, and Mario Savio got up to speak or something, and some university police just swept him off. He wasn't allowed to say anything. Well that immediately you know, enraged I would say, almost everybody in the audience. He was there to speak to us, whoever the audience was, what it was called for, and it was totally incomprehensible to us that in fact he shouldn't be allowed to speak. So lots of things in those days in the university needed changing, and I think a lot of the things did change. I'm not sure that it was for the better but they changed, and a lot of it needed change. Faculty voting was a good idea. I don't know what I think about course evaluations and grade inflation. I would like to get rid of grade inflation. Maybe we can get rid of grade inflation by publishing the average grade in the class. Apparently you can do that. Pick-A-Prof does that now doesn't it?

06-00:53:50

Redman:

Yeah, and RateMyProfessors.com.

06-00:53:56

Carmichael:

To me, if you get an A and everybody else gets an A, and you know everybody else has an A, it sort of diminishes the value of the A to me.

06-00:54:04

Redman:

Right, right, and certainly there are issues of — I was talking to a student about this the other day, where some students are taking three really difficult classes, and they want to take an easier class.

06-00:54:16

Carmichael:

Right.

06-00:54:17

Redman:

And so it's a tough situation.

06-00:54:18

Carmichael:

Right. I know it.

06-00:54:21

Redman:

How about — I mean, were there other issues, even before you became, in the academic administration? Now we've talked about all these different experiences at Cambridge, at Colorado School of Mines, at Imperial. Were there things, by this point, where you wanted to make changes?

06-00:54:44

Carmichael:

The changes I wanted to make were scientific. I was on to two very good things, I thought, and that was really exciting me, and my students were in

demand, from Berkeley were in demand all across — you know, every university wanted a student from Berkeley, or seemed to. And so a whole cluster of students in the '70s and '80s got jobs in American universities, teaching sort of stuff they'd learned here at Berkeley, and that was so satisfying to me. I didn't want to be an administrator. What I couldn't stand was the job was being so badly done. There were some appalling administrators we've had as department chairs, and it seemed to me that anybody with the slightest bit of common sense could do it so much better. And then of course, I got to realize, as I became an administrator, that the least common of attributes of male and females is common sense. Very few people have what you and I would agree is common sense. And then a lot of people are worried about what people think of them and so you know, off of that you generate all sorts of aphorisms. If you want to be loved. If you become a department chair and you want to be loved by a dog, I mean. I'm serious about that, because if you're going to be an effective department chair, everybody's going to dislike you. But that's the job you're expected to do and you should do it well, and you can't run for popularity, that's ridiculous. You can run for respect but not popularity, and everybody whispers and you know, the chair is fair game. Everybody goes to a party, wherever it is, and oh, look what he's done this time, he's crazy. But that's him or her doing their job.

06-00:57:02

Redman:

And so are those comments that you just have to put behind you generally?

06-00:57:06

Carmichael:

You have to live with it. You have to get on with it and don't worry about it, and that's why my army service taught me. Being a department chair, I think a lot of people felt that I manipulated them, and I say well, manipulation is when you're unwilling to do it and leadership is when you're willing to be led. The result should be the same if you're going in the same direction right? We're going to achieve that.

06-00:57:56

Redman:

We're coming to the end of the tape. Is there anything else that you'd like to add to the stuff that we've talked about?

06-00:58:00

Carmichael:

Well I was just thinking about being a department chair. When I became a department chair, it was a rather chaotic time because my predecessors hadn't looked after the salaries of my colleagues very well. You're there to do a job. You're there to run this — do the best you can for this aggregate of people, undergraduates, graduate students, post-docs and faculty members, and to make sure the operation works. When you think about it in those terms, you could resist the higher administration saying this is what you should do. You say no, I'm not going to do that, it doesn't make sense. So I fell out with the higher administration.

06-00:59:00

Redman:

OK. Well very good. That's where we'll pick up next time.

**Interview 4: May 5, 2007**

## Audio File 7

07-00:00:11

Redman: My name is Sam Redman, and I'm sitting down for — what is it today Ian, is it our fourth session together?

07-00:00:16

Carmichael: Yes.

07-00:00:17

Redman: Fourth session with Ian Carmichael. Today is May 5, 2007 and my name is Sam Redman. First what I'd like to do is there were a couple of thoughts that you remembered from the previous topics of our interviews. One of them was a fellow University of London faculty member who you shared a room with. Is that correct?

07-00:00:40

Carmichael: That's right. When I became a faculty member at Imperial College of Science, there were not enough offices for us each to have one, and so I was asked to share with another new lecturer called John Ramsay, who subsequently went on to become a world famous structural geologist. He and I became fast friends, our families became close and friends. We couldn't stand the status quo. The professors were old fogies who were backing bad ideas or out of date ideas, and we wanted to change things. Looking back, I suspect we were a couple of irritating, very obnoxious young faculty members, arrogant and so on, but John and I were very lucky. We had very good students working with us. Both of us were extremely enthusiastic. He's still enthusiastic for his subject and he is not burdened by bad legs fortunately, so he can still go out in the field, in which he's a superb field geologist, and I'd see him from time to time. Our paths separated when I left Imperial College to come to the United States. He went to the University of Leeds. He left there subsequently and went to the ETH, Swiss Federal Technical Institute, and he retired from there some five or six years ago and lives in France. He was very adept at math, and like many people who are mathematically adept and talented, he was also a very good musician. So at the time he was offered a lectureship at Imperial College, he was also offered a position as a cellist in the London Symphony Orchestra.

07-00:02:35

Redman: Wow.

07-00:02:36

Carmichael: So he had these two options, and I think he's in a time when he's actually opened up a music school and teaches people how to play the cello. So he's never lost his love for music. We see one another at annual meetings every four or five years. We regain something of what we used to have, but that's always difficult, because we haven't shared many experiences in the last 30

years, but we do share some interesting memories and we do share a great love for the way the earth works, which of course is the subject of geology.

07-00:03:13

Redman:

On that note actually, I would like to ask you about a few general terms. Now I don't want you to feel as though you're getting interrogated here. This isn't an oral examination for your thesis or anything, but I'd like to ask a couple of these general terms, including, what is geology?

07-00:03:35

Carmichael:

Geology is the study of the earth and all its features. It's not just the study of the surface of the earth, which is a subset of geology, it's called geomorphology, or in some places geography and geomorphology and geography run together. So it's the study of the earth. It's the physics of the earth and the chemistry of the earth and the evolution of the earth in the sense of both the life forms and the rock forms, on which the life has survived and prospered.

The training to become a geologist is usually cast in one of three ways. You can either do it through the life sciences, in which case you become — you've got to take a substantial amount of biochemistry and organic chemistry, and you study the fossil record. When I was a student, essentially that was the main way of dating rocks, from the fossil record, and one became adept at using fossils to do that. The more practiced one had the better one was. Then of course we have the radiochemical techniques of dating rocks came in, and that was different because that gave you an absolute age, whereas the fossils gave you a relative age. Fossils could always tell you what the age was relative to something else, whether it's younger than or older than, from the fossil record, as did in fact the law of superposition, that younger rocks sit on top of older rocks and one has to decipher that succession, that stratigraphic succession, to decide what sort of rocks succeed what and therefore, how did the environment change. So geology then is to try and understand, in detail, how the earth has evolved over its 4.2 billion years of history. The crust of the earth is really the only library we have which records that history, in a way in which makes it evident and decipherable. So studying the rocks themselves gives us a way of browsing through that library, which is represented in the crust of the earth, because the crust does contain rocks which go back almost to about 4.0 billion years. A little bit of the early stuff which hasn't yet been recorded, but we do have rocks essentially from over 4 billion years. If you can read that record and you're trained to read that record, as geology students should be able to, then you can probably deduce what past climates were, the past conditions were of temperature and pressure were, if the rocks had been buried, and so that's the way we understand the evolution of the earth, and that whole subject of geology, of paleontology, which is the study of fossil life, geochemistry, which is the study of the chemistry of the earth and geophysics, which is the study of the physics of the earth. All that comes together in a

subset of the great field of geology, which is as I said, the study of the earth and its evolution.

It's a very popular subject for undergraduates at Berkeley, and in most universities because you go out in the field, and most people like to go outside and explore the outside, and try and understand what it is they can see when they see a rock succession, and that's essentially what an undergraduate training is to do, is to train students to understand that rock succession and to make some sense of it and interpret it. The more experience you get at doing that, the more adept you become and the more reliable you become in your interpretation. It's an issue of some debate, as one could expect, because you can date rocks very reliably now, going back to 4 billion years, but there aren't a lot of advanced number of people in the United States who think the earth is only 6,000 years old and somehow or other, you've got to come to terms with this difference of opinion. One the one hand, I think it's beyond a shadow of a doubt, you can prove it, but on the other hand it is a curious belief system which says the earth is only 6,000 years old, or maybe it's 7,000 now.

07-00:07:53

Redman:

Let's talk a little bit about relative versus absolute dating techniques. Over the course of your lifetime, the absolute dating techniques have really changed quite a bit. Can you talk a little bit about that?

07-00:08:09

Carmichael:

Well stratigraphy, which is the study of the rocks which are laid down underwater, really started, as I understand it, from — although I haven't checked it out — from the canal builders in England. Here they were digging these canals, which was to connect cities so they could transport goods, and they found out that some rocks lay above other rocks and so on, and they also discovered that these rocks contained fossils in them. So it was the canal builders actually, who first if you like, experienced the science of stratigraphy; the youngest rocks lie on top of the older rocks in general. There are curious successions where the rocks have got overturned, but that is because of subsequent tectonic activity. Now as you can imagine, you can build up a hierarchy of rocks which lie on top of one another and have a fossil record, and you can piece — you can get together a succession in one part of the country and dovetail it into a succession in another part of the country and as such, you can probably build up the whole of the, if you like, the Post Cambrian and the Post fossiliferous record, which goes back about 550 million years. That was not known when I was a student. It was considered about 600 million years. So in that era of 600 million years, in the last 600 million years, you use fossils to decide whether it was in the last 20 million or in the last 50 million or whatever it was. The fossils gave you an idea of how young it was, relative to that big succession, which had been calibrated on a fossil record. Then with various activity came the chance to actually get an absolute value. No longer was it younger than or older than. You could actually put a number on the actual sediment itself, if you had the right

minerals there. What you needed was minerals which contained the mineral potassium, or the element potassium, because that radioactively decays to form argon, and you can measure the concentration of that decay product and then the concentration of the decay product from the — as the daughter from the parent, potassium, gives you, if you know the concentration of potassium, gives you the age of the rock itself. So it's become more and more technologically proficient and nowadays, you can measure the ages of rocks with very high precision if you have the right mineral assemblages in which to do it, and it will require smaller and smaller amounts, which is a huge benefit to geologists because in the past, you had to separate several grams of minerals, which now you don't have to do that any longer. Separating pure minerals, a pure fraction of the mineral, was always a very time consuming business. So now we have a large number of dating techniques, and the dating techniques which depend upon radioactive decay of an element. The principal ones used in geology are the decay of uranium to lead and the decay of potassium to argon, or calcium in many cases.

Carbon is a different issue. Carbon also decays and can be used to date materials, but it does not occur in rocks itself. So you need some charcoal or something, which was created by the eruption of say a hot lava or the eruption of a hot ash flow or something like that. The charcoal itself never becomes part of the rock. It's part of the underlying material which got charred as a consequence of the heat of the material being deposited above it. So it's not an intrinsic part of a rock, carbon, as is the uranium and the potassium and the thorium — I've forgotten the thorium — which give rise to the absolute ages of the material.

So it's totally changed from when I was a student. You now can get — or people who know how to do it can get really precise ages, and that has transformed the way we think about how long it takes for geological events to occur and how long it takes for evolution of volcanoes or faults, whatever it is you're interested in. It's become the major impact, if you like, or the major thrust of geology now, to measure the rates of change in the earth, and the rates of change can only be measured by having a good dating system, a highly precise dating system, which has come along. There are specialists in it and you have to either pay for them to be done commercially or talk a friend who knows how to do it into doing it for you. One of the people that I think this program is going to talk to is, I won't say an ex-student of mine but a very close friend of mine and a close colleague of mine, Paul Renne. He runs the Berkeley Geochronology Center and he will tell you what it was like, in his early days, to be a student when I was a young professor here, but he now runs one of the foremost dating, radiochemical dating facilities in the world. It's been an enormous benefit to the dating the archaeological history of man or people. So geologists now can't avoid, thank goodness, trying to get a date to measure a process or the rate in which that process is occurring.

07-00:14:01

Redman:

Has the increased number of different types of absolute dating techniques, do you think this is — you've kind of indicated that this has led to an increased specialization in these dating techniques. So there are certain techniques that geologists, you can become a specialist in you know, measuring the potassium argon.

07-00:14:24

Carmichael:

Oh yes. Because the techniques are a little different, most people have become either lead guys, which means that they measure the uranium lead, because the two forms of radioactive uranium decompose, if that's the right word, into the product of lead, to isotopes of lead. And so you measure the lead isotopes and you measure the uranium, and you get an age of the earth. There are several corrections to be done on that, and then you can get the age of the deposit or the mineral in which the lead was found. Those sorts of people, it seems to me, do not by and large do potassium argon work. That requires different skills, I think, and different machines, different instruments, and so it tends to have a different set of specialties. So the field has developed into two, by and large into various specialties. There are new neurotechniques coming along too, which people can explore, and [they] seem to be used more and more nowadays as the methods of analysis become more and more refined. The principal ones in the time that I've been sort of active at Berkeley and as a graduate student at Imperial College, potassium argon and the uranium lead series, and the lead uranium thorium series. I'll get it right eventually.

07-00:16:02

Redman:

It seems as though these individuals working on dating techniques like that would almost be somewhat analogous to research librarians, where they would be helping other individuals do different types of research. Would they be working on their own research?

07-00:16:17

Carmichael:

Yes. There are two ways of doing their research. Firstly, they could be taking some geological phenomenon which they wanted to measure. For example, if you're talking about the age of hominids in East Africa, and students of mine have become very interested in doing that. You have to find ashes which have been deposited, you know, which are older than the bones or the implements found and which are younger than. Then you separate the minerals and then you date them. So that's one way of doing it. You can become a well versed geologist who is interested particularly in stratigraphy, which is the sequence of events of a particular rock succession, which may hold important hominid fossils, or you can become somebody who is really interested in developing the techniques of separation of the elements, the purification of the elements, the mass spectrometry of the elements, and you become, if you like, much more of a physicist I suppose, who is interested in developing and then refining the technique of making the measurements and therefore, increasing the precision and the sensitivity of the radiochemical dating.

07-00:17:34

Redman: Here's another basic question. What is science?

07-00:17:40

Carmichael: Science, oh gosh. To me it's the orderly study and relationship of things which one never thought were related, but can be shown by genuses to be related, and it's the description of something and the prediction. The prediction is a very definite part of science. You study a certain number of phenomena, you think the relationship between them is thus and thus, and therefore is a consequence of postulating that relationship, it becomes possible to predict. Under similar circumstances you should see, you know, whatever it is you've discovered. That is to me, is the scientific basis. It is a careful description of phenomena, it is the relationship of those phenomena, one to the other, and that takes a certain amount of theory possibly, and then there's an element of prediction. I guess the scientific philosophers have said that prediction is another way of expressing the strength of science, which is its falsification. If you continue to try and falsify a hypothesis and it finds itself incapable of being falsified, you know that it has some strength. But of course, a really good scientific theory can always perish in front of some good experimental data, and that has happened time and time and time again, and your ego has to be somewhat more robust, I think, in the humanities because like many other things, your theories can perish, as I've said. When a graduate student comes along, makes a measurement which you hadn't thought about, and the consequence of that measurement are that something you've been so proud of for ten or fifteen years just become dust in the wind as it were.

07-00:19:39

Redman: And this has happened to you?

07-00:19:42

Carmichael: Close to it. I survived more often than I've perished, but it's come to that. I think that business of falsification, that business of being wrong as opposed to being right, is something which one needs to inculcate graduate students with. One of the important features of a graduate student becoming a scientist, in my view, is acquiring the courage to be wrong. If you haven't got the courage to be wrong, you're very rarely going to be right, because most ideas aren't good ideas. Of all the ideas you're going to have, some actually will flourish and be good ideas and be sustained, but most of them aren't. You can't expect to have — it's very rare that all the ideas you have are successful and germane, and stand the test of time. Most ideas don't. You have to face the fact that however emotionally connected you are to those ideas, they will perish, they will get overthrown. So you've got to have the courage to be wrong in order to have the benefits of being — essentially being right in some stage of your life.

07-00:21:04

Redman: Was this a difficult thing to teach graduate students, who I'm sure came in with, some often with 4.0 GPAs and perfect GRE scores, perfect test scores all

of their lives, and then to teach them this ability to have the courage to be wrong.

07-00:21:20

Carmichael:

I think it's — the courage to be wrong usually comes out when they're writing their papers and they don't want to declare themselves. They've got a set of data and to me, it's quite obvious what the conclusion is. They on the other hand — and they would express it in those terms. On the one hand this, on the other hand that. It's sort of covering one's ass, I suppose, is the popular expression, but it never really works. It's never very convincing. You mine as well challenge your arm, make the case as logically and as plausibly and as tightly as you can and go for it. I think it's better to be wrong for the right reasons than never to be right or wrong. So to train graduate students to do that is not an easy thing to do, because so many of them don't want to be wrong, as you can expect. I didn't want to be wrong, and I was wrong, and it hurts. It really gets you. I mean, science maybe is not a dispassionate occupation. It's a very passionate occupation. You get very wrapped up in your own ideas, very wrapped up in your own conclusions and beliefs if you like, about what that certain set of data mean, and when you find out that it doesn't at all and you've committed yourself on paper to it, it takes a time. You want to go and bury your head somewhere and think ooh, I don't want to do this again, but it's part of learning. I think one of the best ways of teaching graduate students is the seminar series, for them to get up and face the challenge of debate and of ideas being thrown at them saying that no, there's another alternative explanation of what you've just said, and I think there's a better one and it's this. That's where they first learn, I think where graduate students first learn the courage to be wrong. When they get in a seminar and people go at them the whole time, and I had a very good seminar series for oh I don't know, for 25 years I suppose, in Berkeley, in which much of the thickening of one's skin was acquired.

07-00:23:44

Redman:

You had mentioned too, that this is a process that it seems like scientists go through all of their lives, and people become very attached to their ideas and their theories, and some people would argue that this has been a major impediment to the progress of science, is people hanging on to these ideas even after overwhelming evidence suggest —

07-00:24:07

Carmichael:

I would agree with that. There are a number of — before plate tectonics was universally accepted, it was universally poo pood by a whole bunch of people who didn't like it and had every reason on earth to show that it didn't work. Plate tectonics, the movement of the continental plates and the drifting of the continental plates, or continental drift it was called before it got the name plate tectonics, was perceived to be much more operationally valid in the southern hemisphere. South American and South African geologists were much more in favor of it and the geologists of the northern hemisphere, in Europe and in Britain and so on, poo pood it much more, and they said it

couldn't work. They didn't see the necessity of it to the extent that the people working in the southern hemisphere did, and therefore they were more ready, if you like, to find out all the reasons why it couldn't work. Science, you know, once you — science is really only done by young people in a sense. Only they are not bound, if you like, by early experience. They're acquiring it and they're prepared to go in new ways, whereas if in fact you've spent all your life acknowledging the earth is flat, it becomes a huge revolution in one's emotional or intellectual responses, when all of a sudden you have to face the fact that it's not flat it's round. If you do that when you're 50 and 60 it's hard to do. When you do it when you're 25 or 20, that's easy to do. You're not committed in any way to the first belief or hypothesis.

07-00:25:51

Redman:

Right. Do you think, in your experience as a scientist, is there any way that — you obviously have experience with the European scientific community and the American scientific community. Is there any way that the scientific community as a whole could ease this process of you know, showing people how to let go of their ideas that are being proved wrong?

07-00:26:22

Carmichael:

There is no way to ease the process of the hurt or shame or disappointment one feels when something which you cherished and believed to be right has turned out to be wrong. No, there's no way to overcome that. That's a human response. Humans have all these emotional responses to their ideas being rejected. Europeans and Americans, I'd say — well much of plate tectonics came from Europe as opposed to the United States, but I don't think there's any real difference. I think the United States — it's a difficult thing here. The United States is having a problem with evolution as a country, whereas if you go back to the UK, they're quite — the whole country is prepared to accept evolution. In this country, in the United States, it's a big issue. In the south, evolution is not considered to be something that is wholeheartedly accepted and in fact, it is rejected.

07-00:27:30

Redman:

You can throw climate change in there too.

07-00:27:33

Carmichael:

Probably. In fact, climate change. Europe is more secular I suspect, and their lives being [less?] driven by belief, religious belief, I think they're much more willing to accept the dictates of science or the conclusions of science.

07-00:27:56

Redman:

So today — well that was kind of our introduction to what we're going to talk about today. Today we're going to talk about — and kind of half-jokingly you had told me that at one point you, in a very concrete way, held five different positions at the University of California, Berkeley, at one time. Today I would like to talk about being the department chairman and being a dean, and obviously those aren't necessarily exclusive of one another. You were a

faculty member while also being a chairperson and a faculty member while being a dean. So I'd like to keep talking about geology as we move here, but the first question I'd like to ask is, what does the chair of a department do?

07-00:28:46

Carmichael:

A chair of a department is the person who guides that department through the era in which he or she is to chair, and is responsible for all the activities of that department, all the instructional program, the recruiting of students, the grading of students, the graduation of students and in many ways, I hope, the employment of students or the encouragement of students to gain whatever employment they seek. The department chair is there to make sure that insofar as the department can, it contributes to all those activities which are part of the student experience. The department chair also is responsible for making sure that the non-academic staff, their careers are as profitable and as meaningful as they can be, because they're an essential part of a science department, particularly a science department because we have both technical stuff and non-technical stuff, and the science department can't operate without technical staff. So a department chair has a responsibility to insuring that the technical and the non-technical staffs feel that their careers are being looked after and their professional development is being seen as being encouraged in the same way as the students, if you like; their professional development is being encouraged. And so it's true for the faculty. The faculty see the department chair as being responsible for their pay raises, which come every few years, and the department chair organizes the various committees which the faculty are organized into, to deliberate on and give conclusions on such things as faculty hiring, the curriculum, the use of space, and those are big issues in a department. The use of space is an incredibly important issue because young people coming in need space in which to do their research. The old guard probably doesn't want to give up their research space very easy, and the department chair is there to keep peace between all these various constituencies. It is a very rewarding job. It's a job that you can see tangible benefit or tangible results from very quickly. You're also the person to whom everybody turns to, to criticize. I mean, if there's one thing a department chair can do, it can unite a department in their antagonism of that chairman's decision. So it has a beneficial impact if you like. Whatever decision is made by a department chair, you can see the benefit of it. You can see it in the students, you can see it in the faculty, you can see it in the non-academic staff, and you can see it fairly quickly, whereas higher up in the administration, you don't have the sort of intimate contact with people that you've just sent out this memo about, and unless you've go and you know, search out and look for a response to your memo, you don't have anything like the feedback that you get when you're department chair. You know pretty well, pretty soon, whether in fact what you suggested the department do is looked on with favor or with disfavor by a group of your colleagues, a bunch of the students and so on.

You can't get away with very much these days in the average department. After all, Berkeley students are a pretty intelligent group, as are their non-

academic staff, as are the faculty, and the faculty want you to run the place and don't disturb them. The students want you to find as much financial support for them as you can and the non-academic staff want you to probably allow them to continue to do what they've always been doing without too much disturbance, because that's the way they settled into it. So you're there to rock the boat gently. The boat has to be rocked because without change, the place will not flourish in the long term, and the only state of existence without change is death, and one doesn't want to do that. One has to be sure that the department is maintaining its vitality, its intellectual vitality, its research vitality, which is another way of putting it, and does things, in my view, in as operationally and effective and as efficient way as you can do it. So it's a great job.

Looking back, I was a chair from '72 to '76, and that was a very interesting time because in those days, teaching evaluations had just been introduced, faculty votes on faculty appointments had just been introduced, and so it was a time for change, and it had all come from the free speech movement and various student upsets of that era. Teaching evaluations were not perceived to be, in any way, a good thing by most faculty. I'm not sure how they see them now, because they've degenerated into just a few questions in which you just check the box, and there was no sort of sense of thoughtful feedback, which is what many faculty wanted. Of course grade inflation came along and, as I've said before, I think these two are highly related. So there were times which you had to deal with faculty members who didn't teach particularly well and should give more effort to it, and they weren't concerned enough to put that effort in, and that's the chairman's responsibility, to make sure that your faculty are doing the best they can in teaching. One has to remember that some people are naturally born, superb teachers, and other people have to really work hard to do it. Sometimes the ones which are really working hard at doing it are more praiseworthy than the ones who do it naturally and for whom it is no effort. The department chair is there to make sure that the best possible teaching performance is obtained from his or her colleagues. Sometimes it's not an easy task, but, nevertheless, it's his or her responsibility.

07-00:35:14

Redman:

OK. You alluded to some of the differences between being chairperson and being a dean. Today, that's much of what we're going to be talking about, the time period between '72 and '76, when you were chairman of the department, and '76 and '78, when you became the associate dean. So I'd like to ask just a brief follow-up question of what does a dean do?

07-00:35:39

Carmichael:

Well, the deans are responsible — there are so many deans on the Berkeley campus. I joined a great, large number of them. Some of them are deans who take care of faculty promotions and the distribution of resources to the individual departments. Some of them have jobs just like department chairs, only they are deans of schools. Many of the schools on the Berkeley campus

in those days were quite small, so a dean of a school could have a job looking after his or her faculty, which was comparable to a department chair in Letters and Science, but they have the title dean. And then there were deans who were part of the central administration in a way, and that was one of the jobs I got because I was a dean in the graduate division for two years and went to become an associate dean to Dean [Sandy] Elberg, who was the Dean of the Graduate Division, and when I got there, I think the only reason I got there was because of dinner parties, and I had met him at the dinner parties of my department chair in the early days, and I got to like Sandy Elberg a lot, and he asked me to become an associate dean. The job he asked me to look after were the reviews of the department, which he had started, and that was an enormously important aspect, in my view, of Berkeley's contribution to institutional quality. Many faculty members are very adept at taking care of their own quality, their own research prowess and so on. They know from research grants they get, from extramural foundations and so on, whether they're doing a good job or not, and it's their own pride which takes them along that way.

It's the job of the department chair and the administration to make sure that in each department, the whole is greater than the sum of the parts. To do that requires that you have a review every now and again, to make sure the department has the appropriate balance across all the fields in the area being examined. So the reviews were set up to guarantee that, to insofar as possible, to make sure that the whole was greater than the sum of the parts, that every field, new fields particularly, in the area being examined were being addressed in Berkeley and that the old ones were appropriately sort of being diminished, the emphasis on them. Now that's very tricky because that essentially comes down to faculty and all faculty don't necessarily want to change their fields, and they think their fields are very, you know, very important, even if they've become out of date and somewhat less prominent in the general area. So the reviews are extremely important in guaranteeing Berkeley's quality control, and I think they are the principal means in which Berkeley's high institutional ranking has been achieved over the last 40 years. So I was very pleased to participate in one of them. You learn an enormous amount by examining the workings of another department, particularly a first rate department, and so when I was offered the job of being the chair of the review committee of the Department of Chemistry, two things went through my mind; oh my God, it's one of Berkeley's flagship departments and number two is, this is going to take a lot of work.

Well, it was a very rewarding experience, which brought me in contact with a whole bunch of future friends, and I learned an immense amount from doing that review, and I had with me doing it, were some very significant people from the Berkeley campus and from outside. So I learned a huge amount from doing that. I learned that great stature in one's individual career did not give — what's the word? Did not necessarily correlate with good judgment and wisdom for a field as a whole, and let me illustrate my point. The department

chair of chemistry, when I was chair of the review committee there, was Joe Cerny, who I've subsequently become great friends with. I wanted to meet the senior faculty there or my committee wanted to meet the senior faculty to get a sense of where the department wanted to be ten or twenty years down the road. That sounds a sort of silly question but on the other hand, much of science is developing, and new fields are coming up all the time, and one wants to know, how are we going to accommodate those new fields. You just don't want to ignore them, you want to accommodate them, assimilate them, and incorporate them into our everyday operational life. On the other hand we have old fields which are sort of dying away. The Department of Chemistry, in those days when I looked at it, was very strongly related to physical chemistry, which is its great strength, and less so in other fields. So I asked to meet the senior faculty or my committee wanted to meet the senior faculty to get a sense of where the department was wanting to go. When we met, Joe Cerny arranged for his senior faculty to meet us. I think there were five Nobel Prize winners there and everybody else was a member of the National Academy of Science. There must have been 15 people there. Being the committee chair, I had to lead off with something like, "This department is very famous today. Where have you a sense of where you want to be ten or fifteen years from now," and I couldn't get an answer out of any of them. That was the most surprising thing to me. Either they didn't want to reveal what they thought the department should do to one another or they hadn't thought in those terms, that their own research programs were so important to them, they hadn't thought about the collective whole. So that was an extremely revealing moment to me, and I became friends with one of them, and he became my sort of boss in subsequent life, Glenn Seaborg. They were so involved with their own research and so powerful with their research programs and so influential with their research programs, I think they saw really, the Berkeley department being a sort of parking lot, as it were, a hotel for their own research programs, and yet the department had to make an effort. The whole had to be greater than the sum of the parts, and I didn't see how, given those conditions, it was going to do it. So that review illustrated to me firstly, that men of great distinction, and I think they were all men in those days, all those Nobel Prize winners, I'm sure of it. I think there might have been one senior woman faculty member, but I don't think that was there at the time.

The men of great distinction had really not addressed the problem of the department as a whole. They didn't see themselves in any way responsible of a department or as a department as a whole. Secondly, the other thing I found is that here is a department dependent enormously on non-academic staff and in my view, did very little to sustain and look after that non-academic staff. This is drawing on memory, and I know that led to a very interesting and almost acrimonious debate between myself as the Chairman of the Review Committee, and the Dean of the College of Chemistry. At the time, both of us were preparing our reviews to the graduate council. I think the Dean of the College of Chemistry at that time, Norman Phillips, felt that we had transgressed way off our remit in dealing with the non-academic stuff. I think

he's wrong, I thought he was wrong subsequently, and I made sure, when I became responsible for reviews on the campus, that we emphasized career development for non-academic staff. I made sure that they were always considered as part of the system.

07-00:44:18

Redman: OK.

07-00:44:20

Carmichael: So that was me as a dean, but there are plenty of other deans with totally different responsibilities. In conclusion I would say, so I did this review and it led me to think about how the campus was working as a whole, and that led up to my becoming subsequently, when I came back as a dean, I had one of the best jobs on the Berkeley campus because I knew more about the departments as a whole than I think anybody else. So the review system started me off on it. I support the review system. I don't know that it's going on as well as it did today, but I hope it is, because it gives the department the opportunity to put its best foot forward, to reveal its strengths and to reveal, without shame, its weaknesses too.

07-00:45:12

Redman: Now I want to go back to you becoming the department chairman. How were you selected and was there any controversy over your selection?

07-00:45:22

Carmichael: I think there was a great deal of controversy probably. I'm not sure my memory is good here, but I'll do the best I can. The department chairman that had just been appointed before me, was somebody who wasn't very good at writing letters and appointed, I think, two or three vice chairs, of which I was one.

07-00:45:51

Redman: Do you remember his name?

07-00:45:55

Carmichael: Yeah, I remember his name, and he's still alive, so let him be, and it's a matter of record. He was not good at writing letters, and you can't get people promoted without writing letters. You have to write to the dean, assessing everybody's research record and teaching record in order to get them promoted. There was one person who I was friendly with at that time, who was waiting to get a notice for tenure. I kept on getting, because I was involved with him getting tenure, I kept on going to the department secretary and asking her whether the results of his tenure case had been received yet. Finally she said you know, I have to tell you, the letter department chair says that it hasn't been received yet, and the reason it hasn't been received yet, he hasn't even prepared the case yet. I thought that was a disgrace. I thought that was outrageous because the department chair wasn't going to suffer, the poor candidate was. I've forgotten. I went to see the department chair and said, this is absolutely ridiculous you know, you've got to do it. And he said, well I can't

write letters, I'm just no good at it. So he said go and talk to the dean about it, so I went to talk to the dean, and the dean, I think, got involved and said somehow or other, I became the acting chairman and the previous chairman decided that his term would come to an end pretty soon thereafter. So I became an acting chairman for the rest of his term, and then I became the chairman thereafter.

07-00:47:45

Redman: Had it been a rotating chair?

07-00:47:47

Carmichael: Yes. It's always rotating.

07-00:47:50

Redman: And so when you became chair then, was the first thing that you did basically was write this letter?

07-00:48:00

Carmichael: Not only did I write that letter, but I found out, to my horror, that about 20 — no, it couldn't have been 20 — 10 of the senior faculty had not had any promotions. Two of our most distinguished faculty, ones that had been in the academy for years, had never got any promotions or salary increases for years, I mean, in the order of five to ten years, and I thought that was outrageous. So I settled down to write, I think about ten or fifteen promotion letters or merit increase letters, which resulted in salary increases, and I spent the rest of that time before the semester was over doing that. That really occupied me. I had to read all their materials and read their research, try to make sense out of it, and then write letters extolling their contributions and pointing out where they could make better contributions, and trying to give a review of what they'd been doing the last five or eight years. I think in each case, every request I asked for was granted by the budget committee and the deans.

07-00:49:08

Redman: Interesting. So basically it was a matter of: people hadn't asked.

07-00:49:14

Carmichael: People hadn't asked. People had been derelict in my view. Some of my predecessors as chairs had been derelict in their responsibilities.

07-00:49:22

Redman: And part of it was people feeling as though they were not very good letter writers, part of it, over-dedication time.

07-00:49:32

Carmichael: I don't know whether I told you this but my belief, formed since then, is that out of every ten Berkeley faculty, one has the inclination and the talents to be a good department chair. Two or three will do it conscientiously and the rest will make a mess of it.

07-00:49:53

Redman: OK. So does that —

07-00:49:56

Carmichael: So that means, by and large when you think about it, that the big departments are going to be well managed because they can go to the every tenth person and make sure that that tenth person becomes the department chair. The smaller departments are a mess.

07-00:50:12

Redman: What does that mean for systems like a rotating chair system?

07-00:50:19

Carmichael: Well, most people don't want to do it, and that's a good reason to do it actually in some ways, because somebody wants to do it and you think that person is not competent, you offer to do it or something. I mean there's a lot of that in it too. Maybe it's not just one in ten, maybe it's two in ten, but it's a small fraction of a faculty have the talents and inclination and the temperament to do the job well. The faculty however, will only vote for somebody who thinks they're a good scholar, and good scholarship is not necessarily related to good administration and being a good leader, and a good administrator is not necessarily a good leader. They are different issues.

07-00:51:02

Redman: Now it's challenging of course at a major research university. If you have someone, if you bring someone in who is a fantastic teacher and who would also make a fantastic administrator, sometimes that's not enough, correct? I mean, you have to have it.

07-00:51:18

Carmichael: That would be difficult at Berkeley because they want to know that you know, the currency of a Berkeley faculty member is your research, your scholarship, and I'm very happy with that being the currency. But it is. The trouble is that it leads to these anomalies when you get you know, totally erratic choices, that's the best way of putting it, as department chairs.

07-00:51:42

Redman: So is there a way to fix that?

07-00:51:46

Carmichael: Well when I became — subsequently, when I became a dean, we had to take departments into receivership because the department chairs had made such a hash of it.

07-00:51:57

Redman: And by receivership you mean?

07-00:51:59

Carmichael: Bring in a department chair from outside, which is an anathema to the Berkeley department, as you could expect, but it has to be done. My

experience at Berkeley would suggest that the big departments are always well run; history, English, chemistry, physics. Those ones with 50 or so faculty have always got a cohort, if you like, of people with the inclination, the talents and the temperament to be good chairs. The small departments with five or ten faculty, you'd choose one or two and then that person goes on leave, and you come up with one of the ones of the five maybe who make a mess of it, and they do.

07-00:52:50

Redman:

Do you have any more thoughts, in the next couple of minutes, on how, if there's any way to streamline this process?

07-00:53:00

Carmichael:

Well, I think nowadays, there is a — the administration or the senior administrators take you on a I don't know what it is. They give you a short course possibly, on being a department chair. In my days there was no such thing. You were just thrown in the deep end and told to swim, which is fine in some ways. I mean, I had enormous troubles, fights, with the deans about for example budget, and that's how I got invited to China, so it must have been in that era. It was an era in which Reagan was the Governor, and Reagan had just I think, as I remember, curtailed the university budget so that in fact I think the Berkeley campus had to lose about 160 faculty members, and a lot of those were coming out of the Letters and Science. So the budget of Letters and Science was very much under constraint. I was given the budget by the budget officer of Letters and Science and told to live within it, and if I didn't live within it, the overdraft would be taken from next year's budget. Well I objected on two bases. Firstly I had no say in what the budget level was and I also thought that OK, I would you know, this is a sort of dare isn't it, that if I go overdraft, it will be taken out of next year's budget. Well, I think that maybe if I overdrew by a whole, is it likely that he's going to have zero next year, if I make the overdraft big enough? Well I made the overdraft almost big enough and I was called in front of the dean, of who I subsequently became great friends with, Rod Park, and I was told to behave myself. I said yes, I am prepared to behave myself but for goodness sake, make sure that the budget process has some sensible component to it. I said, if you ask a department chair to prepare a budget and then you agree on a budget with him or her, then his professional competence is bound up in living within that budget. But if you just, as an edict say here's your budget, you've got to live within it, I don't feel bound by it. You don't know what all the various constraints are, what the teaching responsibilities are, what all the rest of it are. All you've decided to do is hand out a budget because you think that's what you can afford. That isn't my issue. My issue is, I've got to keep a research program, a teaching program and all the rest of it as department chair, and I have a minimum amount of money to do that. Unless you give it to me, the department can't run. So if you're going to give me — in the future, unless you're going to give me an amount of money which I think we can agree on that I need as minimal to run the department, I don't feel bound by your budget.

07-00:55:58

Redman: OK.

07-00:55:59

Carmichael: That caused a riot but it also got me invited to go to China, because it got me — it gave me — it brought me to the attention of the high administration. I was becoming a troublemaker.

07-00:56:16

Redman: OK. Well we'll pick up with the trouble making on the next tape.

## Audio File 8

08-00:00:07

Redman: All right. I'm sitting down with Dr. Ian Carmichael, and this is our second tape for today, which is May 5, 2007. When we left off, we were talking about your job as the chairman of the department, and you concluded that it was a difficult but a very enjoyable job.

08-00:00:31

Carmichael: Rewarding rather than enjoyable, I think.

08-00:00:34

Redman: OK, rewarding.

08-00:00:35

Carmichael: There is a difference.

08-00:00:36

Redman: OK, yeah, certainly. Certainly that is a big difference. A lot of your duties changed and shifted, and you were probably given more opportunities to do certain types of things and fewer opportunities to do other types of things, and so you had to probably shift around some of your duties and time commitments. How did that affect your life in general, I mean your whole life, your family life?

08-00:01:07

Carmichael: Well, when I became the department chair, I was committed to writing a textbook, or I was involved with writing a textbook at the time I became the department chair.

08-00:01:17

Redman: What was the name of the textbook?

08-00:01:19

Carmichael: *Igneous Petrology*, that was the name of the textbook, and it was published in 1974. I became the chairman in 1972 so it was in the full throes of writing it and reading the gallery proofs and so on throughout the first two years of my chairmanship. The book had demanded many things of me. I was writing it with two of my most esteemed colleagues, the people who, when I was an undergraduate, I looked at with awe and reverence: Frank Turner and John

Verhoogen. They of course authored a book back in the '50s, which is what I read when I was an undergraduate student. So here was I, in the Berkeley department, the place which I thought was next to heaven, writing a book with the two people who I had the most august reputation in my field when I was an undergraduate, when I had been a graduate student at Imperial College. Writing a book with those two was interesting in so many ways.

Frank Turner was a philosopher, or as he aged he became more and more philosophical, and therefore he wanted to quote Karl Popper in as many possible contexts as he could. John Verhoogen, on the other hand, was becoming more and more quantitative, and he couldn't abide the fact that so much of the book didn't really have equations in there which he could manipulate and formulate and sort of filter. As John Verhoogen's second language was English, he, like many people whose second language is English, is probably better at dealing with the English language and the written language than either I or Frank Turner, and Frank Turner believed that he was a master of expression in the written word, and he had convoluted sentences. For example, I would write that pyroxene is present in this rock. Pyroxene uninitiated is an essential rock forming mineral, and it's found in the great proportion of almost all igneous rocks. He would take that sentence and say pyroxene can be seen if looking down a microscope, at a thin section of this rock. He liked to invert the sentences and turn them into a somewhat difficult construction, so that I found them difficult to read.

So here was I, committed to a book, and writing with two people like Frank Turner and John Verhoogen, as I said at lunch, was very much like being committed to a marriage, but with none of the advantages and all the disadvantages of that wedded state. I used to have the text of the various chapters and hand them to my graduate students, and we used to run a seminar on them, chapter after chapter after chapter, for as long as it took. I remember one of my students getting hold of one of Frank Turner's chapters and sort of marking it heavily, saying the language is bad here, the English is bad, and all the rest of it. Frank Turner, this aghast but far from benign elderly professor, got hold of this copy that my graduate student had looked at, and was absolutely disgusted and dismayed to see his quaint, intricate English being so ripped apart by this person he didn't know. Anyhow, we eventually got over that and when the book came out, I think it had some good parts and it had some bad parts, like all books. I think I could never have written it by myself. I could have written it with John Verhoogen, but Frank Turner had a cast for his part of the book which I found difficult to accept, but on the other hand I'm sure that the readers find it just as important to their mind as the part that I wrote.

I was pleased the other day, literally the other day, two weeks ago, two days ago this week, that two students at Berkeley who I hadn't – I only barely know them, because they have offices next to mine and I have nothing much to do with their work – they came to me and said they just bought a copy of this

book, which has been out of print now for 25 years, and they asked me to autograph it. I would be pleased to do. Secondly, I said, well why did you buy it? They said it's really important, I've learned an awful lot from reading that, and I said it was written in 1974 for heaven's sake. They said well, there were parts of it which were timeless, and I felt as though I was walking on cloud nine. To be told, when you're in retirement age, by two hotshot young graduate students that what you wrote 30-something years ago is timeless was the greatest praise you could have got, and it was un-orchestrated. That's the important thing. It was spontaneous and un-orchestrated. So I was delighted with that.

So when I was a chairman I was writing that book, and that required attention every night. Every night I had to go and write something, and of course this was the age before word processors or anything like that. It was all hand-written. The book was eventually published at 780 pages and you could imagine that's over 1,000 handwritten pages before it was even typed. So it was a monumental effort, but looking back, I learned an enormous amount and I realize that the course I taught up to them was missing all sorts of essential parts of the field not because, as I fooled myself it was irrelevant, but really because I'd never understood the stuff. And it was when I had to write this textbook, I came to grips with it, understood it, and I realized how, if you like, appalling I was in terms of my responsibility of giving a comprehensive class. But then I settled down and I learned this new material and realized how important and significant it was, and I think it's that part of the book which is still, if you like, timeless insofar as it is. I enjoyed writing it. I enjoyed the conflict with my two colleagues. I have the greatest respect for John Verhoogen, who I think is the greatest single intellect I met in the earth sciences since I was around, and I became friendly with him as a consequence of writing the book. He was a great faculty member and a great idol of mine for many, many years.

Well, that's how I passed being a chairman in the evenings. It was an imposition on my wife of those days because every night I used to spread out in the dining room. I had paper all over the place and papers and things, long before the days of word processors or laptops, and the dining room in those days was a mess, and it stayed that way for two or three years before I finished the book. And she, bless her soul, typed it. She spent half the time typing the text from Frank Turner and John Verhoogen and myself, and put it into some comprehensive and coherent form that he could all read it easily. Then we could comment on it and it could then be corrected and retyped. It was then sent to the printer of course, and you get galley proofs and you argue about those. It went through fairly painlessly. What pleases to me to see, I had to sort out all the reprints that were sort of the references, and I put them in piles. I got them all on a little piece of the paper and I put them along the floor in the department, against the wall, I put A, B, C, D, E, F, so we could highlight all the authors in various piles along A, B, C, D, E. It took ten years before the cleaners got rid of those grease painted letters A, B, C, Ds along the

foot of the wall, which is interesting to me, to see them for so long afterwards. It was the mid-1980s before those letters disappeared finally.

08-00:09:47

Redman:

So in a sense, is it a stretch to say that it gave you and your wife an opportunity to work on something together?

08-00:09:55

Carmichael:

No, we never worked together. She was a history major, she was an Australian, and I say was because unfortunately she died a few years ago. She took an interest — she loved the traveling part, and I used to take her on all the fields trips if I could. She seemed to love that, and she was a very patient person, so she was quite adept at doing that typing and had enormous patience in trying to read rather incomprehensible writing of all of us. The thing she most came to terms with is when I became chairman, the style in those days was to entertain both the graduate students and the faculty in your home. We gave innumerable dinner parties, both for graduate students and for the faculty, for visiting faculty, and I think they were well received. I know that she used to get into a tizzy beforehand because she wasn't a good cook, and she didn't know what to give these people. She used to get all these cookbooks, look at the color pictures and decide that this color picture looked nicest, so she cooked that. There's a world of difference between a picture of something and the actual product when you dealt with someone who was not very competent at doing it. But as the years went by she became more and more competent. She never became at ease with some of my more alcoholic colleagues, but we had a very nice house, which is now presently owned by my daughter, and which is very easy to entertain in, in the summer particularly, because you could spend time on the patio and in the yard.

So looking back on my chairmanship, it was a time in which almost all the graduate students came up at least twice a year, almost all the faculty were invited and came at least three or four times a year, and so that the most bitter of contest of a faculty meeting could be, if you like, dissolved in the evening at a dinner, with the appropriate amount of Californian wine and so on. And that's one of the benefits of those days, which I think is probably missing nowadays, that in fact that wives or significant other people stayed at home. They weren't required to have another job to pay for a house or they didn't have another job because they chose not to have one. That allowed people to entertain so much more. In a way it provided a social glue to the department which professional contests at faculty meetings often needed in order not to be a permanent rupture. So it was a time in which, I think, many people were happy being in the department, even though they disagreed in many ways about what this particular chairman was proposing to do.

There were two things, looking back, which were significant to my memory. I was the first department chair to start raising money and corresponding regularly with the undergraduates and the graduate students who had

graduated from the department. I paid a technician to go and get all the addresses of all our alumni from the central registry in Sproul Hall, and it wasn't in those days known. So this was the 1970s and the idea of asking for funds and sending out a newsletter to alumni in those days was looked upon somewhat suspiciously by Letters and Science, and certainly not encouraged because they thought we were a state university and had all the funds we needed. It was time to change as you, the reader, I'm sure will understand, but it did start something which has persevered for more than 30 years now; the regular connection of my department to its graduates, so that they have a newsletter once or twice a year by which they can feel connected to the department. I won't say it's paid off in grand style but it certainly gives me the sense that people do contribute. They may give small amounts, but it's significant that they give, and the newsletters make every one of our alums feel in contact with the place where he or she spent some significant part of their lives in. I think that was a good thing.

The other thing that I started was that I invited all the department chairs of the various departments of geology in the UC system to come and spend the weekend at Berkeley. They all came, but that provoked an amazing series of initial responses. The guy, he's still alive, who came from Davis, thought that this was going to be an institutional rape, that he didn't trust any Berkeley faculty member to do anything generous of any sort. But the purpose behind all this was to sort of see if we collectively could get ourselves together and provide, if you like, more cohesion and articulation between the various campus efforts. I think there were six other departments, so there were seven of us in all, and I invited them all to dinner at my home. I think they stayed in the faculty club, and we had a big cocktail party so they could meet all the Berkeley faculty, and I think we spent the next day talking about the things that we could do. We invited one of the vice presidents. I've never forgotten his name, Donald Swain. He was the Vice President of Academic Affairs in the Office of the President — to come, and the idea was that we didn't do as much — we didn't duplicate. It seemed to us it was silly to duplicate so that UC San Diego where Scripps Institution of Oceanography was such a preeminent place in the world of oceanography, it would be silly for anybody else actually to give a program on oceanography when one of the best in the world was given on UC campus. Similarly I think, as I remember, meteorology was being done at UCLA. Why should Berkeley do it when it was being done so well at UCLA. Well, we went through this sort of aggregate of what our departments did and we decided that we all gave a field camp, and we all spent a lot of money on our annual field camps for graduating undergraduates, and they lasted for six or eight weeks, and they were in the west somewhere and they called it camping out and so on. We thought we would actually combine with some of the other campuses. I mean, some of the campuses were quite small and therefore, they didn't have instructors who were prepared to do it. Berkeley was alone in all the UC system in its faculty volunteering for field camp, whereas the rest of the UC system provided teaching — oh, Berkeley provided teaching relief but not a

salary, whereas all the other campuses that I remember provided a salary. So the traditional approach at Berkeley, and we'd been doing this for years, was we've always done it this way and there's no reason to change it. So Berkeley's faculty, and I believe it's still true today, still teaches summer field course without any compensation, unlike almost every other faculty member in the country. So we agreed that in fact we should send students to camp, and then the chairman at UCLA said he didn't think Berkeley students were well enough prepared to attend the UCLA camp. I was somewhat surprised at that and somewhat threatened by that, somewhat disappointed by that, and the fact is that you know, it seemed such a good idea initially, to try and amalgamate the teaching effort into the field camps, and we could all provide, you know, we could take turns to provide a field camp and all the students could go, but that unfortunately ran afoul of a lot of preexisting prejudice.

What arose out of that conflict — sorry, not the conflict, that conference, is that for a time, we had a regular chair's conference in each campus, which was well attended and which I thought very valuable, and for about five years it continued, but in the meantime the vice president had offered money to allow intercampus exchanges, and I went on an intercampus exchange to UCLA because they had nobody in my field. I've forgotten the year I went, I can look it up, but I had a really good time at UCLA for my semester that was there. They found me a little house in Westwood, which is the most palatial part of — other than Beverly Hills, of L.A., and I enjoyed my time teaching undergraduates there, and some graduate students. I became great friends with a student — or a young faculty member there, who is now in Berkeley, Don DePaulo, and looking back, it was a time in which I made, you know, I was very impressed with three or four graduate students there, who subsequently came to my sort of end of professional life party in Wyoming, and I was delighted to see them there. Somebody from Alan Glazener and his cohort from various universities in this country. So my time at UCLA was, I think very valuable to me. What it taught them, I think, was something quite different, and I only found out about this a year or two ago. I brought down my own graduate students to give lectures, and that was something that they had never seen before. They weren't treated like that at UCLA. Here was I bringing down students of mine, working with me, and they gave lectures on their fields to graduate students and undergraduates at UCLA. I found out about two years ago what a huge impression that made on them, because they felt that that was exactly now a graduate student should be treated, and that they weren't treated that way. It didn't occur to me that it even was something special, so it was quite a revelation for me to hear this in Wyoming at a late night of drinks, about their experiences when they were graduate students at UCLA.

So that idea of collaborating with the other campuses, I think had enormous potential. It faded away, I'd say, after about six or seven sessions, because nobody had any particular interest in it. One of the things we did have was an annual big UC cocktail party at the national meetings, and I don't know

whether that's even continued, and that itself may have fallen away. So it's a pity and I think the campus has become more independent, not less interdependent. They're more and more independent of one another and they don't feel a need, in any way, to collaborate or not to duplicate one another's resources, teaching resources. But that's the UC system. Every campus is a boat in its own bottom you know, and every chancellor wants to be able to make his or her campus number one in the nation, and you've got to do that in the best way you can or he or she thinks they can, and so there's no concern, in my view, to make the UC system use its resources in a more effective way.

08-00:22:17

Redman:

Now my understanding is that the student enrollment at UC Berkeley, in the Geology Department, used to reflect the changing needs of the mining and petroleum industry more than it does today. Can you speak a little bit about the transition?

08-00:22:34

Carmichael:

Golly, this is not my field, but I would say that the mining industry was flourishing in North America probably up to about 20 years ago, and the students knew that the mining — there was a career to be spent in the mining industry. It was working big mines in Montana, Anaconda, in Arizona. Is it North or South Dakota, where Homestake is? Anyhow, there were — in Colorado, there were jobs for expiration geologists and mine geologist in quite a number of American companies. Then I don't know what happened exactly economically, but the mining industry and its expiration arm was essentially taken over, as I understand it, by Canadians and Australians. I think the biggest gold producer now, at the moment, is Barrick Gold Corporation, which is a Canadian Company, and I think that's what's happened, is that most of the exploration now in the mining industry, for the non-coal industry, is in fact done by geologists and earth scientists trained in Canada and in Australia and in Europe too. So the employment market for geologists dropped away.

In the oil industry, I think it's — I don't know enough about the oil industry, but my suspicion is that as the oil industry got involved with more and more oil fields in less developed countries, I think part of the agreements they signed in order to get those oil leases was that they should train or be responsible for training the native, you know, the local population in some form of earth sciences, so that they could participate in the riches, if you like, and in the professional life of those oil companies. So I think in Indonesia, for example, I think there are a lot of oil fields around Indonesia. Indonesia has demanded, through its leases, that Indonesians be employed as geologists, because they'd been trained that way. And I'm sure that's happening in many other places as well. So the demand for geologists and geophysicists in this country hasn't withered away completely, but I think it's diminished somewhat, as the oil companies have had to accept and exceed to the requests of the countries in which they're operating, where they are getting oil, which are not just locally from the United States and Canada. So the market, if you

like, for geologists has changed. Geophysics has changed enormously and it has diminished a huge amount, but if you're in Canada or Australia nowadays, it's still a booming market for those people. Canada found a huge diamond field what, about ten years ago, and is now the second largest diamond producer in the world, if not the largest. So Canada has a huge tradition of exploration, of prospecting and so on, as does Australia. In this country, the likelihood of finding anything which has yet to be found, as it were, as unexplored, unknown, is very, very small. The market, I think therefore, for our graduates is small.

08-00:26:16

Redman:

OK, interesting. How was your family life changing during this time? Your children stayed at Berkeley High, is that correct?

08-00:26:33

Carmichael:

Yeah. I don't know when they graduated. My children went to Berkeley High. My three eldest children went to the Berkeley schools, and they all went through Berkeley High, that's right yes. Berkeley High, in those days was a social experiment. Berkeley was the first city in the United States to bus. It was perceived to be a big social experiment, and I think the social experiment ran counter to the educational experiment, namely that Berkeley, as a city, decided that it was very important for people to learn to live together, the races to live together. So I won't say that education was completely forgotten, but it certainly wasn't on the front burner any longer.

08-00:27:30

Redman:

And so how do you think that, in the long run, has affected your children and the children of other faculty members who were at Berkeley?

08-00:27:40

Carmichael:

In my children's case, I think that they didn't do very well in high school because they weren't — there wasn't any pressure on them to do so. The pressures were quite different. Those were the days when you would let it all hang out, do your own thing and all those — I've forgotten all those sayings of the day, and they swallowed it hook, line and sinker. Why not? I mean, everybody else was doing it. My two older kids did that so that when the time came to graduate, they graduated I think, but they didn't do it with any star quality. That would be the best way of putting it. My son, for example, had to go to junior college, and enjoyed it, but he went there for about four years before he got into UC Santa Barbara, from which he subsequently graduated as an engineer. My younger son was different, and he went straight to UC Santa Barbara from Piedmont. He'd been at Piedmont High School as opposed to Berkeley. So things were you know, there was uncertainty and uproar, if you like, in the education system in Berkeley and in fact, now that I think about it, my ex-wife moved to Piedmont so that she could put the kids into Piedmont High School, which was less prone to the social upsets that so distinguished Berkeley in those days.

[portion deleted]

Redman:

Let's switch gears a little bit. I'd like to talk a bit about academic writing and journals and the process of geological science. In 1973 you began editing the journal, *Contributions to Mineralogy and Petrology*. Can you tell me a little bit about that experience?

08-00:31:12

Carmichael:

Yes. That's a very interesting experience because it has ramifications in so many ways. *Contributions to Mineralogy and Petrology* was a German journal, published by a German publisher, Springer. Just before I took over as one of the two executive editors, and I shared it with a very distinguished German professor, it was a journal which had a German name beforehand. It wasn't a journal which had made a big mark on the profession. In those days we didn't have citation (inaudible) and I would say it wasn't a highly cited journal. I got to know the publisher, Springer, Conrad Springer, who owned the company, and he was prepared to put some money into it, in advertising and so on, and gave me absolute latitude as an editor. And the latitude was this; that I could reject papers based on the fact that I had too many on that subject. You could say the paper look, it's an excellent paper, it's been reviewed well but I'm sorry, we've just got too many. And that is a totally new concept for most scientists to accept in those days, so I must admit, the rejection rate when I became the editor in 1973, the rejection rate went up to about — I don't know what it was but it could have been in the order of 50% or even more. Some authors were really upset about having their paper rejected. I have to tell you, I think running a journal is very much like running an airline; every single author expects his or her paper to be published, and there's no gratitude for you because you accepted it. It is automatically assumed you will accept it and the only sparks come is when you've rejected it. So you don't get any credit for acceptances, you get all the hassle of it when it's rejected, and there is a payback, and the payback comes in the following way. When you apply to the National Science Foundation for a research grant, they sent out your research proposals to nine people, who are anonymous reviewers. And there's no question of it, that my reputation or my actions as a general editor, on rejecting some people's manuscripts in the past, certainly came into play when those people who were examining and evaluating my research proposal. There were times when, I mean there were unbelievable things said about my research proposals, which could only come from a disgruntled author who had his paper rejected. I can't prove that but it was certainly consistent with everything else I know.

Running a journal actually was hard work. I was getting three manuscripts a week, 150 a year, something of that order, and they all had to be examined, sent out to reviewers, and then the reviewers comments put together and sent back to the author. Don't forget once again, before email, before word processors, this had to be done with a typewriter and with a mailing system, so it was time consuming. After about four years, there was a conference in Germany on the two editors and so I went over to that as one of the two

executive editors, and I met the executive editor over there, and I found out two things. Firstly, that he's getting a salary or a royalty payment to be the editor, which I wasn't, I was doing it for free, and secondly, he was getting secretarial help, which I wasn't. I just had to pay for it out of my own pocket. So I was really upset about this situation, so I immediately went to see the manager, Conrad Springer and so on, and said look, I want this, that and the other. And he said all right you can have it, I was surprised you didn't ask for it before. I guess looking back, I was surprised I hadn't asked for it before, so that when my turn came for the editorship to be handed over to my successor, I made sure that he knew that he could get money as a royalty payment, you know, per year, and money for a secretary. Once that happened, running the journal became much easier, but after a bit it has advantages. You keep up with what's happening. You know what's happening in instantaneous, modern research, and that's great. So you're aware of what's happening. I used to go to the national meetings and if I heard a good paper, I used to go up to the person giving the paper and say, I would like to encourage you to submit that to *Contributions*, and I found out a very good way of increasing the range of the papers and the significance of the papers in *Contributions*. So I found at the end of my 17 years as the executive editor, that the ranking of the journal in the world had gone up considerably, and I put it down to the fact that A, our rejection policy was pretty high and B, we recruited manuscripts from people who I saw at the national meetings. Those in combination managed to increase the ranking of the journal in the community.

08-00:37:07

Redman:

Do you think part of recruiting manuscript submissions from authors is due to the fact that authors feel flattered that the editor would come up to them and say you know, I really like this paper, and so they might not have thought originally to submit it to *Contributions*, but then as soon as you talked to them, they think wow, you know.

08-00:37:32

Carmichael:

Yes, it may have done. It's a perfectly plausible appreciation of the situation but whether that's what they thought, I don't know. I have to say that to support your proposition, most people and in fact almost everybody I went up to accepted the invitation.

08-00:37:54

Redman:

Interesting.

08-00:37:54

Carmichael:

Yes. So they were very anxious to do it.

08-00:37:56

Redman:

This was very effective.

08-00:37:57

Carmichael:

It was a very effective way of doing it, and the journal flourished and it became you know, they published more and more volumes every year and

they were keen to do it. As a journal, it was so expensive that there were essentially no private subscriptions, but I wasn't allowed to have anything to do with the business side of it. It would cost \$1,500 a year or something, 20 to 30 years ago, you know, so it was expensive. That's how Springer-Verlag made its money and that's how private publishers do the money. There's a big conflict between the private publishers and the publications of the scientific societies, who don't have any you know, the resources aren't anything like the resources of a publishing house. I enjoyed my time there, I'm still an associate editor, but less and less good at it because I'm not up on modern research, today's research. I'm not topical enough unfortunately any longer. I tend to withdraw, go back to what I did ten or fifteen years ago. What I understood there was topical then. I don't read the modern literature enough to be current, and that's a real problem if you're going to review papers now, so I don't review them any longer.

08-00:39:18

Redman:

Here's two large questions. The first one would be does your own research as an editor — you talked about being able to keep up on the research. Does your own research suffer or improve while editing a journal?

08-00:39:36

Carmichael:

Well I think one of the benefits of my editing the journal was that my graduate students could publish in that journal after the papers were reviewed, and they were more or less guaranteed publication after the appropriate review process had gone through. That was very satisfying to them. They knew that ultimately they would be published, and it was in a substantial journal. It was growing. Every five years it grew better. So it was a great benefit to them. I must have published 60 or 70 papers in that journal, and I like it now. My successor, Professor Tim Grove at MIT, has, I think continued the editorial diversity and the interest, which means that every issue that is published has something of interest to everybody in that field, and that's very important. You can't allow it to have too much in one sub area, so that when a subscriber picks it up or the reader picks it up and says oh, well there's nothing that interests me. There should try to be something there of interest to everybody in the field of which that journal purports to respond to.

08-00:41:09

Redman:

Here's another large question. You edit this journal from 1973 to 1990, which is a long time span. How did the specific subfields that the journal dealt with change over the course of this time?

08-00:41:26

Carmichael:

Oh, that's a really good question, and all I can tell you is the subfields did change, but I'm not sure I know quite how they — I'm not sure I can categorize them accurately. My sense would be that isotope geochemistry flourished more towards the end of that era. In other words, more and more departments became more and more interested in what trace isotopes could tell them about the origin of rocks and what trace isotopes could tell them

about the ages of rocks. Therefore, that in combination lent a powerful support to all sorts of studies which previously wouldn't have been originated, because we didn't have high quality mass spectrometers to give us the isotopic ratios we need. That came about, I would say, in the '60s and '70s. If you remember that the United States put a huge amount of money into putting scientific equipment into the universities in the '60s and '70s, and of all that huge amount of equipment that went in, mass spectrometers were very high on that list, and mass spectrometers gave you the capacity to measure isotopic ratios and, therefore, the age or whatever of the rocks. That became a very strong theme in the papers in which came into *Contributions*. By and large, I would say there was less and less emphasis on field work, which is a pity, but that only represented less and less — that didn't mean to say that the journal wasn't interested in having it. It was just that people had to find another home for their field studies or that field studies themselves were less popular than they used to be, and that I know to be true. The National Science Foundation found it more and more difficult to support field studies, because reviewers just wouldn't give them the high rankings which were necessary to do that. All the field studies that I did actually, thinking about it, were supported by the National Science Foundation, only because I could connect those or marry them up to an experimental problem, and that always reviewed well.

08-00:43:54

Redman:

Interesting. Now how about as an editor, we talked a little bit actually over lunch, about the process of being a co-author back in the '70s versus now, where you can just email papers to one another. Do you think that process, I mean if the internet really didn't really, I don't want to say revolutionize the way work was done until the '90s, but.

08-00:44:26

Carmichael:

Well there is a custom and there is a, I'm going to say a procedure, but I hope there is a procedure for allocation of co-authorship between a research advisor and his or her students. Every department, every field is different. They have their own traditional bases for that. In my case, I wasn't prepared to be a co-author just because I supported the research, unless I'd actually made some sort of intellectual contribution to it. There were times, many times actually when I think about it, that I wasn't on my students' papers, because there was some measure of disagreement about the interpretation of the data, and I wasn't prepared to stop them publishing it. So the easiest way about it was to sort of not be a co-author and just let him or her say, in the acknowledgements, that it was supported by my research funds. I found that's the most responsible way of going, but even then you get into trouble. Students think that maybe you didn't give them enough acknowledgement for their work, but by and large, I think my students felt that the division of authorship was probably pretty fair. I don't think I claimed a lot which wasn't my due but perhaps every now and again somebody thought I had done, but I was never aware of it. They seem to think that, you know, if they questioned me and said look, I'd like to be the first author, I've done it, I'd say of course.

In fact, I was not often the first author with my students, unless I had done the majority of the work, and so I feel quite — my conscience is clear, if you like, on the subject of being a co-author with students. But my conscience is not clear on the university as a whole because when I was a dean, I had to adjudicate on these things, and it depresses me how often faculty members would actually use students' work without attribution, and it invariably causes upset. I mean there's no harm in attributing this work to your student, I think it's fine. Everybody knows the research advisor is responsible. You don't have to claim the last — you know, squeeze blood out of a stone, and everybody knows that most students are reacting to or influenced by the research, the ideas of the project from their research advisor. You don't have to claim it by being first author and so on, and all the rest of it.

08-00:47:12

Redman:

OK. So that's the advice that you would give to a young faculty member?

08-00:47:18

Carmichael:

Absolutely. Bend over backwards not to grab too much.

08-00:47:26

Redman:

Is there a difference between faculty members working with graduate students on papers before and after tenure?

08-00:47:38

Carmichael:

That's a good question. I suspect there probably is, but I never thought about it. At least I've thought about it but I never quantified it. When you ask a question, before you can answer it you have to quantify it, and I know I haven't quantified it. I know that young faculty members are much more impatient to get stuff out and therefore, they drive their graduate students harder and faster than probably a senior faculty member who, you know, sees there's no benefit in publishing it this week as opposed to next week. So I think in that sense yes, you're right. Young faculty members have to learn that after all, it was just a few years before that they themselves were graduate students, and they have to come to terms with however they were treated, and most people treat their students as they were treated themselves when they were students, and that's how it goes. By and large, I think you should always take the generous path. Everybody knows or it becomes evident. After a bit, frankly, if I said I'm not going to take my name off a paper, a student can get really upset in later life because — and I said look, I'm the contributing name and he or she would say well, nobody will read it unless your name is on it, and there's that element to it as well.

08-00:49:08

Redman:

So sometimes students would see it later in life, as there being an advantage.

08-00:49:12

Carmichael:

A great advantage right, even though you haven't done a lot, you know, but you've always got to do something. It can't be just the provision of financial support. The chemistry department and so on, that is sufficient, but everybody

knows that. In my field, I don't know what it is. For me, that has never been sufficient. Providing financial support is not enough. You've got to have an intellectual component to the paper or to the material.

08-00:49:40

Redman:

Interesting. Now in teaching graduate students how to go through this process from the germination of an idea to maybe doing a conference presentation to a journal article, and then through the process of editing and reediting the galley proofs and all of that, was being the editor of a journal and being on the other side, was that a big thing as far as learning how to teach graduate students how to go through that?

08-00:50:10

Carmichael:

Oh yes. Because you know the editor of a journal will only take manuscripts of a certain length, and that certain parts of a manuscript will not be published because they're considered either redundant or superfluous or they can be put on some data file somewhere else. You can warn your students ahead of time. The trouble comes sometimes when you say look, I know I'm a co-author of that, I know you want to publish that, but as an editor, if you want to put that in *Contributions*, you're not going to be able to put that in there, so think about that now. Sometimes they resisted that a bit. You should ask my students about this because think about it. When you, in a few years, are going to write something with your research advisor, you are by and large, you're going to accept what he or she says about what should be done, because they've got status, they've got experience, right? But you know, ten years afterwards, you may realize that you, in some way have been short changed. Something was told to you which you felt wasn't fair. Something was eliminated from your study which you felt was germane to the subject or important to the subject, simply because your research advisor or your co-author said no. I'm not sure your research advisor will ever know that, because you're not in the position to say look, I disagree with you completely. I'm not sure my students ever felt they could do that. It is not an equal relationship, a research advisor publishing a paper with his or her graduate student. I'm not sure you want it to be an equal relationship. Someone has got to call the shots, and that's why you have a research advisor and that's why you have a student learning the business. I don't think most of my students would think that I got co-authorship unfairly or I pushed the issue in any way to gain papers at their expense. I don't think they would say that, but I can't be sure, so you'd have to ask them.

08-00:52:30

Redman:

OK. Well, I eventually want to get into the process of how you became an associate dean, but I think it would probably be best to save that for our next interview. Is there anything that we've talked about today that you think you'd like to add, as far as that time period, being chairperson of the department and talking a little bit about academic writing?

08-00:53:02

Carmichael:

Looking back on being the chairperson of the department, one of the things I learned when I was in the service was that you should always make sure, you should always presume that you're not in no sense indispensable, and therefore, part of your job is to train your successor or to select a successor or to give that successor an opportunity to show that the successor has the opportunities. I appointed a vice chairman who I thought would be a very good department chair, and he did a very good job and indeed, when my term was up, he became the next chair. I'm not sure he turned out to be quite as good as I thought he was going to be, and I think sometimes he was too bewildered by some of the senior faculty and not secure enough in his own opinions. On the other hand he did his best and he was an honorable guy, and I say was, he unfortunately died a few years ago. But it's certainly the job of a chair insofar as you can do it, to try and find and bring up or bring forward a successor, and I found that particularly important when I became the Director of the London School of Science.

08-00:54:33

Redman:

OK great, thank you very much.

**Interview 5: May 11, 2007**

## Audio File 9

09-00:00:00

Redman:

So the first thing I'd like to do is give a little bit of a summary of what we talked about last time, and then from there we'll start asking questions about academic administration. Last time we did touch a little bit on academic administration. We talked mostly about your time as chairman, which it seemed to be a very significant time in your career and you seem to derive a fair amount of satisfaction from it, even though you wouldn't necessarily describe it as pleasurable necessarily. Also we talked about academic editing and your time editing journals, and we used that to talk about how the field of geology changed over the course of that time. So I'm curious if there's anything that you thought of since the last time we spoke that you'd like to add to those topics. I know those are very general topics.

09-00:01:40

Carmichael:

Well, it goes to what we were just talking about. When you're selected to become a department chairman, you're there to get the place to run as a whole, to make the whole greater than the sum of the parts. You have three major responsibilities; the students, the non-academic staff and the faculty, and you've got to balance those, very often competing interests. The faculty are interested in their salary raises, the non-academic staff, particularly the technical staff, are interested in their conditions of work, and the students just want to know that their courses are coherent and well-articulated and by and large, that the distribution of funds is fair and transparent and so on. It is because you're a reasonably competent chair that you come to the attention of the administration, because every chair has to report to a divisional dean. My divisional dean in those days was Cal Moore, and we used to fight a lot, in a very benign way. "Fight" is possibly the wrong word. We used to have many disagreements, but those were the years in which Reagan had cut the budget of the University of California dramatically. I don't remember precisely but I thought L&S had to give over 120 faculty slots in those days. So the opportunity for a department chair to go and get new faculty slots was extremely restricted.

09-00:03:05

Redman:

During your time as a chair, you did not bring in any new faculty members, is that correct, because of those.

09-00:03:13

Carmichael:

Yes. I'll go into why. My department, when I became a department chair, was a little antiquated in outlook, traditional in outlook. I had a good, solid career but it was nothing super. It had been before but it was losing its impact, and one of the reasons it was losing its impact is it had made some rather ineffective appointments. Those were the days, don't forget, before the faculty had a vote in who was appointed. So they were before teaching evaluations

and before faculty votes on appointments. There were several appointments who, in looking back, were not as good as they could have been. So frankly, the first thing I had to do was to think about if you can't hire any new people to dilute the sort of the talent you have got or the lack of talent you have got, it is to get rid of them. So I was successful in persuading two people to move.

09-00:04:24

Rubens: To retire early or to go elsewhere?

09-00:04:27

Carmichael: Well, one became the Vice Chancellor of the Berkeley campus and subsequently became the Chancellor of UC Santa Cruz, where he lasted for a year.

09-00:04:38

Rubens: Biester?

09-00:04:39

Carmichael: No, Mark Christensen. And then when he only lasted a year, I got to know Chancellor Bowker because I wouldn't take him back, and Chancellor Bowker thought that was very mean, very prejudiced on my part, and I said no, seldom has the department got an opportunity to make the same decision twice on the issue of tenure. I said it screwed up the first time, and it should never screw up the second time. So Mark Christensen, who is a very nice guy, a very generous, guy, went to work for Energy and Resources, where they found a slot for him, which had been generated by Sandy Elberg, as I understand it. So he was one person that if you like, left and we could fill the slot of. Another person decided he'd like to do poetry, and so he had money of his own and decided to retire to a farm in New Mexico. So that really helped the situation a little bit, because none of these people were, if you like, on the research edge, on the cutting edge of the department. They were adequate faculty members but they were not the sort of faculty members that in my view, Berkeley needs if it's going to maintain its position or enhance its position in the academic world. So that was one of the challenges, if you like.

09-00:06:03

Rubens: How many faculty did you have at that point?

09-00:06:05

Carmichael: I suppose about 15, 18, something of that order.

09-00:06:06

Rubens: So it's one of the smaller departments.

09-00:06:08

Carmichael: Yes.

09-00:06:09

Rubens: And also precisely in '76 is when the women's program is being established. Did you ever get any challenges over that or did you have any women on the faculty at the time?

09-00:06:21

Carmichael: No. It's about '76 that the faculty vote came in.

09-00:06:30

Rubens: That was my next question. I was going to ask you when. I didn't know that.

09-00:06:34

Carmichael: It came in at about the time of the free speech movement.

09-00:06:37

Rubens: There's a whole series of —

09-00:06:38

Carmichael: And when the teaching evaluations came. They all came in at the same time. They were all bitterly fought by the powers that be, and I can remember going to a meeting, and two Nobel Prize winners for physics stood up and said, this will be the demise of Berkeley, you know, if you can't — if the faculty have a vote on their new colleagues, it should be only in the gift of the department chair. But we survived it and we've done really well. I think we have done better as a consequence. Certainly we have become much more diverse because up to that time, it was the old boys' network, and it was literally all boys, and they were all White old boys too. So there was no concern, if you like, for diversity as we understand it today. The concern then was don't rock the boat, and that really was it. They didn't want people who wouldn't fit in. That was the sort of yardstick about whether in fact you would get a faculty appointment.

09-00:07:32

Redman: And so now, how did it happen that after you had rocked the boat a bit, as it were, as a chairman of the department, you were invited to make the transition to Associate Dean?

09-00:07:48

Carmichael: Let me talk first a little bit about how my department was politically divided. There was a very strong foreign component, often British, in my department, and a national component, U.S., you know, all White men, and the department cleaved very much along the nationals of us as the internationals. I think by chance, on most of the issues, I tended to side with the Americans and not with the Brits. So one side sort of saw me as disloyal, and the other side saw me as to take advantage of. I don't know whether they did or not, but the two people I had to get rid of, or I persuaded to retire, were indeed Americans, so I'm not sure it had any long term effect.

In the '70s, one of the things I started was fundraising, and that brought me to the attention firstly of the deans, because I wanted to set about fundraising. It

was before the college had anything to do it. Mike Heyman was just starting it on the campus I think, but my dates are uncertain though.

09-00:09:06

Rubens: And why did you want to fundraise? What were you going to fundraise for?

09-00:09:10

Carmichael: I wanted to fundraise for my department. I had come from a private university in the UK, which had started fundraising itself. There were two things we could fundraise for. One was just the benefit of the research funding itself, the support of graduate students, and secondly for the seminar series which I wanted to do, and we could bring in people from all over the world.

09-00:09:32

Rubens: Let me just ask you two quick questions. How many students roughly were undergraduate and how many graduating students?

09-00:09:38

Carmichael: I would say there were about 100 of each.

09-00:09:41

Rubens: One hundred of each.

09-00:09:42

Carmichael: That was plus or minus ten maybe.

09-00:09:44

Rubens: Right, but that's a substantial graduate program.

09-00:09:46

Carmichael: Yes.

09-00:09:47

Rubens: Substantial.

09-00:09:47

Carmichael: Oh yes. Berkeley was well known for its graduate program. It was putting people into universities all around the country and if not the world.

09-00:09:57

Redman: And then you also said that this divide in your department was over — seemed to cluster around nationals and internationals. Surely, there was an ideological or political or pedagogical underpinning of it or not?

09-00:10:12

Carmichael: Yes there was, there was an underpinning. It was quantitative versus — it was the quantitative group versus the traditional geology, field geology group, and that's where it cleaved. It also happened to be.

09-00:10:25

Redman: And in some ways that represented some similar things that were going on in geology as a whole at the time.

09-00:10:31

Carmichael:

Yes, absolutely. Plate tectonics was being discovered and you're absolutely right. It mimicked that or it mirrored that. So there was a combination of fundraising, which I went to see the deans about because there were two things I wanted to do. One was to establish a connection to the graduates. It seemed to be very important that you should leave this place with knowing that in the future, you would always find out what the department was doing. What I wanted to do is to sort of in gender in people a feeling that hey, they had a good time at Berkeley. They learned a lot and they got a job as a consequence of it, which was you know, has sustained them through life, and for most of the graduate students that was true. So I wanted to draw on their feelings of well-being so that when the time came and they said, and the residue of my will go to the Department of Geology and Geophysics, that would work because I knew enough in those days. I've always been interested in finance. In order to get that to happen, the residue of my will, I had to get people connected to the department for essentially the whole of their professional careers. In 1972 I think I started it, or '74 maybe. I started the business of a regular newsletter to all departing students. Now in those days, there was no development office, and we had to go into Sproul Hall to get the addresses of every single student. It was never characterized, they weren't computerized, nothing was done like that. So I sent one of the department technicians and he spent weeks going through all the records of the Sproul Hall graduates.

09-00:12:15

Rubens:

This was an incredible data room, if you will. It was like a card catalogue, and of course you know they removed that once Patty Hearst had been kidnapped, because she was found through that address.

09-00:12:30

Redman:

What about — was there —

09-00:12:31

Rubens:

Wait. I just wanted to ask one more thing about the... Was this in a way generous to you, because what's so ironic is I've just been talking to Andy Kuo and done his oral history, and he's doing the same thing in engineering at just about the same time, and he was scratching his head.

09-00:12:45

Carmichael:

It must have been. We were the first people in L&S to do it.

09-00:12:50

Rubens:

So did you talk to Andy Kuo?

09-00:12:52

Carmichael:

I didn't know Andy Kuo in those days. I knew him subsequently but not in those days.

09-00:12:55  
Rubens: But it's not — this is something that's coming out of your vision of what needs to be done.

09-00:13:00  
Carmichael: Right.

09-00:13:01  
Rubens: And not that you're modeling someone else.

09-00:13:02  
Carmichael: Right, and the first thing that came about is you can't — the first dispute came with the faculty administration that you cannot use note paper, you know, a heading with the University of California along the top to raise funds. You can't do that. So the thing we had to do is design our own mailing labels and stuff like that, so I got a photograph of the Golden Gate Bridge, because in my building, in the evening, you can see the sun going right underneath the Golden Gate Bridge, because we had those balconies.

09-00:13:35  
Rubens: When was McCone built?

09-00:13:37  
Carmichael: Before I came. I would say in about '60.

09-00:13:40  
Rubens: And who is McCone? Do we know who McCone was?

09-00:13:42  
Carmichael: Yes. He's a Berkeley alum who ran the CNA for Eisenhower.

09-00:13:46  
Rubens: Oh that McCone?

09-00:13:47  
Carmichael: Yeah that's right.

09-00:13:49  
Rubens: That never crossed my mind.

09-00:13:50  
Carmichael: I know it's him.

09-00:13:51  
Redman: Interesting. So who was putting together the newsletter?

09-00:13:56  
Carmichael: I did, and I got my colleagues to help. They sort of did it — they helped. I mean, there was a lot of resistance to it. They thought, "Shoot, Ian, we don't need any more, you know, work to do and anyhow, it's not going to pay off." Some people expected a flood of checks, hundreds of thousands to come in the first year. Nothing happened. There was maybe one or two checks worth

\$100 or something that came in the first year, but I think by the time I left, stopped being the chairman, I think it came in at about I don't know, but it was about 30 or 40 thousand. Well that, in 1980, wasn't bad.

09-00:14:36

Redman: So it was pretty quick that — I mean, it wasn't immediate.

09-00:14:40

Carmichael: No it's not immediate, but in six years it amounted up to something.

09-00:14:44

Redman: That seems like a pretty significant amount for that day. Were your colleagues less resistant to the idea after that?

09-00:14:50

Carmichael: Oh no. They still thought about it as something which — this is a state university. You see, the mentality in those days was we're a state university and the state should provide, and that ran through almost — all the alums minds too, and so you had to try and break that down and say yes, the state does provide but there are lots of things they don't provide and if they do, they're not sort of very adequate. So it was an appeal to eliminate, if you like, the prejudices that the state provided, that you had to start with.

09-00:15:23

Rubens: This was not the era as well of star faculty, where faculty pay began to be sort of —

09-00:15:31

Carmichael: No. No, no.

09-00:15:33

Redman: There were kind of limited expectations.

09-00:15:34

Carmichael: Very limited expectations. I remember that when I became department chair and looked at — I mean some of the "star" faculty hadn't had pay raises in six or eight years, simply because they were perceived to be so high relative to everybody else that it wasn't — you know, they didn't sort of earn a pay raise. A high salary in those days was what, \$12,000 or something?

09-00:16:00

Rubens: So what were you using this windfall for?

09-00:16:05

Carmichael: Oh, um —

09-00:16:06

Rubens: The seminar series.

09-00:16:08

Carmichael: A seminar series and to bring in visitors, which is really what I wanted to do because in order to make the department international in scope, you had to bring in people doing research from all across the country. That was a way Berkeley students, undergraduates could see a possibility of doing research. It elevated the whole atmosphere of the place, it really did.

09-00:16:32

Redman: How did you select people to come into —

09-00:16:34

Carmichael: Oh there was no shortage of ideas for that. The colleagues would come through with oh, I want so and so.

09-00:16:39

Redman: Right, and that seems like that could be a potential problem, is that you only have a few slots and there are hundreds of people that they want.

09-00:16:45

Carmichael: I think we just put them into order. I don't think that ever became a problem. That never was a problem. So then you asked me how I became a dean. Well, I think as a consequence of my criticism of the faculty, of the deans. I was very critical of them about this issue of faculty slots. I mean, they were facing the fact that Reagan had cut them back and I was facing the fact that here we had an aging faculty, and you had to have new blood in every science department particularly. And so it became a big issue of dispute between me and Cal Moore, and then there was a budget officer called Ed Feder, and I think we went through this last time. Ed Feder told me that if I overdrew, it would be taken off the next year's budget. Now, when most people are faced with that, they quickly do the math and realize that they really aren't going to start you off with zero. So if you overdraw by the whole year's budget, you'll probably get away with it, and that's what I did. I was forced meet, as a consequence of that, being irresponsible, Rod Park, who was the Dean of Letters and Science, who subsequently he and I became firm friends and still are, but he very much disliked the idea of my overdrawing by that amount and it came down to, as I said, professional pride. I said listen, if you give me a budget which I've agreed to, I will stick within it, but if you and Ed just hand me a budget and say you've got to live within that, without any discussion at all, I'm not going to feel duty bound to do it. I said, I don't know that you know anything about what the department's needs and wants and requirements are. I said in your case, it's a condition solely about how much money you've got. That's not my problem. My problem is to run the place and do it efficiently and effectively. So I got to know the administration quite well.

09-00:18:49

Rubens: How long had Rod been there, I forgot? He then went to the Office of the President.

09-00:18:54

Carmichael: No. No, no, no. He became — after that he became Mike Heyman's Vice Chancellor. He was Dean of L&S then.

09-00:19:01

Rubens: Yeah, OK. Had he been there a long time before that?

09-00:19:04

Carmichael: No, not a long time. It was the physicist before him, who went to the Office of the President.

09-00:19:14

Rubens: Oh I see.

09-00:19:15

Carmichael: I'll have to look that up for you.

09-00:19:17

Rubens: And Ed Feder, how —

09-00:19:19

Carmichael: Ed Feder was a long time university employee, and he was the budget officer for Letters and Science.

09-00:19:32

Rubens: So were you seeing already, a kind of generational conflict going on? There was some young energy that was saying we have to do things differently?

09-00:19:41

Carmichael: Yes, now that I think about it. You brought me back to it. One of the first issues I met first with Al Bowker about was about the promotion of two faculty members. Al Bowker wanted Mark Christensen, who was an associate professor in my department, to be promoted to professor. On the other hand, I wanted somebody to be promoted to professor who I thought deserved it, and Al Bowker had turned it down. The budget committee had approved it and I think he turned it down. So Al Bowker and I met, and he wanted to know why I turned down his and I wanted to know why he turned down my candidates right? I told him why I turned him down. I said, the guy hasn't done anything very much at all, and he said well, he can't really serve as the vice chancellor you know, if he's an associate professor. So I think Al Bowker was wonderful at making deals. I think we made a deal. We both got — I got my guy promoted and he got his guy promoted, and then within a few weeks or months or something Mark Christensen left to go to Santa Cruz as the chancellor there. So that's when I first met Al Barker. That meeting generated my being invited to go to China with Mike Heyman and Rod Park in 1977.

09-00:21:00

Redman: What were you guys hoping to accomplish in China? What was the major goal for the China trip?

09-00:21:05  
Carmichael: Well my memory is sort of a bit bad now. I think Nixon and Kissinger had gone to China in about 1976, and opened it up and established communications with the United States.

09-00:21:20  
Rubens: It was a little earlier.

09-00:21:21  
Carmichael: '75 was it?

09-00:21:22  
Rubens: Yeah.

09-00:21:23  
Carmichael: And then we had a party of Chinese that came over to visit —

09-00:21:26  
Rubens: Andy Kuo was facilitating that.

09-00:21:30  
Carmichael: It was Andy Kuo and it was Glenn Seaborg, and it was Rod Park and myself. Amongst the people that came was a bunch of earth scientists. So the visiting scientists included earth scientists. I've got a photograph of this all being taken. Two interesting things happened as a consequence. Firstly, I think we were — a group of scientists and scholars were invited back to go and visit China in return. Secondly, about a week after these Chinese scientists had disappeared, I got a visitor from the CIA.

09-00:22:13  
Rubens: I knew you were going to say that.

09-00:22:14  
Carmichael: You did?

09-00:22:15  
Redman: Mm hmm. Go ahead.

09-00:22:16  
Carmichael: It was a young woman who had taken romance language, had a PhD in romance languages at Harvard. She wanted to know what the Chinese were most interested in when they walked around the department. I said frankly, our women students and she said to me, well what do you astride that to? I said, I think they've been away from home a long time, and they were fascinated about looking at American women, which must be very different than Chinese women. I said that's the only thing I remember. Anyhow, she and I started to go out to lunch as a consequence, but then her career took her one way and my career took me another way. So it's just sort of an interesting sideline.

09-00:22:56  
Rubens: Well let's stay there a minute. You're saying that you developed a personal relationship, you enjoyed each other.

09-00:23:02  
Carmichael: Yes.

09-00:23:03  
Redman: But what was your feeling about, that the CIA had this (overlapping dialogue)

09-00:23:07  
Carmichael: I didn't know what the CIA did in those days, in the 1970s.

09-00:23:10  
Rubens: Did she tell you anything?

09-00:23:11  
Carmichael: Yes. She said the CIA is responsible for the oversight of relationships with other countries and the one with China is tricky. She said she had been a Harvard PhD in romance languages, and she had been recruited by them, and she struck me as like Sam ten years from now or you 20 years back. She was just a normal academic sort of person.

09-00:23:40  
Rubens: And had a good job. Well I guess —

09-00:23:40  
Carmichael: And had a good job, and it was in San Francisco.

09-00:23:33  
Rubens: — the war in Vietnam was over.

09-00:23:44  
Carmichael: Yes.

09-00:23:46  
Rubens: There was no conflict in that regard. Did she ever suggest to you what the CIA really wanted to learn?

09-00:23:50  
Carmichael: No. No, no, no. She didn't at all.

09-00:23:55  
Redman: OK.

09-00:23:56  
Rubens: I have one other question about the China trip. Was Larry Levine on that China trip?

09-00:23:59  
Carmichael: No.

09-00:24:00  
Rubens: So it was just scientists.

09-00:24:01  
Carmichael: No. No, no. Lots of scholars as well. There were engineers.

09-00:24:06  
Rubens: I was calling them scientists. Yeah, engineers?

09-00:24:10  
Carmichael: Bob Scalapino, who I became good friends with. Chalmers Johnson, who went down to San Diego.

09-00:24:15  
Rubens: He's a political science professor.

09-00:24:15  
Carmichael: Yes.

09-00:24:16  
Rubens: Chalmers was already gone from Berkeley?

09-00:24:18  
Carmichael: No. He was here then, and moved about two or three years later. The person I shared a room with all the time was from, in those days it was called Oriental languages, a red headed professor, faculty member here.

09-00:24:34  
Rubens: We can add it.

09-00:24:36  
Carmichael: I'll have to look it up. The interesting thing about him —

09-00:24:38  
Rubens: No historians? No one from the history department?

09-00:24:44  
Carmichael: There was somebody from math. History. I'd have to look at the photograph again, but that's 30 years ago you know, it's sort of —

09-00:24:55  
Redman: You did quite well for remembering.

09-00:24:58  
Rubens: So was that exciting? What was that trip like?

09-00:24:59  
Carmichael: I was thrilled by it. I got to know Therese Verhoogen quite well. I liked her a lot. She was a very — I liked the fact that she was involved with the Oakland Museum.

09-00:25:11  
Rubens: Therese Heyman.

09-00:25:12

Carmichael:

Therese Heyman, right, and Mike was doing his thing, being a spokesman for this group. I was followed around by — I think most of us were followed around by Chinese I suppose they were secret service people or something like that. So when it came to looking through Beijing University, I said to Mike, I'm going off. I'm going to look at the chemistry labs and things which I can understand, and he said OK. After about half an hour, the Chinese people got very rattled. I'd disappeared. Well it was fascinating. I went into these labs, and this is the end of the Cultural Revolution. These labs were full of — I mean, you know, they kept chickens in them or something. They were totally incapable of being used as scientific research labs. So that interested me at the time, but soon after the Cultural Revolution changed and they dealt with it. The person I got very fascinated by was Bob Scalapino, who I believe is still alive, and the reason is, he wanted to go into the markets in the morning and get the price of food, because for the price of all of those products you could buy, he got a sense of how the Chinese people were doing. So every morning, whatever towns we were in, he used to go there. He had a very, I think analytical and penetrating sense of humor about China and the Chinese. The person I stayed with, shared a room with all the time was this red-haired, Harvard PhD in the Korean languages I think, who was fluent in Chinese. Very often in the hotel they had Chinese waitresses and things, and the Chinese waitresses used to speak to themselves in Chinese, and little thinking that this red-headed white guy was fluent and understood every single word they were saying, and that caused all sorts of embarrassments on occasions. I enjoyed him immensely. He left, I think, to go to Hong Kong University. I don't know what year he was in.

09-00:27:19

Rubens:

Did you ever go to China again?

09-00:27:20

Carmichael:

Never.

09-00:27:21

Rubens:

And let me ask you a question about Scalapino. Had you, in any way, locked heads with him over any administrative student issues?

09-00:27:29

Carmichael:

Never, no.

09-00:27:30

Rubens:

You had known his role in the Free Speech Movement.

09-00:27:32

Carmichael:

Yes. I knew of him. I knew of him and I met him, and we spontaneously got on well. Chalmers Johnson was very much more critical of America and its attitude to China and the east, and he didn't like — He was in political science too, I think was he?

09-00:28:01  
Rubens: Oh yes.

09-00:28:02  
Carmichael: Not history.

09-00:28:03  
Rubens: No, no.

09-00:28:04  
Carmichael: And I think he left soon after that, to go down to San Diego. I remember not long ago, I saw him. I think he had retired from UC San Diego, so I emailed him.

09-00:28:14  
Rubens: And then he went to George Mason.

09-00:28:16  
Carmichael: I didn't know that. So I emailed him and congratulated him and sort of said, you know, whatever it is one does in these things. So the group that I went to China with was very influential for a short time. We went to one another's houses when we came back, to see all the color slides. Rod Park was there and Rod Park and I remained friends and Mike Heyman and I remained friends, but it's fallen apart now because you know, our lines of work are so different.

09-00:28:50  
Rubens: You became then, in this period —

09-00:28:52  
Redman: You became a dean after.

09-00:28:54  
Carmichael: I became a dean in '77 or something like that.

09-00:29:00  
Rubens: Right after that trip?

09-00:29:01  
Carmichael: No, before that trip I think.

09-00:29:03  
Rubens: Right before the trip, OK.

09-00:29:04  
Carmichael: Right before that trip.

09-00:29:03  
Redman: You became and associate dean in '76 and then two years later you became a dean.

09-00:29:10

Carmichael:

No. Then I went back and became a department chair. I met Sandy Elberg at a dinner party, and he and I talked about graduate students. I was very interested in graduate students. I was a department chair. So I invited him to come and meet the graduate students, and he'd never been invited. Not a single department had ever invited the Dean of Graduation to meet his graduate students. And now that I think about it, there was one other issue which got me connected to him. Soon after I became a chair, a graduate walked in and said, "Ian, I have a problem." I said, "Oh, sit down and tell me about me about it." He said, "Well it's a rather tricky problem." He was a Vietnam vet, he'd been a captain of the Army. He said, "I'm going to change my sex." And he said, "I want you to read this book," and all the rest of it and he said, I want to know how the department is going to deal with this, which brought to light all sorts of interesting responses.

09-00:30:20

Rubens:

He was advanced in his —

09-00:30:22

Carmichael:

No, he was just strange.

09-00:30:23

Rubens:

No, I meant in his studies.

09-00:30:26

Carmichael:

Oh yes, he was a PhD student. He got through his PhD orals and everything.

09-00:30:27

Rubens:

That's what I meant. If it was earlier he didn't have to announce it.

09-00:30:31

Carmichael:

No. So several issues came up. Firstly, half the department, the conservative wing of the department wanted me to get rid of him, for what reason I'll never know, but of course to have somebody to change their sex was ridiculous to them. To my mind the only grounds on which you could get rid of anybody is if they were not doing well as a student. It has nothing to do with what they do with their sex lives. The second issue came up. He was to change his clothes and wear the clothes of a woman for a year before he had surgery. This is what Stanford treatment suggested should happen. So he did that, but the women graduate students didn't like it because the jobs for women were hard to get and here's another man, as it were, becoming a woman, diluting their chances of becoming — so they didn't like that at all, and they came to complain about it. I said, I think you just have to accept that. I mean, let this guy make this transition the best way he can. Well, one of the reasons I met Sandy Elberg is you had to fill in the statistics of how many women students you have and how many men students you have. So I think put so many men, so many women, one other. So he called me on the phone and said Professor Carmichael what's this one other? I said well, here's this person who is changing their sex, and first, they spend a year before they have a surgery, to

make sure they become a woman and their sex isn't changed. I said, I'm not prepared to go and ask him whether he's had his surgery or not. I said, he's one of your students, you can ask him. He was a graduate student, works for the graduate division, you've got to ask him. I'm not prepared to do it, I mean, I know the guy too well or the woman too well, whatever. So we had a little conflict about that but we met. One of the issues that came up with the VA — oh, the university has transcripts, as you know, but if you change your name, you had to put a line through the name, so you can see what the old name was, and replace it by the new name. Of course, nine times up to then, essentially everybody that changed their name had changed it for marriage. It's a very different business when you're changing it for a sex change.

09-00:33:00

Redman:

Because sometimes they want to have the entire name just erased.

09-00:33:03

Carmichael:

Exactly. Ultimately, we went to the Office of the President, and I think they went to the State Assembly, and they got the law changed so you can do it now.

09-00:33:14

Redman:

Wow, OK.

09-00:33:15

Carmichael:

You can white it out if there's a sex change, first thing. But the next thing was the VA would pay for the surgery, as I remember, but wouldn't pay for hormone treatment. And the hormone treatment, because he was (inaudible) you know. So I got involved with trying to get the VA to pay for the hormone treatment, so he could have the hormone treatment and he could grow breasts and the hair would disappear. Ultimately, everything went well and he — she is now a faculty member in a university in the United States, and every now and again she appears at Berkeley and everybody is really delighted to see her.

09-00:34:06

Rubens:

And give some money to the alumni?

09-00:34:07

Carmichael:

Yes she does, she's very good.

09-00:34:09

Rubens:

That is a great story, that's a wonderful story.

09-00:34:12

Carmichael:

So that — you asked me how I came to the notice of the administration. It was that, it was the budget and it was the fact that I wanted my graduate dean to come and meet the graduate students, because I thought it was really important that he should hear what's concerning them. There were lots of issues in those days, but I can't remember what the issues were. They were largely housekeeping, you know, things like when can our salaries go up, can you pay us in the summer, those sorts of things, you know, what the graduate

students worry about. The other thing is you know, what exactly is the broad field of knowledge on their PhD orals, how is that defined. They wanted to hear that sort of evidence. So by the time my chairmanship was coming to an end, the Dean of the Graduate Division said Ian, I'd like you to come and help me.

09-00:35:01

Rubens: And that was Cerny by then?

09-00:35:03

Carmichael: No, that was Sandy Elberg.

09-00:35:05

Redman: Oh it's still Elberg.

09-00:35:06

Carmichael: It's still Elberg. He got me in for two years. My first job then was to become the Chair of the Review Committee for the Department of Chemistry, and the Chair of the Department of Chemistry was Joe Cerny.

09-00:35:19

Rubens: Oh, I see.

09-00:35:22

Carmichael: And that's where he and I made friends, and that's when I became and he became enamored with the idea that a review, a really comprehensive review did the department a world of good. As I said before, all of a sudden you're examining the whole to see if it is greater than some of the parts and unfortunately, in so many Berkeley departments the whole is not — or it wasn't in my day, greater than the sum of the parts.

09-00:35:48

Rubens: Do you want to check the tape?

09-00:35:48

Redman: Yeah, I'm just checking on it.

09-00:35:54

Rubens: So once you become, you have that role — let me just ask you a few questions before Cerny comes in, and then you're a team. Did you have a strong impression about Elberg?

09-00:36:05

Carmichael: Yes. He was a Professor at the School of Public Health, and he had discovered something about some disease which is passed onto humans from domestic animals.

09-00:36:19

Rubens: OK, I forget that.

09-00:36:20

Carmichael: Yeah, I've forgotten that too. Oh he's a wonderful man.

09-00:36:24

Rubens: There was a lot of heat during the Free Speech Movement.

09-00:36:27

Carmichael: Oh of course, of course. He was a wonderful, generous man. He had an extremely painful, deformed back.

09-00:36:40

Rubens: Now also, I believe that '77 is the — oh, oh, I was asking about, you said the things that students were concerned with. Did you see any push for diversity with more women coming in?

09-00:36:57

Carmichael: We had a number of women students then. There wasn't much push for women faculty. In fact to be honest, now that I think about it, I don't think the department has ever pushed for women faculty, and we have five or six now, three of whom are in the National Academy or four of them are in the National Academy I think. And so it's —

09-00:37:19

Rubens: Had evolved.

09-00:37:21

Carmichael: It's evolved, and it's done it, if you like, peacefully and —

09-00:37:25

Rubens: Would you say the same thing about minorities?

09-00:37:28

Carmichael: Oh minorities, we have a rough time with minorities. Earth science now has become more and more quantitative, which means that you've got to depend more on math, physics and chemistry, and those are fields which by and large minorities don't get into, but if they do they want to stay in those fields. For example, if you go and take students camping, as I used to as a freshman seminar course. I used to take them camping on the east side of the Sierra. You would never get minorities there. People don't want to camp there. They've never been camping. It's a white occupation, it seems to me, a white traditional, you know — or going on vacation. You never — if you're going fishing on the Sierra Nevada, and I don't fish but I used to do geology up there. I've never seen an African American up there, not ever.

09-00:38:17

Rubens: Now you would take students. Was that for your era, where you didn't have to have you know, insurance and reliability?

09-00:38:25

Carmichael: None of that. We didn't have any of that. Nobody bothered us with that.

09-00:38:29

Rubens: It's not so easy to do that now because of all that.

09-00:38:30

Carmichael: I know. Life has gotten much harder.

09-00:38:34

Rubens: So Sandy Ellsberg —

09-00:38:35

Carmichael: Elberg.

09-00:38:36

Rubens: Elberg.

09-00:38:38

Carmichael: He was the dean. He was a delight. Then comes trouble. My department is reviewed, undergoes review. Let me get the dates right. It must have been reviewed in 1979 or something like that, '78 or '79. In the meantime, the previous chairman, the chairman — sorry. My successor had come to the end of his term and the deans are going about appointing his successor, and they appointed his successor, and the review committee found out who that successor was and went to see the deans and said you can't do that, you really can't do that. So the deans were in a really difficult situation. I was on teaching leave, if you remember, I told you last time, at UCLA, because we had arranged that when I had been a department chair. I arranged this intercampus exchange business. So I was at UCLA, and they called me up and said Ian, we want you to go back for two years to become a department chairman, there's been this upset. Now my enemies in the department which, believe you me, I've got many, said Ian you've manipulated this, it's a disgrace and all the rest of it, you're not coming back as chair. They got a letter and signed it. The trouble was that less than half the faculty signed it, so I did go back there as a department chair in 1980. The review committee was chaired by Frank Morrison in material science, and they had been dissatisfied with the choice of the deans and said that he was not — would not address the problems of the department. So I was given two faculty slots, to go and recruit two people, and told to go in there for two years to do it, and so that I did.

09-00:40:54

Rubens: Were you happy with the appointments?

09-00:40:55

Carmichael: They were very successful. Both are members of the National Academy at the moment.

09-00:40:59

Rubens: Who were they?

09-00:41:00

Carmichael: Bill Dietrich and Raymond Jeanloz.

09-00:41:03

Redman:

Let me ask about this kind of — you said less than half of the faculty were signed on this letter. Did the other half come to you or did the other half say to you in some way, we support you, or was it a little more vague?

09-00:41:18

Carmichael:

It was a little more vague. If you were going to get into the politics of how departments work, people talk about it behind your back about it all the time. Very rarely are they upfront and in your face, if you like. Some are but most aren't, and that's one of the problems of it. You never know quite what everybody is thinking. So a smart department chair, man or woman, will go and visit every faculty member in their office. That's where they feel at home, that's where they feel less threatened and most at ease to talk about the problems of the department. So I used to do that regularly, and that I found, made my life much more easy when I was a department chair both the first and the second time.

09-00:42:00

Rubens:

Did you also have soirees, people over to your house?

09-00:42:03

Carmichael:

Yes, oh yes. I did that all the time because in those days, and I think we went through this before.

09-00:42:08

Rubens:

Oh I'm sorry.

09-00:42:09

Redman:

No that's fine.

09-00:42:10

Carmichael:

My wife didn't have a job and no wives did in the '70s. So we could have a really acrimonious faculty meeting but in that same evening, we could all be down at dinner somewhere with our wives and so on, and the feelings which had been so badly bruised six hours earlier were assuaged and everything was calm, and that made for the harmony of the department, it really did. So you know, there are two professionals now having to go to work and having things catered doesn't help department politics at all, in my view.

09-00:42:45

Redman:

And also, do other department chairs or did other department chairs at this time — you said it was good to meet people on their ground and to go into their office. Was there a common practice of having people into the department chair's office, almost like you're going to see the elementary school principal, you know.

09-00:43:01

Carmichael:

Well it was a bit like that because you know, the department chair used to sit in his department office, and he used to do whatever his work was I suppose, and if you had some problem, you used to go visit him there. That never really

solved the issue of what did you think about the department, the direction it was moving in. Looking back, the issue which divided us was essentially, from the nationals and the internationals was they — the foreign element wanted to appoint somebody who was a post doc on the campus in the department, and he was another Englishman, and he, in my view, was mediocre. So I went to the department chair and said look, have you read this guy's papers? He said no, I haven't. I said oh, but John you should go read them, I think this guy is mediocre and I don't think he's done anything very much and yet you and so and so and so and so and so and so want him. He said yes, well because Frank wants him I support him. That's how it worked in those days. Anyhow, after a week or so, he called me in and said I agree with you. I've read his papers, we shouldn't have him. And so he didn't get the job, but luckily the Americans, as it were, had seen that weakness in this case and taken that position, and I joined them. So if you like, that sort of made secure my role with the Americans as well, with the Brits, because the Brits were bad about that, they really were.

09-00:44:40

Rubens: We stick together or?

09-00:44:41

Carmichael: Right.

09-00:44:44

Rubens: I wanted to just ask you very quickly. Was there a chairs' council? I know there's a deans' council.

09-00:44:52

Carmichael: Yes there was, the Physical Sciences Council. Yes there was. George Trilling ran that for the first time and then I ran it for the rest of the time.

09-00:45:02

Rubens: How many chairs would be there about?

09-00:45:05

Carmichael: Now that you talk about it, I hadn't thought about this actually, Lisa. There's a woman chair of statistics, Elizabeth — God, I can't remember her last name.

09-00:45:15

Rubens: We'll look it up. You know, it was in statistics that the first African American was hired.

09-00:45:19

Carmichael: Yes. He went to China with me.

09-00:45:21

Rubens: Oh he did?

09-00:45:22

Carmichael: Yes.

09-00:45:23

Rubens: [David] Blackwell.

09-00:45:24

Carmichael: That's right, yes.

09-00:45:28

Rubens: I don't think he was a nationalist or anything particularly, or an outspoken civil rights.

09-00:45:34

Carmichael: No, I don't think he was. I think he was just a first rate statistician. Elizabeth, Elizabeth, I don't remember, but she was chair of the statistics department.

09-00:45:51

Rubens: Well, I ask you that because —

09-00:45:53

Carmichael: Some of this I'm going to have to look at the text.

09-00:46:02

Rubens: '79 and then into the '80s, it's just when the raising of more private funds is starting.

09-00:46:10

Carmichael: Right.

09-00:46:12

Rubens: Because deans and chairs start to entertain more. But it's also — the other question I wanted to ask you and again, if it derails what you've been doing. I mean, the phenomena of science, you know, big science. I don't mean big science in the sense of nuclear, but science is really taking off now, the biology and the —

09-00:46:31

Carmichael: Well it's particularly the biology. In the case of earth science, it had taken off too because all of a sudden we had discovered — we, not me, I wasn't part of the discovery, is plate tectonics, the way the earth had evolved and the fact that the plates are moving. That resolved so many problems which no one knew how to address beforehand.

09-00:46:51

Rubens: Just tell me for my own sake, if it's repetitive. So is there one name associated with that?

09-00:46:56

Carmichael: No. A whole bunch of people. Yes there is one name. Harry Hess, who was at Princeton, is one of the names. There's another guy, whose name I forget, who was at Toronto. Those are the two.

09-00:47:15

Rubens: OK. And this is about what year?

09-00:47:19

Carmichael: This is the late '70s. During the '70s it was a buildup to it.

09-00:47:24

Redman: People were resisting the idea at first.

09-00:47:26

Carmichael: Oh yes. Scientists are human. Unless you discover the new thing, you're very resistant to everybody else's new thing.

09-00:47:38

Rubens: Well we were talking about new ways of seeing things and discovering things and you know, that's what's going on with biology and microbiology.

09-00:47:46

Carmichael: Right.

09-00:47:47

Rubens: And that is driving —

09-00:47:50

Carmichael: And geology is the same thing. It's the same thing in geology, plus the fact that the techniques in physics and in materials science became more and more incorporated into geology because we could then — and the understanding of the way the earth works at depth, which is through seismology and so on. So the earth sciences are by and large, just as susceptible to those advances that are coming, but nothing like the explosion of the life sciences. There's nothing in earth sciences comparable to DNA.

09-00:48:24

Rubens: So did you find yourself — right, DNA exactly. Did you find yourself, in the '80s, having to kind of hold your ground?

09-00:48:31

Carmichael: No, not at all. For my own research, I'd carved out a niche which you know, had taken hold in a small way, first in the United States and then into Europe and then around the world, and I was very happy with that. So I was doing my little thing. My backyard was doing just fine, thank you very much you know.

09-00:48:53

Redman: Describe the development of that niche.

09-00:48:57

Carmichael: Can I do that another time, because that's going to take some thought. I have to do that in non-technical terms, for both you and Lisa to understand, and any other reader to understand. It's going to take a little thought beforehand.

09-00:49:12

Redman:

OK. Let's talk about what we were talking about a little earlier, as far as being a researcher and then becoming a dean, and then as far as the way other faculty members maybe view your sacrificing your research by becoming a dean, and you're not a true scholar.

09-00:49:33

Carmichael:

Sacrifice is not the word. You weren't sacrificing your science, you'd just given up you know. Most faculty members here have an antithetic relationship to the administration. They don't think — they get in the way, they believe and rightly in my opinion. The great prestige of Berkeley has been generated by the departments, not by the people who look after the departments, the deans and so on, and they, by and large, would like to take credit for more than is due then, I think, the administration. They are responsible for you know, the aggregates of the departments and so on whereas the average faculty member feels that he or she can do my thing and do it well. That's what you're essentially hired to do. You're hired to become an entrepreneur and you're hired to become a giant in your own field, a small giant possibly or even a big giant, but everybody's looking to you to generate a new little empire. You're supposed to be an empire builder. That works on a lot of people. It seems to me, I hadn't appreciated that when I'd come from England, and it took me about three or four years to understand what the ground rules for this were. But then you know, I understood and sort of profited by it, prosecuted it, and was happy doing it. I have to say that when you become a dean, the interesting thing is — the first thing that Joe Cerny said to me when I met him, in his big office in chemistry, was, "I've looked you up." Now in those days, I don't know how people looked one up, but it was before the days of a citation and all the rest of it, when you could do that, but he, in some say you could look people up, and I don't know where it would be. That is very — that is the yardstick by which you are judged, unfortunately. So if you're an administrator, you seem to be much more compelling if in fact you yourself carry with you, a substantial academic reputation. The interesting thing about the faculty is, they think that they don't want administrators who are not skilled and successful scholars and researchers. The trouble is that being a successful scholar and researcher doesn't guarantee your being a good administrator in any way whatsoever. So there's a total disconnect. On the other hand the faculty pay lip service to the fact that they don't want somebody who doesn't understand the process of being an academic. So you've got to pay lip service to that and you've got to do it. As I said before, if you think about the department chair or the department faculty on the campus here, and my experience is probably wider than most people's, because I reviewed 65 different departments here, as I said before, one in every ten faculty has the talent, the inclination and the temperament to be a good faculty member. Two or three are dedicated enough to take their turn at it, and the rest will make a mess of it.

09-00:52:43

Redman:

To be a dean you mean, or I'm sorry, to be a chair.

09-00:52:45

Carmichael: A chair. The rest will make a mess of it.

09-00:52:49

Rubens: A lot of people don't want to do it either.

09-00:52:50

Carmichael: They don't want to do it. So as I said, the big departments are well run, because they can go to every tenth person, and the small departments tend to go from feast to famine, and that's what worries the administration. Now the administration, you can pick a person. Now in my view, and this is true when I became a dean with Tien, who was the Chancellor the second time. He was insistent that all his deans, and I think we were vice chancellors then, to carry on with research. He said you know, you'll lose all your credibility if you don't carry on doing research and you've gotten the published papers. He said, I've told the Budget Committee that you guys are not to get promoted, except on your scholarship.

09-00:53:39

Rubens: But it took until — see, I wanted to ask you — are you worried about the tape?

09-00:53:44

Redman: Maybe we'll switch tapes here and then you'll start off with asking this next question. OK, very good.

#### Audio File 10

10-00:00:00

Carmichael: Where you come from the department, right? And if you're in the social sciences, maybe social psychology or whatever. If you're in the physical sciences it's physics and chemistry. Chemistry has been at the apex of scientific success since the days of G. N. Lewis, which is essentially what, for the last 50 years on the campus. So chemistry has always been number one in the nation.

10-00:00:27

Rubens: So that was chemistry.

10-00:00:29

Carmichael: Tien?

10-00:00:29

Rubens: Tien.

10-00:00:30

Carmichael: No, he was mechanical engineering.

10-00:00:31

Rubens: Oh yeah right, I'm wrong.

- 10-00:00:38  
Carmichael: So when Sandy Elberg left the deanship, he was followed by an anthropologist, and African American. Are we going still?
- 10-00:00:49  
Rubens: Yeah.
- 10-00:00:50  
Carmichael: You don't say your thing this time?
- 10-00:00:52  
Redman: That's fine. This is the second tape of sitting down with Lisa Rubens and Dr. Ian Carmichael, and we're continuing our conversation of academic administration.
- 10-00:01:06  
Carmichael: All right. When Sandy Elberg resigned or retired as Dean of the Graduate Division, his job was given to an African American professor from anthropology. His first name was Bill but I've forgotten his second name [William Shack?]. He asked the — when he came in, I decided to resign because I felt a new person coming in should have the slots vacant for the associate deans. So I resigned, got out of it. He took this — because none of the other associate deans resigned, he took this as a sort of statement of my antagonism to him being Black. So he took me to lunch and you know, it was an interrogation about, can't I get on with African Americans. I said, “I get on with African Americans perfectly well. You deserve the right to hire the people to put in those slots, because you've got to have a different, you know, different yardsticks.”
- 10-00:02:15  
Rubens: He didn't try to persuade you to stay?
- 10-00:02:17  
Carmichael: No.
- 10-00:02:18  
Rubens: He just wanted to make sure the air was cleared.
- 10-00:02:20  
Carmichael: Yes. So then I went back to being a department chair.
- 10-00:02:24  
Rubens: Well, you went to UCLA. I did want to ask you quickly, how you felt about UCLA. Why did you go?
- 10-00:02:31  
Redman: That was part of the geology departments were interacting, but we didn't talk about what you felt about UCLA in comparison to Berkeley.

10-00:02:39

Carmichael:

As an introduction, when I was a department chair, I got all of the other department chairs in the UC system together in earth science, and we tried to discuss the things in which we could collaborate and ways which we couldn't. We involved one of the Office of the President, I think it was the Academic Vice President. His name was Donald Swain. We said what we should do rather than appoint faculty members in various specialties, where we don't have representation, we should ask them to come you know, to make it available for them to go from one campus to another. I was the trial — because I suggested it, I was the first person. Because they didn't have anybody in my field at UCLA, UCLA took me and the Office of the President paid my salary, and the Office of the President paid for my living conditions down there. Was it successful? I would have to ask UCLA that, but I met three or four graduate students down there who I liked a lot. I think as I told you the other day, when my retirement party was given, those four were there, and they said that the thing that most impressed them about my presence at UCLA was I brought my graduate students down there, from Berkeley, and they lectured. He said you treated them as if they were young colleagues and able to give talks on their own and with authority and all the rest of it, and you did it with five or six people. They said, we've never been treated like that UCLA, and that is true, now looking back. UCLA's faculty did not treat their graduate students as young colleagues like we do here. So that was the residue of that. I enjoyed my trip there a lot. I liked the UCLA faculty.

10-00:04:28

Rubens:

Where did you live?

10-00:04:29

Carmichael:

Westwood. They found a little house for me in Westwood.

10-00:04:33

Rubens:

I grew up in Westwood.

10-00:04:33

Carmichael:

Did you? I could walk to work. I loved it.

10-00:04:37

Rubens:

I love the village. Before it got big, it was a village.

10-00:04:42

Carmichael:

It was a village, and oh, it's incredible. I used to go running every day around the campus. Isn't there a theater arts department or something like that? Oh gosh, I've never seen so many beautiful looking young women come out of theater arts.

10-00:05:00

Rubens:

People did dress better in Los Angeles.

- 10-00:05:02  
Carmichael: They do, they do. It's terrible. Berkeley is sort of you know, a bit down on the heel in some ways.
- 10-00:05:09  
Rubens: How big was the department at UCLA?
- 10-00:05:12  
Carmichael: It was about the same, must be 25 faculty maybe, something like that.
- 10-00:05:15  
Rubens: And I don't know this, I've forgotten. When does the department name change?
- 10-00:05:19  
Carmichael: Here?
- 10-00:05:20  
Rubens: Yes.
- 10-00:05:21  
Carmichael: It changed just as I got there in the '60s, from geology to geology and geophysics. It changed in the last five years to earth and pageantry science.
- 10-00:05:29  
Rubens: And that's only the last five years.
- 10-00:05:31  
Carmichael: Yes.
- 10-00:05:32  
Rubens: All right. Those were my backup questions.
- 10-00:05:37  
Carmichael: I'm not quite sure where I am. I was at UCLA, and I enjoyed UCLA. It was at UCLA they communicated to me that I had to go and come back and be the chairman for two years, when all that upset was occurring.
- 10-00:05:48  
Rubens: And then you got those two new slots.
- 10-00:05:50  
Carmichael: Got those two new slots, who I am good friends with to this day. I think the chairman always has a particular connection to the people he or she appointed. They're your progeny if you like.
- 10-00:06:05  
Rubens: So Heyman was still Chancellor when you came back.
- 10-00:06:09  
Carmichael: Right. Rod Park was the dean but Cal Moore had gone as the Dean of Physical Science. His place was taken by Len Cowie, who was an astronomer.

10-00:06:21

Redman: You had an interesting run-in when you first met Mike Heyman, is that correct? The first time he brought you into his office, there was an interesting anecdote about that.

10-00:06:31

Carmichael: Oh yes.

10-00:06:32

Redman: That I'd like to hear.

10-00:06:35

Carmichael: Well, when you're teaching undergraduates about geology, you have to go to Europe. One of the key countries in Europe, where geology essentially was founded as a science was the UK, the United Kingdom. Much of Scotland is a classic, and I wanted to teach these students the difference between the east coast of Scotland and the west coast of Scotland, and there are some very significant differences and the names go with it and so on. I had this idea. I think it was a brilliant idea, of bringing in eight unblended scotches with French bread and my tiny little beaker, which I got out of my chemistry lab, because I was trained as a chemist, and I allowed each student to take a sip of whisky which came from the east coast, the middle, the west coast and the far west coast. I said if you don't want alcohol you don't have to take it. But most of them did and they took break in between so they could clean their pallets and so, because some of those whiskeys are fairly strong, and they hadn't eaten don't forget. So you're going to give them a very small amount. Otherwise, you're going to have a bunch of inebriated students on your hands. Anyhow, they got the message. They could tell the east coast and the west coast, no problems at all. They knew the names and everything that went with it. About six weeks later Mike Heyman's secretary called me and said will I go and see Mike Heyman. I said yes, what's it about? She said, well I don't really know. Well whenever I had to deal with the administration, I always wanted to know what it's about because you want to get prepared you know, just so you get your dots lined up. It's very important to get your dots lined up, so you're not faced with something which takes you by surprise. So she wouldn't tell me.

So I went in there and Mike said, "I had a rather extraordinary communication from a parent of a student who is taking geology, and that is that you were serving scotch in the lab. Tell me about it." So I told him about it and he told me, "Alcohol is not allowed on the Berkeley campus." I said, "Are you sure?" I said, "I don't believe it," because I'd come from Cambridge and it never occurred to me not to have drinks on the Berkeley campus. So it was just one of those things I've never tested. He said the real problem is that some of those kids could be under 21. I said, "No, I don't think they were, I asked about that." He said, "Well, I don't want you doing this. The parent didn't make a complaint. He was actually sort of rather praising of the novelty of the instruction. It wasn't a complaint about you turning his son into an alcoholic

or anything like that, but I don't want you to do it again." He said, "If you're going to do it, do it in your home." Then he said, "And invite me."

10-00:09:28

Rubens: Oh that's so Mike Heyman. That's wonderful. I don't know when the rule ended that you couldn't sell liquor within a mile of the —

10-00:09:36

Carmichael: That's right. It was like that when I came, I understand.

10-00:09:38

Redman: I think it was only beer and wine. You couldn't take hard liquor. But my most important question is what part of Scotland does Glenlivet come from?

10-00:09:46

Carmichael: The east coast. I like the west coast whiskeys, you know, Talisker and Lagavulin and things like that. I'm not really good on wines. All my friends, because they live in California, love wines. I'm looking forward to — next week I'm going to be in the UK or the week after, and I'm looking forward to going back to —

10-00:10:11

Rubens: But the whole wine thing didn't really started until the '80s. I mean that's really —

10-00:10:15

Carmichael: All of the faculty at Berkeley have been wine aficionados ever since I've been here.

10-00:10:18

Rubens: Is that right?

10-00:10:20

Carmichael: I was recruited on the basis of wine.

10-00:10:22

Rubens: What does that mean?

10-00:10:25

Carmichael: The faculty seemed to enjoy it.

10-00:10:27

Rubens: But recruit on the basis of wine, that was the elixir, that was the —

10-00:10:30

Carmichael: I was told that one of the benefits of being at Berkeley was the fact that you're close to Napa. I mean that was a draw back in the '60s.

10-00:10:43

Rubens: You know Heyman seemed to have this personality that could you know, handle really tough issues and kind of smooth them over.

10-00:10:53

Carmichael: He could handle very tough issues. He didn't like to handle tough issues. He could have been the Mayor of New York. He is a very congenial, very nice person. He was ideally suited to have Rod Park. Rod Park did the difficult, harsh things, and Mike was the good guy. So it was a good cop, bad cop pair, the one, two, and that turned out, that was Joe Cerny with me; he was the good cop and I was the bad cop. I cut the budgets, he said, "Oh Ian, I'll raise Ian's cut a bit." That was the deal, that I cut the budgets, he raised them a bit, but we were lower than what they were you know.

10-00:11:34

Rubens: And you would literally strategize that?

10-00:11:36

Carmichael: Yeah. Joe and I have remained very good friends and yes, we did that sort of thing.

10-00:11:42

Rubens: I'm going to stop. I know you can handle this. I am so sorry that I have to go. I have to be in Mississippi.

10-00:11:50

Redman: We'll continue with that question.

10-00:11:52

Rubens: You're going to continue with that.

10-00:11:53

Carmichael: We've got one more meeting next week, right Sam?

10-00:11:56

Redman: Yeah, and then you leave for the UK and I leave for Los Angeles.

10-00:11:58

Carmichael: I'm leaving for the UK, right.

10-00:12:02

Rubens: So I'll hear what you cover and I can even talk to you.

10-00:12:06

Carmichael: I'm not really back until the middle of June or something.

10-00:12:09

Rubens: Certainly a little more on — yeah, now you're one, two relationship, but if there was anything else on Heyman too because it was under Heyman that the issue of the over-representations of Asians comes up and I don't know if that bears on you.

10-00:12:25

Carmichael: Really? I never knew that.

10-00:12:26

Rubens: Oh yeah, it's in his oral history. And so Asians aren't particularly going into your field either, is that right?

10-00:12:33

Carmichael: No. More so now, much more so now.

10-00:12:38

Redman: Interesting. OK, thanks Lisa.

10-00:12:40

Rubens: Ian, be well, and I — and I'm sorry to — it was just because of the day that we dragged you here, but let's get some Glenlivet, and what's yours?

10-00:12:52

Carmichael: Talisker.

10-00:12:53

Rubens: OK, and we'll do these, make it a test next time I see you.

10-00:12:58

Redman: Very good. Let's talk about the relationship that you had, as far as yeah, the good cop, bad cop scenario. Were you then unfortunately making enemies or did people perceive you as being kind of a hard guy to work with for that reason?

10-00:13:19

Carmichael: I suspect so. When I stopped being a chairman a second time, in '82 I think it was, I think I went back to being a faculty member. Joe Cerny, I think was appointed Dean of the Graduate Division in 1984 or maybe... He came to me and said he wanted me to run the review system under the graduate council of the graduate division because he had felt that the review that I had done of chemistry run very well, and he realized this was very important. He and I had remained friends since that review. I said yes, I'd like to do that. I tried to organize his office for him, you know, his staff for him. He had some very talented staff members who had not been recognized, like Linda Fabri, who I thought needed to be encouraged and promoted. Indeed she became his sidekick, I think, and it was a very benign and profitable relationship between the two of them, and between Linda and me too.

When Joe became the dean and I became his associate dean, firstly, he let me carry on with my research. Tien was the chancellor and Tien insisted on that too. So it was not a question of having to give up research, and I managed to publish as many papers as any of my non-administrative colleagues. So all the yardsticks, Sam, of being successful, were just as — or active rather than successful. All the yardsticks of being active were just as applicable to me as they were to any of my other colleagues, despite the fact that I was only half time in the department.

10-00:15:25

Redman: Was there teaching relief there?

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Carmichael: Yes, I had teaching relief.

10-00:15:28

Redman: OK, so that was significant in helping you.

10-00:15:32

Carmichael: Well, the teaching loads in geology in those days weren't that great. I also edited a journal then. So then went on until 1990. I was busy. Don't worry, I was busy.

10-00:15:48

Redman: Yeah, it sounds like it.

10-00:15:52

Carmichael: I really liked the review system. I felt that what Joe was wanting to do and through visiting the departments, and we talked to one another about that. I got him in a program or he and I developed this program that two things. Firstly, he visited the departments regularly, so every department received the dean of the graduate, meeting the graduate students and secondly, we devised an exit statement every PhD student has to fill in when he or she files her PhD thesis, and it's still done. And that is to get measures of how they see the — looking back, on how they see their time in Berkeley, and that's the high point of their careers. They're just about to leave, they've got their PhDs, hopefully they got a good job. So in fact they're sitting on the crest of generosity when they assess how they are looking back on Berkeley. I think we graduated what, about 1,000 PhDs a year, so there must be a huge dataset now, because I started that in about 1990. So there we are, 17 years or something of it. So there may be almost 17,000 of these exit statements, and they were used by Joe Cerny to look at departments and the strengths and weaknesses of various departments, and see how in fact he could you know, persuade them to correct the deficiencies and so on. So that was how he and I interacted. He then was also Vice Chancellor for Research, and I took on the corresponding title of Associate Dean for Research. In those days, the Federal Government had lots of requirements of us, and the reporting requirements for things such as animal care, human care, plagiarism, all those sorts of things, and every year we had to sign a document saying that we had the proposed procedures. I wrote many of the procedures which the faculty would abide by or could abide by, having discussed this with the Academic Senate, so that in fact we could deal with issues like plagiarism and non-attribution of research. Even today, I think, there was in my time, five or six complaints a year from graduate students and from post-docs about their faculty not attributing to them their due in scholarship.

10-00:18:24

Redman: Specifically as far as publications?

10-00:18:28

Carmichael: Yes, that's right.

10-00:18:29

Redman: As we talked about, co-authorship.

10-00:18:30

Carmichael: Right. Co-authorship in publications, and that was it. So that was the other half of my job as a dean. So I was a dean with two hats, as it were, in the research office, and I might say I've now been replaced by two vice chancellors with our new chancellor here.

10-00:18:50

Redman: Explain to me. When you would get a complaint, you said there were five or six complaints every year, of a graduate student would come in and say I haven't been given my due as far as co-authorship. How would you?

10-00:19:02

Carmichael: Well sometimes it wasn't that. It was sometimes a written one. You have to, under federal law, you've got to investigate everything you're capable of investigating. So we investigated any concern that somebody had about whether work had been plagiarized, you know, whether in fact the student was getting... Also, problems of sexual intimidation too. All of those came on my desk for a time. So I was running the review system and I was looking after that part of the campus as well. Also, I had to deal with gifts to the campus, how you deal with those, through the sponsored projects office. So that was another issue.

10-00:20:00

Redman: This is kind of a silly question. At this point then, you have three jobs. Do you have three desks or are you running everything out of one office in the geology department?

10-00:20:09

Carmichael: No. I have a desk in the California Hall. Do I have a desk anywhere else? No. I had a desk in California Hall. I used to be there every afternoon.

10-00:20:19

Redman: OK. And you had one still at the geology department?

10-00:20:22

Carmichael: Yes.

10-00:20:24

Redman: And so did you spend mornings in the geology department?

10-00:20:25

Carmichael: Right.

10-00:20:27

Redman: And then you'd go over to California Hall —

10-00:20:28

Carmichael:

In the afternoon, unless there was, you know, unless I had to go meet a member of the senior administration, which of course the only time I could meet with him was in the morning, and then I had to go across there. But by and large, my afternoons were spent in California Hall and my mornings in my department.

10-00:20:42

Redman:

Did you look forward to each part of the day?

10-00:20:45

Carmichael:

Yes I did, I did. I hated to give up teaching or my interaction with graduate students, because that really took in the mornings, from about 8:00 in the mornings until lunchtime, and then lunchtime was often a business lunch on behalf of the graduate division or something like that, because that's when you can get most of the faculty from various departments together. If you bribe them with lunch then you get them together and you can talk about whatever that committee has to talk about. I think Joe Cerny and I had about six or seven review committees running every year and in those days, I used to call up and get all the campus members of those. So let's say that there were five — I think there were five members on each committee. Was it five? It was either three or five. I think it's five. So I had to do that and I'd say I had a success rate of less than 50%. So I must have called, in my time, at least half of Berkeley faculty to ask them to sit on these review committees. Half of them turned me down and half of them didn't, and I used to select these with really without much consultation, except with the responsible dean, but there was no really, consultation with the Academic Senate, it was just the responsible dean. And then the Academic Senate, towards the end of my term, got more and more concerned about it and wanted to participate far more in the choice of the departments, what the charges were to the review committees, which of course highlights what's going wrong with the department, and thirdly, to include the undergraduates in the reviews more than they were. When I started off it was essentially a graduate review.

10-00:22:39

Redman:

Right. Now that's interesting because when I spoke with Nancy Caputo, we talked about your time working together in the Sponsored Projects Office.

10-00:22:50

Carmichael:

That's right.

10-00:22:51

Redman:

On the Conflict of Interest Committee.

10-00:22:52

Carmichael:

That's right.

10-00:22:54

Redman:

What was interesting to me is that she said one of your main contributions was the emphasis on the protection of students, more specifically graduate students

in this Conflict of Interest Committee, and that your perspective was almost always, or very often, protecting the graduate students and protecting the integrity of the graduate education. Do you feel as though, in each of these positions, that you were really concerned with protecting graduate students and really looking out for the graduate students?

10-00:23:24

Carmichael:

Well, Sam, in a way yes, but it didn't start off as protecting them. It was pretty obvious to me, from day one, when I came to Berkeley, that if I was lucky, I would have graduate students who were smarter than I working with me. I just you know, I've been lucky to have that. I didn't feel threatened by that. I would learn from that.

10-00:23:47

Redman:

Do you feel some of your —

10-00:23:49

Carmichael:

My career here is entirely dependent, in my view, on the caliber of graduate students that I've had, and the number of them. Most of them are world famous, and they deserve to be, and I enjoyed my time with them immensely. Everyone is different, as one would expect. They weren't treated the same or at least I hope they weren't treated the same. So I had a great sort of emotional connection to the role of a graduate student. I depended on them, I liked them, I spend my days with them, I spent my nights with them in Mexico when we camped. My life was involved totally with graduate students essentially and so, when I became a department chair yes, they were my major concern, but not to the extent of diminishing that of the undergraduates. When I became an administrator yes, they were my major concern, to make sure that their careers here were as intense and well supported as they could be. I wanted people to be well recruited, well supported, well guided, well advised and finally, to get a good job.

10-00:25:00

Redman:

So you think you emphasized that more than some of your colleagues holding the same positions, either before or after?

10-00:25:06

Carmichael:

Only Nancy could tell you that. I never met my predecessor, and I never met my — well I know who my successor is, but I don't know what he or she is doing.

10-00:25:16

Redman:

OK, interesting.

10-00:25:18

Carmichael:

Once you leave a job you leave it.

10-00:25:20

Redman:

You're kind of done with it.

10-00:25:21

Carmichael: You should be done with it because otherwise, you'll want to interfere and you're a pain. So once you leave it just get out of it.

10-00:25:31

Redman: This is maybe kind of a quick aside, but on that committee, on the Conflict of Interest Committee — by the way, what years were you serving on that committee? Do you remember?

10-00:25:41

Carmichael: I would say from about 1988 to about 2000, something like that.

10-00:25:47

Redman: OK, so this is I mean, relatively recently.

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Carmichael: Well yes.

10-00:25:53

Redman: Nancy was telling me that biotech was really the main concern.

10-00:25:58

Carmichael: Right.

10-00:25:59

Redman: Protecting patents and conflict of interest as far as biotech, and the interaction between private companies and research results and faculty members. In some ways it seems like there are analogies that could be made to something that's going on, on the campus right now, which is the BP deal.

10-00:26:19

Carmichael: Oh yes, absolutely.

10-00:26:20

Redman: I was wondering if you could draw on your perspective from that.

10-00:26:22

Carmichael: Well the big dispute about the average faculty member is, if the average faculty member gets a gift from a company, that has to be recorded. Now the difference between a gift and a contract is that a gift has no reporting requirements. But to the faculty members and very much an additional one, a contract has to pay overhead, and the overhead on the Berkeley campus is roughly about between 50 and 52%. So you immediately lose quite a large fraction of your contract and so if you get \$100,000, you're going to lose about \$33,000 in overhead, whereas if it's a gift, on that \$100,000 you get to keep the lot. So this committee was making sure that in fact there were no reporting requirements for the people who accepted these gifts, and they would be used to do whatever that PI wanted, not on anything necessarily to do with what the company wanted. So there were no reporting requirements, and so that protected the graduate students. They had no obligation, you know, if they were being supported, there was no reporting requirements by

them to do a particular thing. We had to protect the integrity of this place, and Nancy and I, I think, we saw eye to eye on this completely. And that, as far as I remember, is really the predominant issue. It was a perennial issue, it came up time and time and time and time again. A faculty member said no, this is not a contract, it's a gift, because they wanted to escape that 52% overhead. They could then use it for whatever it was they wanted to do, and very often we said no. So the committee works fairly well. It's made up of one or two members of the administration of the sponsored projects office, a person from the administration, which is me — I'm sure my successor does it now — and a bunch of faculty who are appointed to it on rotating terms, who come from the various segments of the campus, so they know that, you know engineering, biotech or whatever.

10-00:28:35

Redman:

Is this an example of a type of committee that you look forward to being on, or do you feel as though you'd maybe gotten sucked into this?

10-00:28:44

Carmichael:

I think it's the sort of thing that I wouldn't have — I'd never had any gifts that I remember, so it never arose as my own research. I always had contracts with the National Science Foundation. So it's a job that I did for the benefit of the campus. That's one of those jobs which Joe Cerny said he would like me to do, and I had to you know, why not. I was being paid as a dean and he could determine what jobs I did for that deanship.

10-00:29:13

Redman:

And so you envisioned all of these things, and these various responsibilities as promoting not only academic integrity on the campus, but also just making the campus a better place.

10-00:29:25

Carmichael:

Yes. I mean frankly, a lot of faculty will try and cut corners. Almost all the regulations we have on this Berkeley campus, when you think about it, have arisen because somebody, at some time or other, cut a corner or they did something which the rest of us thought was unreasonable, so we made a regulation saying you can't do that. You don't start with a set of regulations running a university, it doesn't work that way. There's usually just a bunch of you cannot do this, you cannot do this, you know, because it's perceived that somebody did something which is extreme, and they don't want that to happen again. But by and large, the Berkeley campus does — it flourishes on I would say on trust, on the belief that so many people are honorable. I always believed that, and if somebody said something, you automatically had to believe them, even if one of their colleagues says, "I don't believe a word that guy said." You still have to do it officially, as an administrator, you've got to believe what they say. I had no trouble doing that.

10-00:30:32

Redman:

So do you feel as though the bureaucracy necessarily grew at the university?

10-00:30:38

Carmichael: Oh yes. The bureaucracy grew, and I'm not sure it's the university's fault. The reporting requirements to the Federal Government dramatically increased, I would say from the '70s on.

10-00:30:49

Redman: Specifically the NSF?

10-00:30:50

Carmichael: No, it wasn't the NSF, it was the other things like — it was all the research problems — plagiarism, animal care, human care, all those things, also protection of research rights. All of those offices have reporting requirements, and you've got to deal with it. You've got to document the activities. So it built up a sort of more and more people taking care of what the Federal Government wanted, in response to its laws. So when the Congress passes a law, it rarely finances that requirement. It just says you know, you've got to do it.

10-00:31:34

Redman: Right. And then the university has to figure out a way.

10-00:31:36

Carmichael: Figure out how to do it.

10-00:31:38

Redman: And so were there things that maybe a rule would change as a result of the Federal Government's reporting requirements, and there were elements of the bureaucracy that you'd have to cut out and say, this now is outdated, we have to change how we do certain things in response to that?

10-00:32:01

Carmichael: That's a difficult question to answer because I'm not sure I have enough experience to give you examples of it. I think the most difficult issues came up with research risk, and this is a difficult one because there was one professor, who shall remain nameless, who took blood samples from his students without their signing off that he could do that. That came to our attention and that you can't do. Another professor was, I think, rather ill-advised or forgot completely, and then he let his students take radioactive materials home. So we have to deal with those things because they trigger a lot of responses from officialdom, either the state government or the Federal Government or both, and we have to do it in such a way that a transgression isn't repeated, and yet you've got to be fair to the faculty member. I mean, the faculty member, by and large, feels that you're restricting his or her capacities to do research or something, and that it was nothing harmful. At other times they say oh, I'm sorry, I never thought about it, you know, and you've got to deal with these issues. By and large, I think you've got to accept the faculty's word that nothing untoward was planned here, it was an accident largely, it was thoughtless rather than malicious.

10-00:33:48

Redman: Actually, I want to change gears a little bit and talk about curriculum development during this time, and your role in that. Was this the time period where there was the creation of the American cultures requirement on campus?

10-00:34:01

Carmichael: Yes, but I don't know anything about it.

10-00:34:03

Redman: OK. Were there other similar, parallel types of requirements that were major requirements for the undergraduates?

10-00:34:11

Carmichael: Well, the curriculum in any department is a continuing, ongoing dilemma. It's an ongoing battle between those who want to change it and those who want to keep it. My perspective, looking back over my years at Berkeley, is that most curricula are determined by what the faculty members were taught themselves. It isn't anything new, it was what you were taught and how you were taught it, what the subjects were that you were taught. So there's a great inertia here, there's a great unwillingness to change very much, but every now and again you have to have these upheavals. Such an upheaval was, I think it was in the early '70s or late '60s, we had one at Berkeley which was called the Muscatine Report, which is really designing how we taught undergraduates, and what lies in the path of the undergraduate career here, and what an undergraduate level education comprised of. I think we need one of those again.

10-00:35:10

Redman: Oh really? OK.

10-00:35:11

Carmichael: My attitude would be yes. I mean, my observation, and I don't know how realistic it is, is that the present day education is trickled down — the graduate curriculum is a trickle down from the faculty research, and the undergraduate education is a trickle down for the graduate programs. I don't think they've — so there has been no comprehensive look at now, at what I think should be a comprehensive, liberal education, which would be quite different to what it was 40 years ago. I mean, look at what's happened to computing and so on, as a consequence, and how the Internet has changed things. So it is time for us to do it again. That leadership can only come from a chancellor. If you want the faculty as a whole, on this campus, to look at the curriculum overall, there's only one person that can bare that load, the very top. You can't get a dean to do that. The present chancellor, I don't know what he feels about it, but in those days, back when it was done. I don't know who instigated this one, the Muscatine Report, but I think Rod Park was on it and a bunch of other people, and they instituted all sorts of good things as a consequence of that, but we're still running on that, or the remains of that, which have been affected by all the various faculty needs and requirements that have come subsequent to that.

I don't think there's been a global look on the campus, and there hasn't at Harvard, and the moment Harvard does it, I think we should do it. It worries me that we have to follow Harvard in this regard. We should, in fact, have taken the lead but we haven't.

10-00:36:50

Redman:

You touched a little bit on computers and technology, and how that affected the campus and education as a whole. Over the course of your time in the administration, I mean computers absolutely changed everything, technology absolutely changed everything, or did it? I guess that's one of my assumptions.

10-00:37:11

Carmichael:

I think the assumption was that computers were going to change everything, but you know, this is particularly true in my experience in science and watching people interact with kids. Nothing beats the interaction between a faculty member and a student. If you want to motivate that person and get them excited about a problem, that can only come on that sort of human interaction basis, and it's wonderful to see. I mean, we've just seen Leon Litwack retiring. He's run a history course which apparently everybody's taken, and thinks is absolutely spectacular. He must have had all these thousands of kids on the edge of their seat.

10-00:37:52

Redman:

30,000.

10-00:37:53

Carmichael:

30,000?

10-00:37:53

Redman:

Yeah.

10-00:37:54

Carmichael:

That could never be done by computer, not at all. So we should avoid throwing the baby out with the bathwater. The University of Phoenix is trying to do this, capitalize on doing everything at home on a computer. I would hope that Berkeley doesn't have to go with that route, and compete with the University of Phoenix. Faculty members, by and large, in my experience here, are conscientious about teaching. They're trying to do the best they can. Now that doesn't mean to say they're all good teachers. Some you know, it's a whole spectrum of not so competent teachers to extremely competent and in fact is clearly one of the aces, and I think we should continue like that. I think we should encourage good teaching and do all we can to bring the best out in the faculty to do it, and we should never underestimate the power of human interaction when it comes to one professor or one person talking about the excitement of that research and that problem, how severe that problem is and how it affects other people. That is what makes this place turn around.

10-00:39:01

Redman: Do you think that's true from the students' perspective in that students rely so much on sending professors emails now as opposed to actually visiting them over office hours and talking things out face to face?

10-00:39:14

Carmichael: Well, I don't know. I've never had a lot of students email me, because I really haven't taught an undergraduate class for probably about eight years.

10-00:39:26

Redman: And do you think the graduate students were maybe better?

10-00:39:29

Carmichael: They come and see me a lot now. They don't email me. They'll email me to see if they can come and see me, but not to —

10-00:39:34

Redman: Interesting, OK. Not with a specific question?

10-00:39:38

Carmichael: Oh, sometimes, yes. I think it's to save me time, but by and large, I get the sense that they like to come and talk or think about a problem or something like that, and that hasn't changed since I came here. I'm sure it's just as effective for you in your field as it is anybody's field, that one on one, when an exciting, informed person talks to you, you pick up on that excitement, and that's the — I won't say the genius, but the caliber of his or her thinking.

10-00:40:14

Redman: That's very true. Now let me ask again, changing gears, your opinion on the Lawrence Berkeley Lab and nuclear research on campus. Has that changed at all over time?

10-00:40:26

Carmichael: When I was a staff member for ten years and I enjoyed my time up there. I liked mixing with the engineers and all the rest of it. They don't do any classified research up at Lawrence Berkeley National Lab. They do in Livermore and Los Alamos but not here, and I think it's been a huge asset for the campus. I think while in my day, about 600 graduate students were employed up there, and maybe 100 post docs or 200 post docs. So it has been an incredible asset and the resources that it has, and I think we should do everything we can to incorporate it. I'm sure that the new chancellor, because he's a physicist, will want to see that happen, and the new director up there is a physicist as well. So I'm sure that they'll want to try and connect this campus more closely to the lab for two reasons. Firstly, that we have an incredible resource of cheap talent, our graduate students, and we use those to solve all sorts of problems for five years and pay them a graduate student salary, whereas if you're a national lab in Tennessee or something like that, you're going to have to pay a full salary of benefits and all the rest of it. Here we just pay benefits plus a graduate student salary, and you've got somebody who is probably five times as smart and as dedicated. So we have this incredible

resource of having great graduate students here, and it behooves Lawrence Berkeley Lab to stay connected, and that was one of the things which I wanted to do with the Lawrence Hall of Science when I became director, is to connect that more to the graduate students. I think there are now about four or five graduate students doing their research, actually using Lawrence Hall of Science data. Once again, this is an incredible resource on the campus, and we're not making — well, Lawrence Berkeley National Lab is making much use of it, and the Lawrence Hall of Science should make more use of it.

10-00:42:19

Redman:

OK, interesting. Now what — as kind of a final question, I want to talk more about academic administration, because it's so interesting and there's so much to talk about. What do you think, encapsulating this in a single question, what do you think your most important achievements are in academic administration?

10-00:42:44

Carmichael:

Difficult question. Well I have to start from the last job I had. I think my time, which is seven years I think it was. Was it seven years or nine years, seven years I think. Yes, seven years. I think that did transform the place. In that transformation, I was well advised and helped initially along the path, by Nancy Caputo, who analyzed the problem for Joe Cerny, before he sent me up there as a director. The place was much stronger when I left than when I took it over. Now that doesn't mean in any way that my predecessor, Marian Diamond, was ineffective. She just saw her role in a very different way than I saw my role. I saw it as an opportunity for change, and I think everybody hated that to start with because they didn't like change. Change means their comfortable pathways have to be upset. We need to change. It's part of what a university is about. If this campus means anything, it's dealing with change. All these graduate students coming on the campus discovering new things means that sooner or later we're going to have to change. You can't keep my ideas any longer. And that's that conflict, and it's a wonderful conflict. It's gotten comfortable as hell.

Now before that, I suppose I was a dean. I was a fairly good chairman because I introduced new things, which was important. I introduced, for example, connections to the alumni, raising funds for the alumni. I introduced the intercampus collaboration. That's fallen by the way now. I went out to recruit graduate students from other universities, which I don't think is done any longer, but it was very successful the two or three years that I did it. My deans would have a better sense of that because I — what I did because it seemed sensible to me. I came to the conclusion Sam, that most — the quality that you most need when you're an administrator is common sense. I've come to the conclusion that it is the least common of all attributes that human beings have.

10-00:45:27

Redman:

And what's your definition of common sense?

10-00:45:34

Carmichael: I'm not sure I can come up with the common sense. It's a capacity that everybody thinks they've got. It's universally believed to be high on everybody's sort of success stories, and I would say usually they're wrong.

10-00:45:54

Redman: Very few people actually possess common sense.

10-00:45:56

Carmichael: Exactly, they really do. But as I said before, there are few things you can teach people if you deal with people if you're a department chair. One is you can never tell a faculty member, despite the evidence, that they're a bad teacher. Everybody believes they're a good teacher. They may think they can improve, but they still think they're good. Everybody seems to think they're a good administrator. I don't know why but you know, they seem to think they're good. They use strange yardsticks or metrics to measure that. Very often you just use it on the number of meetings you go to, and they think that being an effective administrator just by attending meeting after meeting after meeting. I think that's wrong. You can't tell the average driver that they're a bad driver, particularly when they've just done a piece of bad driving. It will engender the worst possible driving. And you can't tell people that they haven't got common sense, though it's very apparent that they usually haven't.

10-00:47:02

Redman: So let's say you're speaking with a young professor, who is about to embark on a career in academic administration. What advice are you going to give them?

10-00:47:15

Carmichael: I would say don't embark on a career in academic administration, with this proviso. It's very important to take your turn when the time comes, but your credibility, your capacity to influence people is going to be entirely conditioned by your role as a scholar or researcher. If you are not considered by your peers to be adequate or even good or even superior, you're never going to convince people outside your field, when you become an administrator, that you know what you're talking about. You've got to have that clout running for you, and I think most people realize that, and I think by and large, the Berkeley campus makes its administrative appointments from its better scholars, not its best but its better ones. Remember, just because you're a good scholar, a good researcher, doesn't make you a good administrator. So there's this dilemma.

10-00:48:14

Redman: Is there anything you'd like to add on this topic? I think we've covered a lot. There's a lot of good material in here. Thank you.

**Interview 6: May 18, 2007**

## Audio File 11

11-00:00:05

Redman: All right. My name is Sam Redman, and I'm sitting down here today with Professor Ian Carmichael. Today we're going to be talking about a number of things, and we are going to take a break after this interview. Ian is traveling to the UK and I am traveling to Los Angeles, but when we return, we'll get more into the Lawrence Hall of Science, but we're going to start touching on that a little bit today and getting into that. First, I'd like to go over some things that we talked about a little bit in our last interview. The first question, we talked a little bit about your visit to China with a group of scholars from Berkeley, and then a subsequent reciprocal visit from Chinese scholars, and I wondered if you had any more thoughts on that. Or it was the other way around.

11-00:00:57

Carmichael: It was the other way around. The Chinese scholars came here first, and then we followed a year or two later.

11-00:01:06

Redman: And we talked a little bit about how afterwards, at least the Central Intelligence Agency had approached you and asked what the Chinese scholars were most interested in.

11-00:01:19

Carmichael: Right. The Chinese visits were distributed over several fields. There were engineers, there were chemists, there were physicists and there were scientists, geologists. When they came on the Berkeley campus, we sort of split them up so they could see their respective departments. We found they were very well read. They had read all the western literature, but they weren't very well equipped to make the sort of measurements that the Europeans and the States does. So they were way behind in that, but their theory was good and they were very, you know, they knew what had been happening, sort of the cutting edge and so on. We took them around our department, and I've forgotten — I suppose that was 30 something years ago now, so I don't remember exactly what we did with them, but they spent a day and a half, or something like that, in our department, meeting graduate students and meeting the staff and meeting all the faculty members. Then they left and as I said, subsequently to their leaving, I was interviewed by a young woman from — and I was a young man then — from the CIA, and who had this PhD in romance languages or something. She wanted to know what in fact the Chinese were interested in particularly, so I described the whole visit and so on, and said that they seemed to be very — the men were very interested in our women students. Looking back today, I think it's because everybody wore all these Mao Tse Tung uniforms. All the Chinese had the same clothes on, men and women. The women and the men both had slacks and sort of dark, navy blue jackets and things which buttoned up to the collar. Mao Tse Tung wore them too, so it

was sort of a Chinese uniform in those days. Our students, on the other hand, were full of color and variety and everything else. I think that's what interested them. Many of them had never been to the United States before. So really it was a somewhat superficial response that I had for the CIA lady, whose name I've forgotten. Now that I thought about it, the other night I thought about it. A few days later, for some reason, the Russian Consulate called and asked me if I'd go talk to them about the visit with the Chinese.

11-00:03:57

Redman:

So this would be the Russian Consulate in San Francisco?

11-00:03:59

Carmichael:

In San Francisco. So I went across to San Francisco and met this very good-looking, blonde young man. He was very fluent in English. You wouldn't think he was anything else but born and bred in the United States. He didn't have an English accent, he had an American accent. We talked for a couple of hours about once again, what the Chinese were interested in. Then I asked him if he was a member of the NKVD and he said, "I can't tell you that." So I assumed that he was. I think the Russian spy agency, if you like, was interested in what was happening with the Chinese, and they wanted all the information they could get on them too. But it was very superficial, by and large, the information I had to offer them back, because their visit really didn't have any substance. They were tourists, really.

11-00:05:01

Redman:

You said that they were pretty much up to date on the information. It's interesting because I'm thinking of a period of time where information is exchanged mostly by paper and print, in this time period, rather than online.

11-00:05:19

Carmichael:

Right.

11-00:05:21

Redman:

You suspect that they were reading the latest journals.

11-00:05:24

Carmichael:

I think they were.

11-00:05:25

Redman:

But not going to conferences or something like that.

11-00:05:27

Carmichael:

No. They couldn't go to conferences. I don't think the Cultural Revolution shut down the acquisition of scientific journals. It may have diminished them some, but I don't know enough about my facts, and I'm sure it did diminish the flux of scientific journals into China. These people were reasonably well informed and I thought they wouldn't be informed at all, but they were.

11-00:05:54

Redman:

You probably wouldn't have been privy to any of that information, being an editor of a journal. It would have been the publisher who would have seen that— oh, by the way, 20 universities in China are subscribing to...

11-00:06:10

Carmichael:

I didn't know that. Although I was the editor, I didn't know how the subscriptions ran. The journal was owned by a German group and I never — I could have found out but never bothered to do it. I don't know how many you know, what the circulation in China was in those days.

11-00:06:30

Redman:

Did you ever get submissions from China or Russia?

11-00:06:33

Carmichael:

No. Russia, yes.

11-00:06:34

Redman:

Oh Russia yes.

11-00:06:35

Carmichael:

Oh yes.

11-00:06:37

Redman:

So you suspect that they, unlike the Chinese, had the appropriate equipment and lab.

11-00:06:42

Carmichael:

Oh yes. The Russians were scientifically very advanced, particularly in theory. They had very good mathematicians, so they understand the theory very well. In the beginning, they had some rudimentary equipment which they could deal with, and made some significant measurements. I don't know what it's like nowadays because they've gone through hard times, the consequence of the end of the Cold War. Russian science is excellent, it really is.

11-00:07:13

Redman:

Right. It would stand to reason. OK. So now, we talked a little bit about, before we started the tape, that there's a separation as far as UC Berkeley and the UC system in general, as I understand it, is not allowed to do classified research, except at the Los Alamos and the Livermore National Labs.

11-00:07:42

Carmichael:

National Labs, right. They're managed by the UC system. They're managed on behalf of the Federal Government and the agency from the Federal Government that looks after them and funds most of them is the Department of Energy. I don't think any campus is allowed to do secret research. Berkeley, to my knowledge, has never done it and Lawrence Berkeley Lab has never done it either, in the years that I've been associated with it.

11-00:08:11

Redman: Was this as your time as Associate Dean of Research and Dean of Research, were you ever pressured, in any sort of way, to take on any classified research?

11-00:08:22

Carmichael: No.

11-00:8:23

Redman: So it was always assumed that there would never be classified research.

11-00:08:27

Carmichael: There never would be classified research. It was just verboten. That was it, you can't do it. I think the Academic Senate passed that, and they said the end of it. I noticed in the newspapers the other day, there's some controversy about accepting tobacco research funds, and apparently the faculties agree, or part of the faculty, in the University of California have said that we shouldn't use tobacco research funds. My own view is if the results are open and publishable, yes. But that you've got to make sure about, that in fact the research itself is not in any way — it's not like a research contract to do something and, therefore, becomes proprietary. You can't have that sort of research going on in a university. The students get too, you know, it's not fair to the students because so often their research actually, they do under these circumstances as part of a thesis.

11-00:09:23

Redman: Now there's a difference, as I understand it, between research grants and research contracts.

11-00:09:30

Carmichael: Yes.

11-00:09:30

Redman: Is that right?

11-00:09:31

Carmichael: Right.

11-00:09:32

Redman: Is it grants or contracts that the university takes a cut as far as processing fees and things like that?

11-00:09:41

Carmichael: The grants contracts, they take a cut, but what they don't take a cut on is gifts. It's gifts. Now gifts have no reporting requirement, and that's the distinction between a gift and a contract. The contract says will you please do this and at the end of it, will you report on this at such-and-such a time in such-and-such a way. That's a reporting requirement. That can never be considered a gift. A gift, you know, they literally, it's perceived by the university as people giving you money, maybe to go and measure this, that or the other, but if you want to

go to Tahiti on it you could do it. You might not get another gift but on the other hand, you can do it with that gift right.

11-00:10:21

Redman:

OK. So as far as the surveillance goes, government surveillance, there's — I mean to a degree, the NSF, the NIH and the funding agencies, they have a reporting requirement, but that's not necessarily — all of that is —

11-00:10:43

Carmichael:

They have a reporting requirement at the end of their grant. They want to know what you've achieved. Sometimes there are annual reports but in the National Science Foundation, it's just a report at the end of the grant period, and they want to know what papers you've published and what students you supported and what post docs you supported, those sorts of things, so that they can give the money — you know, they can tell Congress that their money has been reasonably well spent. It's not onerous. It takes a little time to do but it's not really onerous, the reporting responsibility. The university has the responsibility of making sure that the money is spent in accord with the best accounting principles. So you have to — the university treats the money as if it is his own, and what we have therefore to deal with, all the universities normal accounting practices and procedures, things like renting cars overseas and renting airplanes overseas, both of which I've done. It's gotten more stringent lately but in the past it was reasonably — as long as you had receipts, that was easy enough, you could do it.

11-00:11:59

Redman:

And so there was — do you feel like the amount of surveillance, official surveillance in some ways is that with non-secret research or research that's unclassified, has in some ways shifted and it's become more bureaucratic.

11-00:12:19

Carmichael:

I think it's become more bureaucratic and onerous now, I'm sure of that. I sense that from just listening to my colleagues. But in the early days, when I came here, it was pretty good. As I remember, the National Science Foundation actually sent a check the first time around. There's essentially no reporting requirement and you could just get on with it, and Congress wasn't particularly involved with checking up on how its funds were used. Subsequently, Congress changed its interest or its oversight, and wanted more and more information about how its funds were used.

11-00:12:57

Redman:

Do you think that's a good thing or a bad thing?

11-00:13:02

Carmichael:

I think where public funds are concerned, you've got to expect it. Congress goes through these cycles of wanting to spend \$1,000 to check up on misuse of \$10, and so does the state government. They both feel that the misuse of public funds is a very bad thing, but we often spend a huge amount to make

sure that there is no misuse and if there are misuses of anything, it's over a rather insignificant amount.

11-00:13:33

Redman:

Now this is, in some ways, kind of a convoluted question, but do you think like Congress, the university itself could do the same sort of thing, where they're spending \$1,000 to check out the misuse of \$10?

11-00:13:52

Carmichael:

I don't know any longer really, what the university does on its own. Any big sums I've had have been external funds. So I mean, they were subject to the university principles and practices of prudent guidance and prudent reporting, and the university would use that for its own — you know, if the funds come from the university. The university funds are so few and far between, I've never — I can't remember what they are, but I think I got \$600 a year or something.

11-00:14:30

Redman:

On committees like the Conflict of Interest Committee and you know, working with these faculty issues, it was much more of a focus on outside grants.

11-00:14:43

Carmichael:

Oh, yes. You couldn't exist in the science departments or in most departments, without outside grants. The university, when I came here in the '60s, gave you \$600 a year, which you could spend on anything you wanted. I think the sum has now gone to \$1,000, forty years later, and that's all you get. The rest you've got to scramble up yourself from external research funds and so on. The universities are totally dependent upon those research funds to support its students. In my case, for running Xerox machines and telephones and all the rest of it. The university doesn't pay for a telephone.

11-00:15:21

Redman:

So does that change the way you do things, like look for faculty and graduate students, is that — I mean in the sciences it's so crucial that people have been awarded grants.

11-00:15:33

Carmichael:

Right.

11-00:15:35

Redman:

I mean it's almost as crucial, in some ways you'd think, as publications.

11-00:15:38

Carmichael:

Well you can't do publications without a grant. There's no way you could do the research usually. I mean you need it. It's desperate, it's blood. It's paper blood.

11-00:15:49

Redman:

You're right, paper blood, there you go. What if somebody has worked with a really influential advisor that has constantly, you know, been able to pull down these huge grants, but someone has never applied or won their own grants. Is that a big red flag to you, as someone who's hiring or looking for graduate students?

11-00:16:14

Carmichael:

Let's do the last part of your question first. When we recruit graduate students, by and large, we put them in an order of rank order in the department, and then we find out who can support them, because the department has one or two or three GSIs, and they go down almost every year as I can see, as I remember. The means of getting most graduate students here and supporting them, actually comes from these individually held research grants. So mostly, we sit around and say well I can support two new ones or something, and that's what I used to do. I could usually support about four or five a year, until the last few years, and then I went down a lot. I could do four or five a year, and that meant by and large, two — to throughput them would be about — I had — no. We had six or eight students and so that would be, in the last five years I'd say. I'd support at least one student and sometimes two students a year. I would recruit them. And that's how we do it, and that's how every department does it, even now. The campus gives us some fellowship money, there is some fellowship money, but by and large, it's so competitive now. I mean, every other university except for this one, maybe it's changed now, offers five years support for graduate students. You tell me. You're much more up to date than I am, and you want a package of five years support. I mean that's what we should be doing. I don't know whether we actually do it, but, by and large, that's what the outcome usually is. If a student comes in and does reasonably well, he or she will be, in my department, will invariably [be supported] whole five or six years. What about you? You've got a job right, doing this.

11-00:18:19

Redman:

Yeah, exactly. I mean that's the way of supporting the students, but none of that's guaranteed. So that's the big beef in my department right now, is that it's difficult because a lot of the funding isn't guaranteed. They're trying to change that to make sure it's guaranteed five year funding.

11-00:18:37

Carmichael:

It's an interesting prospect. In the United States, you fund professors to support students to work on their research, right, or the professor's research. In the UK, you fund the students, and then they can go work with whom they like. So it gives the students much more freedom, if you like, to do it that way in the UK. Here, on the other hand, I think they're much more efficient, because you've got somebody riding on your shoulders saying hey, come on, we've got to get this done because my grants have got to be renewed.

11-00:19:10

Redman: Right.

11-00:19:12

Carmichael: It works really well here. I think it works better here, the system here is better by and large than it is in the UK, where students can sort of goof off if they want because they've got a five year grant from the government. So if they don't do anything much the first or second year nobody cares.

11-00:19:28

Redman: Right, nobody's checking up.

11-00:19:29

Carmichael: Right. The system here, it has problems, and one of the problems that arise is publication and attribution of, you know, contribution to the publication. I don't know whether it's true now, but I think when I was dean, we'd try to make sure that every department had, or every professor had sort of a practice which he or she followed in co-authorship. In some fields, if you support the student, that makes you a co-author. That's the custom. I don't wish to put organic chemistry down, but as I remember, organic chemists are a bit like that. If they support the research, they want to be the co-author, whereas in most departments, you've got to have a substantial intellectual contribution to do it, and then that makes you the last author, not the first author.

11-00:20:29

Redman: You can't just use somebody's desk space for a day.

11-00:20:34

Carmichael: No. So those are the problems that arise from sponsored research, the researcher is funded by external agencies, because the reporting requirements for a faculty member wants you to do the research. You want to get a PhD or a master's degree out of it and over and above both of you is this [wise] of time. You've only got two years or three years or four years or however long the grant is, by which time you've got to apply for another grant so that your successor's graduate students can come in. So you are actually working for that professor not only for yourself and for him or her, but also to make sure there are grants available for your successors for the next wave of graduate students coming in. And that's how the system works. It's a little bit like a tractor track, you know, it goes round and round and round like that. It has its great benefits, it has some drawbacks, but the benefits, I think, outweigh the drawbacks.

11-00:21:35

Redman: Do you think in some ways it helps breed community in the lab, for instance?

11-00:21:42

Carmichael: Oh yes.

11-00:21:43

Redman: The whole lab —

11-00:21:43

Carmichael:

The research groups are very tight. If you work for so-and-so and you're part of that research group, that's your home, that's your emotional home and it's a good idea, because when you first come to Berkeley and you get enlisted into one of these research groups, become part of it, you've got someone there to give you advice who's been there for four or five years. It's a really nice way of sort of introducing you to beating the system, as it were. It gives you an emotional home as well, an academic home.

11-00:22:19

Redman:

Later on, not now but later on, what I'd like to do is ask you about translating that experience of lab groups into the Lawrence Hall of Science, because it sounds to me like when you arrived at Lawrence Hall of Science, things were very fractured. You know, people wouldn't talk to each other if they were working on different projects and whatnot, and it seems as though in some ways, it's trying to translate that experience of working for the same team in a lab, is that you're all — if you don't get the grants. I mean it makes for an environment where people —

11-00:22:58

Carmichael:

Yeah, OK, we'll talk about that if you like. I mean, there are 300 employees up there, so it's quite a large operation to try and make homogeneous in the sense of working for one course as it were. There was some progress in that direction when I left. I clearly had made some progress.

11-00:23:22

Redman:

So the next thing I'd like to talk about a little bit is gender issues in geology and science in general. Over the course of your time there, it sounds to me — and actually, we talked a little bit about your chemistry courses in Cambridge and lining the female students up to try to get attention that they were there. It seems to me that over the course of this time, there were a lot more women.

11-00:23:55

Carmichael:

My first graduate student was a woman.

11-00:23:58

Redman:

Oh really?

11-00:23:59

Carmichael:

When I was a staff member or a faculty member, she was at Imperial College of Science. She stayed on to do research with me. She was a somewhat older woman and it worked out very well. We became good friends as well as colleagues. And now I have what, three or four more students I suppose at Imperial College, and then I left. Then it was quite a number of years before I had a woman student at Berkeley, because there wasn't a lot in the department here. There were more — thinking back, there were more in the UK than there were, in those days, in the '60s, than there were in the U.S.

11-00:24:50

Redman:

Why do you suppose that was?

11-00:24:54

Carmichael: The means of support I suspect, plus the fact that a PhD in the UK takes much shorter, because there's no coursework. So you could get a PhD in three years.

11-00:25:09

Redman: Was it something about having a family than with —

11-00:25:14

Carmichael: It's just that because it's shorter, so that they — I guess that women students didn't see it as such a huge investment of their time, at a time when you know, this is in the '60s. So this is where people were still thinking about getting married and having children in their twenties. That's gone up a bit, ten years to now. So I suspect that had a lot to do with it. They knew they could get a PhD and get out by 25.

11-00:25:51

Redman: Right. And that's just not possible in the United States.

11-00:25:54

Carmichael: It's not possible, so I think that's what happened. I hadn't thought about it before. This has been a drawback, a barrier I think, for women getting into science or into graduate work.

11-00:26:09

Redman: But yet at the same time, you seem to have indicated that you think coursework is what really makes American graduate work strong.

11-00:26:17

Carmichael: Oh absolutely, it really does.

11-00:26:19

Redman: So is that something that — I mean it makes it difficult to draw in women students but yet, it makes the program stronger to have coursework. So is there any way to —

11-00:26:33

Carmichael: I don't know that you can readjust the whole system. American graduate work is now so involved with having courses. You could never stop that, not ever. I mean, it's a tradition like the sun getting up in the morning actually, that you have PhD orals on your work and the courses you've taken. That's a rite of passage, which I don't think this country will ever give up. In the UK they don't have that tradition. They have a totally different tradition. More people, by and large, expect to get PhDs here, it seems to me. So many people expect to go to graduate school here, whereas in the UK in the '60s, not a lot of people did. It was really for people who were going to become academics. So you didn't have to have coursework to bring that standard, they would do it spontaneously, you could argue that. That's what the Brits would argue. So I think I was — when I came here, it was clear to me that I was defective and my background was deficient in so many ways, and I sat in on courses with my graduate students. I really enjoyed that and relished that, and I met some

professors of chemistry and professors of material science, and I found them invaluable, that coursework that I took here. I never took it for grade. It seems silly for a professor to take it as a grade, but at one time the TA in chemistry did point out the fact that the thought my homework was not as up to snuff, whereupon I pointed out to him that it could be easily be on the PhD orals, and I could remember that. I seemed to do instantaneously better the next time. I really appreciate the coursework that I was exposed to here. It made a huge difference to my life.

11-00:28:43

Redman:

And so is there a way of — I'm sorry, it's difficult to come up with a question here, but as far as gender and is there coursework —

11-00:28:59

Carmichael:

Until you just raised the issue, I would have thought that having to contribute five years of your life to graduate school, with an uncertain job after that, at a time when most women were thinking of getting married and having families, was sort of deleterious to it. I mean, it's not likely to produce the results you want, which is to encourage women to go to graduate school. But what has happened, I suppose, is that women have become encouraged to go to graduate school and as a consequence possibly, of more and more going, they've delayed the business of having children and having — they've wanted to become professionals too. Having got a PhD, they want to become a professor and then maybe, you know, maybe start having their children then. I think that today's average young woman, of which my daughter is one, who is 32 and she's unmarried and no children yet. It's much more likely to — that's much more typical nowadays than my day, when I was 25, 26, and had children. Very different.

11-00:30:23

Redman:

Right. We've talked a little bit about changes in student behavior as far as students bringing dogs to campus. But you've also indicated to me that you think that students are a bit more conservative now.

11-00:30:41

Carmichael:

Oh, yes. In the '70s, you know, the Free Speech Movement and so on, students were radical. They were too radical in some ways but that's what half of the United States, would swing from one extreme to another and we would like to occupy the medium position for longer than those occupied. Berkeley has always been lucky in getting superb students. I went out to dinner last night with a friend of mine in the department and he said they're still getting superb students, and that's wonderful. So for 40 or 50 years we've been getting really great students, and I hope that continues. I hope that Berkeley still acts as a magnet to people like you and your successors. So you come here and you get the education you deserve and you can contribute, and it's always happened. Now, what has changed about the politics of the students, that's what you're interested in. When they came here in the '60s, they wanted to challenge everything, because it was a rough time. I mean the United States was

beginning a war in Vietnam, which became extremely unpopular, as I'm sure your parents have told you. Students challenged the basis for their education here and they wanted to design their own education. I think that's where we started in the Division of Independent Studies, so you can go and more or less design your own degree here. That's where teaching evaluations came in, that's where faculty voting on new faculty came in. What else?

11-00:32:19

Redman: Now how involved were graduate students in some of these changes?

11-00:32:22

Carmichael: Oh just as much.

11-00:32:23

Redman: Oh really?

11-00:32:24

Carmichael: Yes.

11-00:32:25

Redman: So at an FSM rally, would all the students come?

11-00:32:27

Carmichael: Oh yes. My students disappeared to watch the FSM rally, and I was there too oh, yes. We all went together. I was fascinated by it. I mean, there were people... But then the issues sort of changed. It went from the Free Speech Movement — as I remember — and became a filthy speech movement. It became tacky and everybody said fuck this and fuck that, and for a long time it became objectionable. Then we got into the era of dogs, and every student wanted a dog to make him I don't know, make him feel emotionally whole. So you had 20 students and 20 dogs in a course, and that was a mess. It was a mess in terms of what was left there and certainly what the dogs used to scabble a lot, bark at one another and so on, and we got fed up with it. In fact, notices went up all around the campus that you can't take dogs into the buildings. I think it's gone now. All the students fed their dogs the same food and it was the wintertime, and the sidewalks of Berkeley were you know, full of excrete of this purple color, which was a synthetic dog food which everybody fed their dogs. But that passion or fashion stopped after about four or five years.

11-00:33:58

Redman: And then in the '80s and '90s?

11-00:34:00

Carmichael: It became more normal, if you like. It came into the more medium sort of political position, and now it's become more conservative. Students are much more conservative now, and it's not a bad thing. It just reflects what's happening in the country as a whole, and a university will do that. I would like them to not reflect the country as a whole or lead the country as a whole, but maybe that's happening. Berkeley was known to be the great liberal bastion, if

you like, in the '70s. I wonder if it is now. I don't know how the population sees it but if you came from Berkeley, people looked at you with awe and dismay.

11-00:34:45

Redman: At the same time.

11-00:34:46

Carmichael: At the same time. If you're traveling, and I used to travel a lot, people always asked me what I did and I said oh, I'm a professor of geology. And they said well where do you teach? I said Berkeley and they'd say oh my God. And I can give you a good example of that. I was flying down to Mexico to meet my research group and in those days, we had an airline called Hughes Airwest, and it was painted yellow. It looked like a banana, and it was Hughes Airwest, and Hughes Airwest flew from San Francisco to Los Angeles to Tucson or Phoenix to Guadalajara, and that's why I took that airline. Well, at Los Angeles, an American major general came on the airplane and with him was his ADC. I don't know what the expression is in the American army, but you know, there's sort of an attendant junior officer, who happened to be a woman. What interested me about this American major general was he was wearing British paratrooper wings. So I said to his sidekick, "Would you mind if I spoke to your general?" — he was a two-star general — and she said, "Why do you want to do that?" I said, "Well, he's wearing a British paratrooper wings, and I was a British paratrooper myself." She said, "Please do." I mean, a major general to me was up here. I said, "Excuse me sir, I notice you're wearing British paratrooper wings." The interesting thing is, we'd both been second lieutenants on the same military exercises in NATO in Germany, and he had been literally 20 yards away from me. So that was a very interesting thing. So I said to him, "Gosh, you know, from a second lieutenant to a major general, you have done well." So then he said to me, "Well what do you do?" I said, "I'm a professor at Berkeley," and he said, "Jesus, you have screwed up," which is just you know, a way that the population saw Berkeley faculty members in the '70s. We hadn't screwed up. It is a great faculty, it is a great group of students, and we didn't screw up, but the public perception is that we were lawless and so on. Reagan became a Governor on that basis. He wanted to set the situation right.

11-00:37:24

Redman: So let's talk a little bit about, you said that, when we were talking a little bit earlier, that some of the private funding changes during the dot com boom were less so that monies were streaming in from —

11-00:37:38

Carmichael: I really don't know about — how the money streamed off the dot com boom. All I know is that, or what I understood that if you've got a lot of shares, you often donate the shares to a university or something like that, and if the shares went up then the university flourished and if the shares went down, it didn't do so well. I don't know, but the funding itself, the great resistance to funding on

the campus in the '70s and '80s because we – well, in the '70s, anyhow, because we saw this as a state institution, and the state should pay for this, the state should pay for decorating the offices, which they never did. I mean, I decorated my office once in my 40 years in it, and it was painted by me once and never painted by the department at all. In fact no, it was twice by me, now that I think about it, twice. The faculty was not all that well looked after in the sense of you know, these little things like painting the offices and all the rest of it. I think I've lost my point now.

11-00:38:51

Redman: Just as far as funding.

11-00:38:52

Carmichael: Oh yes. We saw ourselves as a state institution and the state would pay things, and it took a big monumental change in perspective and in direction just to get the idea that in fact, we should go and use our alumni as a source of funds. I started in the department and I didn't use funding arguments much, just connected to the alumni, and that went in the — I think that's in '74, but when Mike Heyman became the Chancellor, he started fundraising on a big scale. If he hadn't done that we'd have been in bad shape, but we still have a much lower —

11-00:39:32

Redman: Endowment.

11-00:39:33

Carmichael: Well I wasn't thinking endowment, but participation rate[ among alumni] than a private university.

11-00:39:39

Redman: Now why do you think that is, as opposed to fundraising at Stanford, let's say.

11-00:39:44

Carmichael: Well, when you go to Stanford, they tell you pretty soon, or your father probably does, that he's paying you — you know, to come here it's costing him \$45,000 a year or whatever it does cost at Stanford. All the time you're told that you may have a scholarship, in which case that's got to come from somewhere, and that's come from our endowment. But the cost of actually educating an undergraduate is, let's say, \$45,000, which is a substantial sum over four years, where it's close to \$200,000. So you get the sense that the alumni have contributed in some way to the scholarships given to the less well-off students at Standard. So there's a tradition. Private universities inculcated the tradition in their products essentially since Harvard was started, I suspect, but the state universities have not done that. I mean, it's essentially a post 1970s operation I think. State universities have not been big at raising funds, and it's Mike Heyman, to his great credit, I think started fundraising here, which now is a full-time occupation for so many people on the Berkeley campus.

11-00:41:05

Redman: Do you think that with the coming of the next few generations, that that will really take hold at public universities?

11-00:41:13

Carmichael: What I'm curious about is the Old Blues. Now the Old Blues are our alums, and they're very faithful to the football team, and an awful lot of them played football. If you look at them nowadays, they're my age, younger a bit, they're White Anglo Saxon, WASPs, you know, whatever you like. Do Asian people play football? I don't know? And if they don't play football, are they prepared to support the football team 20 years from now at the extent that you know, the present day alumni do.

11-00:41:53

Redman: Right. So you think that —

11-00:41:55

Carmichael: The ethnicity is changing, and it's not only changing in the student body, it must be therefore changing in the alumni, and they may have different perspectives on how they want their money spent.

11-00:42:05

Redman: Interesting, OK. That's an interesting —

11-00:42:08

Carmichael: I have no idea whether an Asian group, do they like to go and watch football, do they like to go and watch basketball, do they like to go watch swimming? I have no idea what they do. Do you?

11-00:42:21

Redman: Well it seems as though, from my perspective, that that's traditionally more of a White Anglo Saxon Protestant activity, and there might be some problems with that. But yet at the same time yeah, a lot of the — where I — at the University of Minnesota, one of the biggest donors of buildings on campus was a former football player that went into business and made millions of dollars and has now donated alumni centers and tons of money.

11-00:42:54

Carmichael: Well certainly the Asian alumni have done a lot for the campus.

11-00:42:59

Redman: Comparatively, do you think?

11-00:43:00

Carmichael: Oh I don't know. I wish I knew that. What intrigues me actually, as the student population is changing ethnically, the alumni population will be changing too.

11-00:43:13

Redman: Right.

11-00:43:14

Carmichael:

And whether their pattern of giving and their interests and particular aspects of university activities will remain the same, I don't know. I would guess they won't be.

11-00:43:25

Redman:

Actually, let's talk about changing demographic at the university. We talked a little bit about your visit to China and the reciprocal visit. There's been an increased amount of just Pacific Rim connections in general, and the university has tried to emphasize some of those Pacific Rim connections. What have you seen as far as that increased connectivity, and how has that changed the university?

11-00:43:53

Carmichael:

Well you've just got to walk across the campus and you'll see that half the student population is Asian, whereas 30 or 40 years ago it being essentially all White. That's had interesting comments on its own. For example, I used to teach a three night camping course for freshmen. We used to go camping and I used to explain to them — on the other side of the Sierra Nevada. We used to — you know, I explained sort of some of the more aspects of geology to them, like Mono Lake and the Mono Craters and all the rest of it. But what intrigued me was that so many of the Asian population of students had never been camping before. What intrigued me even more is when I got used to the idea, after so many years of camping, that you can drive up to a bunch of trees and say all right, women to the left and men to the right, and off they go happily to do their toilets that way. Asian women didn't like to do that, and sometimes — and they used to say to me, how long is it before we get to a toilet, and I'd say maybe three hours, and sometimes those women were gray, in pain, I suppose, or discomfort. I don't know what it — I think they were ill at ease with sort of doing the things which I've gotten so used to. Possibly because as kids they weren't taken camping. I think they're maybe a more urban community than the White undergraduates we had before them. I don't know, but that's an observation. I have no idea. I haven't taught the course for eight or ten years or something like that. It may have changed and maybe it's not a good example but it was an interesting observation to me.

11-00:45:55

Redman:

Sure.

11-00:45:59

Carmichael:

The other thing is we had to cook, and so we set up camp for about 35 students or something. A campus technician, a department technician and I started lighting up the stoves and decided to cook. And so I got a great big thing of water boiling because I was going to cook spaghetti, and you wouldn't believe, out of 35 students, something like 17 came and asked me what I was doing. I said I'm cooking spaghetti and they said, is that how you cook it? Nobody knew, and they've come from a microwave community.

Apparently you can buy ready prepared meals, put them in a microwave and three minutes later, you yank it out and there's your spaghetti Bolognese.

11-00:46:44

Redman: Oh, my goodness.

11-00:46:46

Carmichael: They hadn't even seen it. It was interesting to me. And then two days later or two nights later, the bears came through the camp, having told the students, for goodness sake, make sure you don't leave any food around and all the rest of it. They thought I was joking. Bears came to the camp and then they went from thinking that these were their best friends to thinking that these were their worst enemies. We all survived though, there was nobody hurt, but it was remarkable to see the way they behaved for these bears. Some people just ran like made and other people just, you know, went up almost to try and caress them.

11-00:47:25

Redman: Gees, wow that's amazing. Do you think in some ways the community as a whole here at Berkeley has become more urban?

11-00:47:40

Carmichael: I couldn't answer that. My experience would suggest that's what would account for the differences I've seen, but I'm not sure that's true. When I was a director of Lawrence Hall of Science, I remember working a lot in Northern California, trying to get the Lawrence Hall of Science active up there in the schools up there. So few of the kids up in Northern California came to Berkeley, even to think about coming to Berkeley.

11-00:48:11

Redman: What types of schools would they prefer do you think?

11-00:48:14

Carmichael: Chico State, something like that. They would never think of coming to Berkeley, and they weren't encouraged to do so. It's gotten better now. The University of California has made certain now that its PR goes to make sure that more and more kids apply to the University of California. But those kids up there when I met them sort of ten or more years ago, they were, and their schoolteachers were very — they just didn't think it was worth getting their kids to try and apply to Berkeley, because they'd get turned down. I hope that that changes. Berkeley was seen as a very distant goal which was seldom, if ever achieved by the graduating high school student from Northern California. There's some pretty — you know, they're pretty rural schools, some of those, up in Siskiyou and Modoc and Trinity counties. I mean, they're pretty isolated in the winter you know. They're pretty isolated now. It will take you seven hours to get there by driving. So the University of California is not seen — this is an interesting issue — is not seen to be much in their lives, the average resident's life up in Northern California, in the rural communities. The only connection they have is through the agricultural extension, but now farms are

fewer and fewer privately owned anyhow. So it's very difficult to see how the average person in Northern California, as a taxpayer, actually gets involved with the University of California. I think it's a problem which not only has Berkeley got to address but I think the Office of the President has to address too. We have to make ourselves more visible and useful and tangible to the general population of the central valley and the northern state.

11-00:50:23

Redman:

Have you, in some ways — and we'll get into this more later on, but you felt as though the way to do that was to go to these rural communities and to really get them started thinking about Berkeley at a very young age.

11-00:50:40

Carmichael:

Oh yes.

11-00:50:40

Redman:

And having it be in their lives.

11-00:50:42

Carmichael:

I took students out from a high school with 15 or 20 students in it, and I took about five of them out to do some research up in Northern California, Northeast California. As a consequence of that, two of them went to Chico State and had never thought about going to college before. So it had a beneficial effect. But I mean, I didn't have the time to keep going, that was the problem. So it was a one off or two off operation, but there was a big benefit from it.

11-00:51:15

Redman:

And so you think that the Lawrence Hall of Science, in some ways that can be a function of that institution, is that it can have that outreach capability. The professors might not be able to.

11-00:51:28

Carmichael:

I don't think you should necessarily involve professors, but the Lawrence Hall of Science, who knows dealing with schools K-12 regime very well. That is the agency of the University of California which most people could appreciate and have directly affect their lives, you know, their children's lives, and I think that's really important politically in the future because we've got a large rural population who doesn't speak English, who are not destined to the University of California but are going to vote as taxpayers.

11-00:52:03

Redman:

Now that's an interesting point, yeah.

11-00:52:08

Carmichael:

They're not going to vote for an increase to the University of California budget unless they feel the University of California does something for them, and the normal approach is to put a medical school there, then they'll fill that. But there must be something between nothing and the medical school, and I think the Lawrence Hall of Science and all its programs in the K-12 regime

would be a good first step in trying to distribute the University of California to the population at large in California.

11-00:52:52

Redman: Well very good. Well on the next tape, we're going to talk more about the Lawrence Hall of Science, if you don't mind.

11-00:52:47

Carmichael: No.

## Audio File 12

12-00:00:14

Redman: All right. This is my second tape today, May 18th, with Professor Ian Carmichael, and our topic for the second tape is going to be Lawrence Hall of Science. I'd also like to ask you just a bit about the Botanical Gardens, but mostly we'll just be talking about very basic stuff about the Lawrence Hall of Science. First of all, what is the Lawrence Hall of Science?

12-00:00:43

Carmichael: The Lawrence Hall of Science was set up by the regents, in honor of Ernest Lawrence, and it was set up as a science center, to improve the state of math and science education in California and the rest of the country. So it was to be — it's not a museum. It's a place where in fact schoolteachers can come and refine their teaching techniques and find the new methods of — new units of teaching various aspects of math and science. They can get instruction in doing that. Where new exhibits are put up which illustrate some scientific phenomenon. Sometimes the exhibits are designed at the Lawrence Hall of Science and sometimes they're rented, and what else does it do? Oh and then it has an outreach, what is known as outreach. It sends its staff members to the various schools to deliver various programs at various times of the day and various days of the week, and that's a method of forming their income as is the development of curricula. So the Lawrence Hall of Science depends very, very heavily on the development of curricula which is sold to the private sector and financed by the private sector, and the staff members who go in to deliver programs to the local schools. They go quite far afield, actually. As I remember, they sometimes to go Fresno. So you can see it's quite a long journey involved in sometimes the delivery of these programs.

12-00:02:24

Redman: Why is it at Berkeley?

12-00:02:26

Carmichael: It's at Berkeley, I suspect because in 1968 the powers that be in the regents and on the Berkeley campus, where most of the compelling powers that be and they wanted it at Berkeley because that's where Lawrence would have been. I think. I have no idea why it was at Berkeley. I don't even know if there was any discussion about it, but I suspect that it comes down to the fact that

Lawrence is at Berkeley and therefore, they wanted to recognize his talents by doing something rather different.

12-00:03:00

Redman:

So given its role in the community and by community I mean the state of California, you know, the area surrounding Berkeley and the nation as a whole, does it make sense to have it in Berkeley?

12-00:03:20

Carmichael:

To me it makes a lot of sense because in a way, it is a big lab to the school of education, but the school of education and the Lawrence Hall of Science don't have enough to with one another. They have a little bit to do and in my time as a director, I made my — encouraged them to get much more together. There's not enough interaction between the school of education and the Lawrence Hall of Science. Essentially the Lawrence Hall of Science does the practical stuff and the school of education does the theoretical stuff. That's an oversimplification but that nevertheless probably fits the bill fairly well. What the trouble is, it's hard to get faculty members involved with the Lawrence Hall of Science, and there are several reasons for this. Firstly, most faculty members don't have research programs which sort of fit in any way with the activities of the Lawrence Hall of Science, and those that do are probably in the school of education. There was a time when actually you could get exhibits designed and manufactured in the college of engineering, and I think one or two of those have happened, and that's been very successful. By and large the connection between the Lawrence Hall of Science and the campus needs to be very much enhanced. It offers employment to large numbers of Berkeley students during the day, as part-time employment, so it's a valuable asset that way. It is an asset to the community because it provides a place to go to show kids science at work and a series of very personal exhibits which are illustrated there, and it does it throughout the year. I think it's only closed two days a year or something like that and as such, it's a wonderful advocate for the Berkeley campus. All those parents who bring their kids there will sooner or later, one hopes, be parents of those kids who become undergraduates on the campus. In fact, the parents and the kids visiting the Lawrence Hall of Science are really intrigued when you have Berkeley undergraduates there demonstrating some scientific phenomenon for a workshop or something such as that. It is amazingly successful in being, if you like, an outreach from the Berkeley campus to the general population, because so many people hope their children will in fact attend the Berkeley campus. So it's very good from that point of view. I'm repeating myself.

12-00:06:04

Redman:

Well, here's another question then. If I were to critique this notion, my question would be that we have the Exploratorium in San Francisco. There is a term that one of my colleagues at the Hearst Museum is working on coining this concept of museum ecology, is that there are only so many museums in any given community and for each strength that one museum has, usually another museum doesn't focus on that strength, and so the critique could

potentially be that the Exploratorium and the Lawrence Hall of Science overlap in a lot of their interests and goals.

12-00:06:55

Carmichael:

I'm not an expert on this but I think that's a rather superficial judgment, and let me tell you why. The Lawrence Hall of Science is not a museum. It doesn't archive anything very much. It has one or two archival properties but it's rather small, but they develop curriculum, and they've developed large numbers of curriculum, such that it is said — I don't know how good the data are — that three out of every four kids that go through American middle school and high school education, come in contact with the Lawrence Hall of Science at one extent or another, with one of its programs represented by the big centers up there called FOS, SEAPUP, and we'll talk about what their names mean later, and who else am I thinking about? FOS, SEAPUP and GEMS. So they are the big three programs which are essentially in large numbers of schools in California and in many in the United States. We, unlike the Exploratorium, which is a well-known science center to visit, there's virtually little or no programs which are issued out from the Exploratorium which can be used by school teachers in the school districts of California and the rest of the country, and that way it's totally different from what is it — the Hearst Museum, you said?

12-00:08:30

Redman:

Yeah, that's totally different.

12-00:08:31

Carmichael:

Totally different. It is an arm of education, and in a way it's very much like a lab of the graduate school of education, in my view. That connection has to be fostered. The reasons for doing it are two-fold. Firstly, the deplorable state of science and math education in the high schools of California and presumably the rest of the country, and secondly, putting the Lawrence Hall of Science into the schools, particular high schools, into the central valley and Northern California is a way of making sure that the University of California has a connection to the average person, resident in those rural areas. That is important politically I think. In the future, that all these people in the central valley and in Northern California, they're all going to vote and whether or not they vote to support the University of California is in some measure going to be determined by what their experiences are of the University of California and what it does that is of use to them, and if the Lawrence Hall of Science and its programs are perceived to be valuable and available in almost every school district, then I think the chances of getting continuing support from the population of the state of California for the Berkeley campus and for the rest of the University of California will be greatly enhanced. I think that's a really important concern for the present chancellor, the present president and their successors. We have to do something with the large immigrant populations of the central valley, to incorporate them into the mainstream of America, and we do that in the school districts. We have to give those school districts the means to just do that, and the Lawrence Hall of Science stands ready, if you

like, from its experience, to participate in that very, very important experiment.

12-00:10:33

Redman: So what — that's, I think, a satisfactory answer.

12-00:10:38

Carmichael: Thank you. It's like taking my orals again.

12-00:10:41

Redman: Yeah, exactly. Now another question would be, what are the Botanical Gardens?

12-00:10:49

Carmichael: Joe Cerny — let me start off, I worked for Joe Cerny since 1985 to, I think, 2000. He was a wonderful person to work for, and he was Dean of the Graduate Division and he was also Vice Chancellor for Research. Some of the units like the Lawrence Hall of Science and Botanical Garden were part of his kingdom or bailiwick or something. Working for him, just writing the reviews, was a really nice experience. He left me very much alone. He wanted to know what was going on, but he never interfered in an intrusive way. He was very aware of the importance of my research to me, and allowed me to do it with great generosity. So working for him was a great pleasure. We didn't always agree on everything. In fact, the things we disagreed on were so trivial, but that's like life anyhow. They usually had to do with money or funding, or something like that.

After I'd been a director of the Lawrence Hall of Science for a couple of years, I think it was, the position of Botanical Garden director became vacant, and Joe Cerny said, well, you're going up the hill anyhow, you might as well stop halfway up the hill and look after the Botanical Garden, and for two years I did. Looking back, I see three or four ways I contributed to the Botanical Garden, which I think stand them in good stead, amazingly so. Firstly, I got rid of the Friends of the Botanical Garden, and the way they funded the garden and its programs. It was done by an outside group which was not, in any way, accountable to anybody on the campus, and that struck me as wrong. So I introduced an admission fee, with Thursday being the free day. That caused a riot amongst all the general population, the admission fee to the Botanical Garden, but it provided them with an income of about \$80,000 or \$90,000 a year, which they could spend on their programs any way they wanted to and was — it was not necessarily designated for any particular thing, but could be spent for the good of the garden. My successor, Paul Licht, says that in fact the income has gone up, because they've raised the fees, and everybody pays it without qualm. It's amazing. But the time it was introduced, of course, it represented a change and it had to be resisted to the bitter end, and we paid a price for that, there's no question of it, but I think people now accept the idea that they should pay to visit the garden, and the garden has benefited from that enormously.

Another thing about my legacy, related to the Botanical Garden, is also related to the Lawrence Hall of Science. I managed to persuade Joe Cerny to support putting in two stoplights; a stoplight right outside the Botanical Garden entrance, and a stoplight opposite the entrance to the Lawrence Hall of Science. This is on Centennial Drive, and the reason for that is the cars rush up and down that, or did, and most of the occupants or most of the visitors to the Botanical Garden are elderly. They're enthusiastic gardeners, they're enthusiastic garden supporters. It's a wonderful support system, but they need to be protected from the traffic, and we protected them with stoplights and by the way, a new toilet now that I think about it. So the Botanical Garden actually, for the two years, I think saw many changes. The changes weren't necessarily accepted as being beneficial, but I suspect that Paul Licht, if he was generous, would say that the changes are immensely beneficial now, because it gave him room to maneuver, which he didn't have or I didn't have when I took over the job.

12-00:15:01

Redman:

So again, what is the role of the garden in the community?

12-00:15:07

Carmichael:

Two things. Firstly, it provides research material for the life scientists on the campus, and it's used by some of them for their research. I'm not quite sure what the research is now, but they've got greenhouses and so on, which enables them to grow things under whatever constrained conditions, to allow them to produce you know, research of one sort or another. So it's a very useful research facility in that regard. It is a wonderful fundraiser. People love the Botanical Garden. They like to visit it, they like to have lunch in it, they like the walk around it. It has an amazing array of plant material, which comes from all over the world, and is organized in various sort of climatic segments. Indeed it is a wonderful resource. It may not be as good as the one in Missouri, it may not be as good as the one in New York, but for a university, it is a very substantially equipped garden, and it's flourishing. I think in that sense, one should never be too keen to sort of see it as something which can be discarded. It is a great draw, I think, to many of our alumni and to many of the local population, because they like to walk through it. Have you walked through it?

12-00:16:38

Redman:

Not yet, I've walked past it.

12-00:16:40

Carmichael:

Oh, there you are.

12-00:16:41

Redman:

So I need to do that.

12-00:16:41

Carmichael:

You need to walk through it. Go and take a lunch up there.

12-00:16:44

Redman: OK.

12-00:16:44

Carmichael: You do it, it's great.

12-00:16:46

Redman: And so that actually answers the follow-up question of why is this affiliated with Berkeley. I mean, all of the things that you mentioned seemed like natural fits, is that it's a connection with the alumni, it also contributes to research. It seems like something that makes much sense.

12-00:17:03

Carmichael: It is, that's why they kept it. I think the Botanic Garden was originally set up to provide a source of botanic specimens, living botanic specimens, to the Department of Botany, which existed then but which no longer exists. It's been subsumed into integrated biology or something like that. It's a fairly old. I don't know when it was founded, but it's a large area. It has many sort of climatic variables, so it can be very diverse in what it grows, and I think provides an enormous amount of satisfaction and pleasure to, I would grant you, a small section of the population. Not everybody likes to wander through botanical gardens, but for those that do, Berkeley Botanical Garden is a prince of a place.

12-00:17:56

Redman: So in 1996 you were a faculty member, you're editing a journal, you're Associate Dean of Research and Associate Dean of Academic Affairs. Are you bored at this time or do you not have enough of a challenge?

12-00:18:20

Carmichael: No, I was very happy. So I take it this is the time I became the Director of the Lawrence Hall of Science.

12-00:18:27

Redman: Yes.

12-00:18:28

Carmichael: OK, you're leading to that. That started in a curious way. I've always been very good friends with Nancy Caputo, ever since we first met on the campus some probably —

12-00:18:38

Redman: How did you guys first meet?

12-00:18:39

Carmichael: On a committee somewhere I suspect. I don't know what the exact committee was. It may have been setting the overhead rate or something like that, but Nancy and I have always got on. I think in 1996 or the winter of 1995 leading to that, Joe Cerny's Director of the Lawrence Hall of Science, Marian Diamond, decided she wanted to leave. Joe had to find a successor quickly

and figure out if there were any long-term, sustained problems which needed putting right. He asked Nancy Caputo to go and sort of summarize or to survey the Lawrence Hall of Science, to see whether the structure was appropriate for the place, whether in fact it was a fairly efficiently run organization, so that he could appoint a new director, knowing that certain things needed to be put right and should be put right. Other things were going just fine. So Nancy spent — I don't know how long she spent there, let's say three or four weeks, writing a report on the state of affairs of the Lawrence Hall of Science. I think more or less, as she came to the last page, she came to me and said, "Hi, Ian, how would you like to become Director for the Lawrence Hall of Science for a year, until Joe gets a permanent director?" I said OK, I'll do that, more or less, and Joe said you know, would I do it. He and I have always had a very pleasant working relationship, and that is that you know, he asked me to do something and I thought he asked me to do it because he needed it to be done. So sure, I was prepared to do it, and then he left me alone, by and large. So he asked me to do it and I started doing it, and I think on the 1st of January of 1996, I became the interim director. I went up there initially with the intent of being there for one year, just to wait until a permanent director was found, but in the end I did seven years and enjoyed every moment of it. I'm very grateful to Joe Cerny, for the opportunity of the experience of being associated with the Lawrence Hall of Science.

12-00:20:56

Redman:

So had you been up to the Lawrence Hall of Science before?

12-00:20:59

Carmichael:

Yes, when my kids were small. So that would have been what, in the 1970s.

12-00:21:04

Redman:

OK. And you hadn't been up there since then?

12-00:21:06

Carmichael:

No.

12-00:21:09

Redman:

So that's kind of how you envisioned the Lawrence Hall of Science.

12-00:21:13

Carmichael:

Well I didn't know much about it, to be honest with you. I didn't know how it was run. You should go there, you really should, because all the exhibits are on the A level, as they call it. It's the level where you walk into from the parking lots. So that's the highest level, and there are three levels underneath it, which the general public don't go into very much. So A level is where the exhibits are. I went and took my kids for the A level and the exhibits, and maybe to some other exhibits on a lower floor, and thought not at all at that time about who runs it and why it's run. It was just there. I was divorced, so I had to find something to do with my young children on a weekend, and this seemed to be a good way, and we were interested in — we got a lot of fun out of running some of their exhibits, some of their challenging games. I enjoyed

it. So that was in the '70s, it was what, 25 years later that Joe Cerny said to me, "Would you like to go up there?" That was a whole new experience. Firstly, it has about 300 employees, an annual budget of about \$15 million, and of the 300 employees, I would guess 280 are women. I came from the campus when the exact opposite ratio was in existence for most of my life, and so I got used to essentially a White male operation on the campus. I was a department chair, looking at graduate students and all the rest of it, and I went up to the Lawrence Hall of Science and found a totally different population, which required a rather different outlook and rather different techniques to sort of manage them. I hope I learned fast, and you should make contact with the people of the Lawrence Hall of Science, like Susan Gregory and Craig Strang and so on.

12-00:23:11

Redman:

I talked a bit with Nancy Caputo about the Lawrence Hall of Science, and she told me that you did really fall in love with working there, and the process of working there. I'd like to ask you, before we get into that, you know, your falling in love with this place, what was the political situation like when you entered into that place? You say that there was a large population of women that were working there. Were there other political things going on?

12-00:23:49

Carmichael:

Oh yes. Let me set my sort of time in life, 1996.

12-00:24:00

Redman:

Actually, really quick I'd just say that by this time, you'd already won, just within the few years before, in 1996, you'd won the Arthur L. Day Medal, the Schlumberger Medal and the Murchison Medal. We talked about how you were always trying to stay involved in research, and now this kind of represents somewhat of a —

12-00:24:23

Carmichael:

Well it was clear to me I was close to the end of my research career. I was going to dot a few I's, possibly, and cross a few Ts, but I wasn't going to make any major advance in my field at all. Those days were over and the advances were being made by my students, in a large measure. So I was very prepared at that time, to consider doing something else. The strength of that was that my ego was very much connected to my research reputation, and therefore, I could go up to the Lawrence Hall of Science and not necessarily have my ego attached to me being a manager up there, and that was a very important separation. I could just use my common sense up there and my whatever management techniques I picked up in the British Army and subsequently on the campus, and try and use those to the best possible way, and if it didn't work it didn't work. My ego wasn't involved. My ego gratification came entirely from my research and that essentially had been satisfied or was being satisfied. So that would put the Lawrence Hall of Science into a much better position, vis a vis its director, because they could fight back and I was quite happy to fight back. But on the other hand, if I didn't win all the battles that I

got myself involved with, it didn't worry me too much. It was just a fact of life and I was quite happy to lose a few, as long as I won a few. There were a lot to start with. First, there were so many individual programs up there that people never taught one group to another, and they all got their individual financing externally, and they were little fiefdoms all on their own. It was like — I don't know what it was like. They had no connection. In fact, there was a resistance to work at the University of California. They didn't really have any regard to the University of California or the Berkeley campus. A lot of them resented having to answer to the Berkeley campus in any way, and I think my first request, which was fought rather bitterly by some, was that all of their publications — they have a lot of them — should have on the front page “University of California Berkeley.” And they resented that. They thought the Lawrence Hall of Science was sufficient.

12-00:27:07

Redman:

So their publications, did they run from the popular to the technical?

12-00:27:13

Carmichael:

No. They were all these programs to enhance the learning and teaching, if you like, of science or math or both, sorry.

12-00:27:24

Redman:

Were people concerned that the University of California Berkeley, having that name associated, would bring with it a certain —

12-00:27:34

Carmichael:

They just didn't feel part of the University of California. The trouble is that the Lawrence Hall of Science is isolated geographically. There was no reason for so many of them ever to come on the campus, and they didn't. The connection to the campus in any tangible way was trivially small, and then they had no say in their interim director. Joe Cerny had told them that Ian Carmichael was coming up there and that was the end of it, and 300 people had to sort of line up and say all right, they didn't like it.

12-00:28:03

Redman:

OK, so —

12-00:28:04

Carmichael:

So I had to negotiate that.

12-00:28:06

Redman:

Now let's talk a little bit about translating some of your previous experiences into this sort of leadership experience. It seems to me like some of the programs, some of the lab groups, in some ways, with their external financing to fund different research agendas on campus would be somewhat similar to the individual programs with external financing going on at Lawrence Hall of Science. Yet, you have to try to breed the sense of community and sense of connectedness.

12-00:28:42

Carmichael:

But on the campus we have one thing that unites us all, and that's the students. So we have undergraduates and graduate students, and we're all very anxious to participate in the recruitment of the best we can get, and that unites all the programs. It's in all our interests to get the best group of students we can. The Lawrence Hall of Science doesn't have any students. It has permanent employees and its students, as such, belong to high schools or middle schools or something like that, and they have a rather small and short-term connection to the Lawrence Hall of Science. So there is no group of people who owe their loyalty, like students to do the campus, up at the Lawrence Hall of Science. So to meld them together, took oh much longer than it would. There's no uniting glue there. The glue had to come from my expressing a belief that the whole must be greater than the sum of the parts, and keep on repeating that and repeating it and repeating it, until they got fed up with it. But eventually it worked and people started working together, and it was a great delight to me, to see people who had been sworn enemies when I went up there, were by the time I left, working together and good friends and so on. There was no reason for them to be enemies. It just happened. Their loyalties were totally focused to their own little groups, and they felt they didn't owe anything to the unit as whole, which is the Lawrence Hall of Science. It was a pity that things had been allowed to develop that way. It wasn't necessarily because of my predecessor, Marian Diamond, as director. I think she didn't see quite the drawbacks in having that sort of work environment that I did, and if she did, she didn't really know what to do about it. I'm not sure I knew what to do about it, except I had to try and experiment and if it didn't work, we'll try something else.

So I had Nancy's idea of reorganization and the fact that we'd reorganized within 100 days or something close to that, my going up there, meant that the Lawrence Hall of Science had to face change. They had to get used to change and change was going to be the way they lived, and I told them that repeatedly. I said, if it's not changing, it's dead. By and large, the reorganization was greeted with a lot of initial antagonism, but as it worked its way through, it became much more successful. I'm not a Paul Wolfowitz, though.

12-00:32:02

Redman:

What were some of the ways that you encouraged more connectivity between these different parts?

12-00:32:10

Carmichael:

Firstly, I had to go and find some people who were really good at their job of curriculum design or something like that, to help run the place. Don't forget, I had no background in the sort of education programs which they deliver and develop. I had none of that. Initially, I found a young woman, Jackie Barber, and she said she would help and become an Associate Director, so I appointed her, and she suggested I have a talk with somebody called Craig Strang, and he's an extremely imaginative guy too, and he agreed to become an Associate

Director. Then I think I went for three other people, and I decided that the five of us or six of us could run the whole Lawrence Hall of Science. By doing it that way and meeting regularly once a week, I could get the sense of what the departments were doing and what the strengths were, what the weakness were.

There were lots of things I tried to do to incorporate a sense of unity or cohesion or whatever it is you'd like to call it, in the place. I regularly had lunches with the staff members and the faculty club. The outcome is, although they had never been on the campus, or very rarely they had been on the campus, the idea of having lunch with Berkeley faculty kind of appealed to most of them, and so I did that. So that helped a bit. I had retreats with each program, for me to get a sense of whether they were going anywhere, whether there was an opportunity for professional development for their staff members and so on. Then we tried to sell the Lawrence Hall of Science's programs to the surrounding community and I thought that was very successful, but I notice that they've stopped it now. It is expensive but on the other hand, when you're in the business of living on what you sell, which is what the Lawrence Hall of Science does, you've got to make sure that the market is aware of what you've got to sell. It can't be only word of mouth. You have to every now and again, to put a step forward and say hey, this is what we do. Here's our display of how we do it and what we do and for whom we do it. We did three of those, and I think they were all very successful. We increased the market a lot, we increased the participation in those three annual successive displays of what the Lawrence Hall of Science does. It was my way of trying to get the place to work together, and it did work.

The other thing is, when I went up there, almost universally, all the staff members couldn't stand wasting money on the exhibits. They thought the exhibits on the A level, which is the top floor of the building, were deplorably bad and a waste of money and so on, and the money should be spent on their programs and not on the exhibits. Well, the first thing I did was to get a review committee going, from people who run good exhibits in various other science centers. I can't remember who they were, but it was somebody from Canada, somebody from Cleveland, some from here, there and everywhere, and their universal opinion was, you should scrap the lot. Most of the exhibits are out of date, they're not exciting, they're not germane to what you're trying to establish. You really have to scrap the lot. Well that you can't do, but you can prioritize some of those scraps, so we did it. I was also told that the director of exhibits was not really on top of the job. So to be honest with you, I transferred her to the Botanical Garden, and the Botanical Garden was delighted, she was delighted, and the Lawrence Hall of Science was delighted. It worked out really well. Then Barbara Ando took hold of the exhibits and she's done extremely well with it. The whole thing was given, I think, a boost, by my being able to get a very large outside exhibit, which really put the surrounds of the Lawrence Hall of Science onto the top line. It's a wonderful site up there, you should go there Sam. I'm not going to take you now, but you must go up there. It's part of the story of the Lawrence Hall of Science.

12-00:36:59

Redman: Do you think in some ways you were helped by being an outsider, as far as —

12-00:37:05

Carmichael: Oh, in the sense, I hadn't any built-in prejudices about the people, yes. So everybody started equally right. I either liked the lot of them or hated the lot of them, but it was equal and so there was no history.

12-00:37:21

Redman: Does that go for your opinions on things like science centers in general or exhibits in general, the effectiveness of the exhibits, and your opinions on that were basically blank slates.

12-00:37:34

Carmichael: Right. I didn't know much about science centers. I knew the exhibits. What depressed me, I think, is the exhibits hadn't changed since I had taken my kids there when they were small. So I got a sense of the antiquity of them and their sort of general looking tackiness. They looked downhill and that's not a good thing to be. You're trying to encourage more and more people to visit the Lawrence Hall of Science, and you can't do that with stuff which looks tacky, and so I wanted a whole new approach to be taken to, if you like, the face of the Lawrence Hall of Science which a visitor would see, which included the café, because that's where so many kids and their parents would get their food from. So we changed that and decorated that, and that was really important and was very successful as a consequence. We got this wonderful outdoor exhibit called "Forces that Shape the Bay" and we got a lot of new indoor exhibits, and we rented those, and they were very successful. I don't know what has happened to the long-term admissions, but I would guess that you know, that we haven't lost by having a much better café and a much better outdoor exhibit called "Forces that Shape the Bay." I'd say that we've kept our head above water compared to other science centers in the Bay Area.

12-00:39:00

Redman: OK. So now that's, let's see —

12-00:39:06

Carmichael: We're competitive with Chabot, when I went up there, but Chabot was built subsequently, and we're competitive with the one in San Jose, the tech museum and we're competitive with the Exploratorium. The Exploratorium, I got to know the director very well. He is very lucky. He's a Frenchman, he's a physicist from France. He left there about a year now and he's not in Bristol, in England apparently, but he managed to turn fundraising for the Exploratorium into a great social event in San Francisco, and he could raise gobs of money that way. I was very envious of that because you can't do that at the Lawrence Hall of Science. The Lawrence Hall of Science is a subset, and a rather small subset of the Berkeley campus, and if the chancellor wants to raise money he can do it. He can sort of say, I want money to do this, and go out and put the squeeze on all the alumni which exists in the Bay Area for a particular program he's interested in. But the Lawrence Hall of Science

doesn't have any alumni. It doesn't have a coterie of people who visited on the scale of the Exploratorium, and you can't turn it into a fashionable organization in quite the same success that it's been done in the Exploratorium. We have an advisory committee up there, which is very good, and they do the very best they can, but it's a different scale, the Exploratorium. San Francisco has a lot of money, the East Bay doesn't.

12-00:40:49

Redman:

Right. And so how would you go about fundraising in a situation like that? How did the Lawrence Hall of Science...

12-00:40:57

Carmichael:

For "The Forces that Shape the Bay," I had to go and raise two and a half million dollars, and I did it through Marian Diamond's good offices, the class of '48, of which she was a member, gave \$500,000. I raised around about one and a half million from the National Science Foundation, and then I think we raised a lot more from the advisory council, and just with chicken and salmon dinners and just doing the hard work that way. By and large it's not complete yet, but you wouldn't think it wasn't complete if you go up there. It looks complete. The vegetation is growing well. It's a stunning sight. The Lawrence Hall of Science, you sit up there and you can see the whole bay, and it really is a stunning opportunity to understand a little bit about how the bay was formed, which is why I wanted to put it outside. I think it's been successful. I know the employees up there like to use the outside exhibit as a place where they go and have their lunch and so on. That had never happened, so it's beneficial in many ways.

12-00:42:17

Redman:

Now this is going off a bit of the website and not your fall CV, but I've noticed that your publication, the number of publications slowed a bit in '95 through '98, but then shot back up again. It seems to me like you're still interested but during the time there, you're holding five different jobs.

12-00:42:43

Carmichael:

I think I had a bypass operation in that year.

12-00:42:45

Redman:

Oh really?

12-00:42:46

Carmichael:

Right.

12-00:42:47

Redman:

Can you tell me a little bit about that?

12-00:42:49

Carmichael:

They just open your chest and you know.

12-00:42:50

Redman:

Well, not the surgery itself. I mean about your specific —

12-00:42:57

Carmichael: I think in '97 I had a bypass operation. Is that what you're talking about?

12-00:43:03

Redman: I mean that and —

12-00:43:06

Carmichael: So my health wasn't the best.

12-00:43:08

Redman: And your knees by this time too are —

12-00:43:11

Carmichael: Oh they had been replaced too I think, but then I had — I don't remember what the sequence is, but maybe my knees were after the bypass, but the bypass came in '97. And that puts you on, you know, you're not terribly energetic when you're recovering from that or indeed working up to it. So there was a time now I think, when my energy went down, not in an order of magnitude but a significant fraction. I think what you've done is spot it, that it did happen. I felt lucky to have recaptured it. The Lawrence Hall of Science did everything they could to make me sort of recuperate and not worry too much about what I was losing contact with. So I had some really good people working with me up there, and that made all the world of difference. You could delegate and know things were taken very well, looked after extremely well, which brings me to sort of something which I learned on the campus and before that in the Army. If you're going to delegate, to delegate to people who are intelligent and smart and ambitious, you can't sort of sit on their shoulder and monitor their work. That's horrible. It's insulting and it doesn't work. I used to represent this, if you like, by my little saying of do not keep a dog and bark yourself. If you've delegated, let them get on with it and just leave it alone, and then ask them at the very end you know, how things are going. That's the first thing. The second thing is, if you're going to be administrator, be a chairman or a dean or something, if you're looking for affection in doing those jobs then I suggest you go buy a dog, because you can't do the job if in fact you're going to be continually subservient to what other people think about you. Remember Hitler had his friends, and so you mine as well go and do the things you think is best for the department, because you will always have friends and you will always have enemies. It's very important to realize you'll always have enemies, and they remain hidden, but you're never going to get rid of them and don't ever fool yourself that you can. So I felt, as an administrator up there I felt very well served by all the people I had asked to help me with it, to whom I delegated much of the Lawrence Hall of Science operations. They did most of the work.

12-00:46:09

Redman: Is this how you would say you balanced, because I mean, looking at it on paper, it seems as though it's a superhuman task to have five different jobs at one time. Do you think a big part of that was surrounding yourself with a capable staff that you could then delegate?

12-00:46:28

Carmichael:

Absolutely. You couldn't have done it without them and so it's a question of finding them. If you've found them and they didn't work out, you've got to get rid of them. Looking back, there were issues at the Lawrence Hall of Science which I, like many people, were unpleasant and one hoped that if you didn't deal with them they'd go away. They didn't go away and when I had to deal with them, they were worse than if I had dealt with them initially. It's just a fact of life, that you don't — most people don't want to deal with something which is unpleasant if it can be avoided. But if you're going to be an administrator of any substance, you have to do that, and I learned that. I wasn't very good at it to start with.

12-00:47:13

Redman:

Were there common things that you would look for in working as an Associate Dean of Research versus being say the Director of the Lawrence Hall of Science. I mean, it seems as though you're surrounding yourself with two very different types of staff, but at the same time, were there things that were commonalities between that and say hiring a faculty member or anything like that?

12-00:47:40

Carmichael:

Oh yes. You must avoid hiring yes people. What you want are people who can be constructive in their criticisms and the result is better than either proposition. So you've got to be able to suppress your ego and admit that your initial idea could stand a lot of improvement, and thank you very much for improving it. That helps the situation a great deal. If people feel that their ideas are going to be listened to and actually implemented, you will bring out the best in them. It's important to do that, and give people the credit for doing it. So you have to look after their pay scales too, to make sure that they are being acknowledged with anything the university can do, which is your pay scale. The director is responsible for that and so you have to be vigilant about looking after the salary problems of the people that are working for you. If you're looking after them, you tell them that they must look after the people who work for them. You can't look after everybody, so you just do it for your immediate surrounding managers and express the intention that they should do it for everybody as well. So you've got to try and reward — there are two things actually, when you think about it. You want to reward great performance and you also want to provide an incentive for growth, and that means sometimes giving people a little bit more money than they probably deserve from a past performance, but it is seen as incentive and you should do it that way. So there's a lot of time that must be spent in carefully writing up people's performance evaluations, so that they can be used to make sure that one was fairly paid, each of which represents, as I said, a performance and is gauged by some way by performance, but also one hopes a little bit of an incentive too.

12-00:50:06

Redman:

So it seems as though yeah, actually I was reminded as you were saying this, that when I first arrived at the Field Museum, that pay scales hadn't been increased for years and years and years, and from time to time the director would throw lavish parties for everyone, and that was their kind of way of congratulating the employees, but most often people were just like why don't you just pay us a little more you know, to make a fair wage.

12-00:50:33

Carmichael:

Right.

12-00:50:36

Redman:

You think that the Lawrence Hall employees would have said the same thing?

12-00:50:40

Carmichael:

I'm sure they would. I changed the basis for promotion in the academic employees up there. There's a title up there called coordinators of public programs, which is an academic title. The non-academic titles, essentially the salary can only be increased if in fact your scale of responsibility has increased.

12-00:51:08

Redman:

So not based on merit.

12-00:51:09

Carmichael:

No, it's not based on merit, which I think is deplorable, but nevertheless, that's the way human resources deal with it on the campus. For academics, it's based entirely on merit. When I went up there, the promotions of the coordinators of public programs weren't based entirely on merit, it was based on the years of service, and I thought that was somewhat inappropriate. So finally, after many years of back and forth with the campus personnel office, I got the rules changed, and now everybody up there has the opportunity to rise very highly up the ranks in just the same way as the faculty do, and they are essentially faculty.

12-00:51:54

Redman:

Who reviews the merit up there?

12-00:51:58

Carmichael:

Oh it goes down to the Vice Provost for Academic Affairs. Are we at the end?

12-00:52:06

Redman:

Yeah, so actually I'm going to ask you — I mean, this is obviously a very basic first overall general look of the Lawrence Hall of Science, but as far as what the Lawrence Hall of Science is, what the Botanical Gardens are and what they should be, do you have anything to add?

12-00:52:26

Carmichael:

I think the Lawrence Hall of Science should be the apex of an educational extension service, which should be run by the Office of the President and not

by the Berkeley campus, because it should represent the whole of the University of California and not just the Berkeley campus. It should be a sort of advance guard in the schools of Northern California, and I want to do that for two reasons. Firstly, I want to increase the morale and the training of all the science and math teachers who exist in those school districts, the first thing, because they get very little attention to that except during the year, and they need the intellectual sustenance which comes from meeting with people who, like the staff members of the Lawrence Hall of Science, know so much about it. The other thing is thing, that I think I've said before, is I really want the University of California to have its name in the school districts and the homes, if you like, of so many of the rural residents of Northern California, so that they know and understand that their tax money actually has a benefit to them, and that can be done through the Lawrence Hall of Science. I think that's very important and I hope the powers that be will do it, but the trouble is, the Lawrence Hall of Science is so far outside the average faculty member's corpus of experience, that I don't think it will ever be done. Frankly, if I was the chancellor, and the English Department of Berkeley was on the ropes, and the Lawrence Hall of Science was on the ropes, I think I'd probably have to look after the English Department before the Lawrence Hall of Science, which is why I want the Lawrence Hall of Science to be part of the Office of the President, because it is acting on behalf of the whole university and not just the Berkeley campus. So the load of looking after the Lawrence Hall of Science shouldn't fall just on the Berkeley campus.

12-00:54:29

Redman:

OK, very good. Well I think that's all for today. Are you exhausted?

12-00:54:33

Carmichael:

No. Not bad, a great day.

**Interview 7: June 29, 2007**

## Audio File 13

13-00:00:06

Redman: My name is Sam Redman, and I'm sitting down today, Tuesday, June 19, with Ian Carmichael, and today we'll mostly be talking about the Lawrence Hall of Science, which you were the director of from 1996 to 2003, is that correct?

13-00:00:22

Carmichael: Yes.

13-00:00:23

Redman: Okay. Now, how did you first get involved with the Lawrence Hall of Science?

13-00:00:29

Carmichael: Good question. It was very accidental, but looking back, it was one of the great opportunities which came my way, and I've been grateful to Joe Cerny, who's the Dean of the Graduation and Vice Chancellor for Research, ever since. The Lawrence Hall of Science in those days used to report to the Vice Chancellor for Research, Joe Cerny, and the director of it, Marian Diamond, is a professor in biology, and she retired or resigned. I don't know whether she'd ever talked to Cerny, her person she reported to, or not, but the impression that I got was that she did this rather abruptly and rather suddenly. Whether or not that was the case, I don't know, but I think that the office felt that this was suddenly thrust upon them. So Joe Cerny decided that he would ask Nancy Caputo, who by that time had retired from being the director of the Sponsored Project Office, to go on and sort of assess what the Lawrence Hall of Science needed, and what it was up to, and what future directions it should take. So she went up there and met with five or six of the senior people up there, and wrote a report to Joe Cerny, and said, "This is what should be happening, and this is how it could be reorganized, and so on." Because I think Marian Diamond had her own unique form of formulization, which subsequently I found didn't work very well for me. So Nancy Caputo went up there, and after about two or three weeks wrote a report, and suggested to Joe Cerny that I should be sent up there as an interim director while they went and found a permanent one. And that is indeed what happened. Joe Cerny came to me, and Nancy came to me, and said would I like to go up there for a year or so, until they got a permanent director. And I was very pleased to do that. It was a totally new experience for me. I'd never been to the Lawrence Hall of Science, since the early days, when my kids were young and I'd taken them up there to look at the exhibits and play those games — those computing games, whatever it is. But other than that, it had never impacted me at all on my normal work a day life on the campus. In fact, I knew very few faculty members who it did impact. It was just not in our orbit. The School of Education possibly had some connection to it, but the average professor of geology, or the average professor of chemistry, or whatever, had very little to

do with the Lawrence School of Science. So, when I went up there, it was a revelation in so many ways. Firstly, I was used to essentially a male-dominated society, which was becoming less so as the years went by, and we had more and more women faculty, which I thought was great. But when I first came to Berkeley, there were extremely few women faculty. There was a very significant woman faculty member who was a chair of statistics at the same time I was a chair of geology, and her name started with Elizabeth. I can't remember her last name. She was one of the few women faculty members I knew of in the physical sciences in those days. So my experience — it had widened considerably as I had become a dean, and I had some involvement with the humanities and the social sciences, where women faculty members were more frequent, but by and large, my administrative career was spent — essentially, my teeth were sort of cut, if you will, in the physical sciences, and there are not many women there. So when I went up to Lawrence Hall of Science with a prescription of what to do from Nancy Caputo and Joe Cerny, I was met by a society up there of about 300 people. I would say — roughly speaking — 270 of which were women. So it took a very different sort of orientation, and I had to get that, reorient myself very quickly. And there are some significant changes between running a male-dominated society, as opposed to a woman-dominated society. Most of them are trivial. I'm sure like all generalizations, they have their strengths, but they have great weaknesses as well. But one of the things that I noticed was that women at the Lawrence Hall of Science were not anxious to criticize one another to their face. It was seen that for them to lose friendships was a much greater loss than for a man to lose a friendship, and therefore, as they became administrators and jeopardized that friendship, they were very often less willing — if you like — to take that hard step of doing the administrative job in preference to looking out for the friendship relationship. But once you got used to that — and it took me a few weeks to get used to it, and to understand what their objectives and motivations were — then I found them, as a group, just as hard-working and just as interested in the future of the Lawrence Hall of Science and what they were doing — which was essentially looking out for the K through 12 regime — and they were just as competent, and just as — what's the word? Renowned? — in their field as the department of history, or department of physics, or the department of planetary science was on the campus. It took me some time to realize that, because it's such an odd unit, when you think about it, related to the campus. Here was something set up in Lawrence's name in — I can't remember the exact date when it was founded — but it was essentially to make the teaching of science and math better in California schools. It had all sorts of devices to do that, including the teaching of students, the teaching of teachers, and writing materials to increase the understanding of math and science in the schools. And they did that remarkably well, and in fact that's the principal source of their income. The materials which they have written — and which are published by publishing companies — give them an income on which essentially, I should say, half the

Lawrence Hall of Science lives. The rest of the budget comes from the campus. I don't know whether that's true now, but roughly true.

13-00:07:15

Redman: So, of the 300 staff, how many do you think — roughly — at the time were dedicated to building those programs and writing those materials?

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Carmichael: Oh, I would say two thirds.

13-00:07:28

Redman: Okay.

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Carmichael: Another fraction of them was devoted to exhibits, and the exhibits, frankly, were in a deplorable state when I went there. The same exhibits I'd seen 25 years before with my children were still there, and the place had a sort of downward heel, rather worn-out, sad look about it, and so the first thing I think I did up there was to sort of decide what to do with the exhibits. Now, if you talk to the staff members, most of the staff members up there wanted to get rid of the exhibits. They thought it was a waste of money, and they didn't think that it produced any interactions with young people which were worth having. It was seen to be a rather dead and decaying part of the Lawrence Hall of Science. Funnily enough, I don't believe that. I didn't believe it then, and I don't believe it now. I think if you have a vital and lively exhibit, you will encourage young families to come to visit the Lawrence Hall of Science, and that could be their first contact with the University California — the Lawrence Hall of Science. And their first contact with science, possibly. To me, it became a great opportunity to try to persuade more and more families in the Bay Area to come and make contact with it. Far from getting rid of the exhibits, I encouraged them and tried to expand it, and now we have a big traveling exhibit program, where you actually rent an exhibit, like dinosaurs, or something, and they literally get thousands of people to come watch that. And to me it's a great asset in the Bay Area, you can take your family up there and have a great a good time up there for about three or four hours, and the kids will learn something. And we've started to measure — or, we did in those days — started to measure how much kids learned, because that's very important, to know what they're learning, and how they're learning it, and how much is retained, and so on. It turned into an educational arm, and not just a collection of rather run-down equipment and run-down exhibits which nobody really looked after. It became a much bigger part of the operation, and it did that as a consequence of a review committee, which I set up up there. Having been a dean for so many years, looking after reviews on the campus of all the departments, it seemed to me that the most appropriate way of dealing with any problem is to have a review and get outsiders' opinions on what should be done. Well, I got five or six directors of museums around the country to come and spend two or three days here.

13-00:10:11

Redman: Do you remember what museums they were?

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Carmichael: No, but I could find out. One was Cleveland, one was in New York, one was from Arizona, but I don't remember the others. I will find that out for you.

13-00:10:30

Redman: Okay. Were these science museums?

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Carmichael: Yes. Science museums.

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Redman: Okay. So you tried to find similar museums?

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Carmichael: Yes.

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Redman: Okay. Great.

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Carmichael: Science museums.

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Redman: Okay.

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Carmichael: There wasn't anybody with the Smithsonian, because don't have that sort of money, or from the New York museums, either. So I asked those people to come, and essentially, their recommendation was two-fold, I think: you've got a huge resource of creative and imaginative people in the faculty and the graduate students in the campus, which is not being used — which was very obvious to me, too — and secondly, virtually the whole of the art exhibit should be scratched and start again. Well, as a consequence of that, I decided that I would take the opportunity of another job that Joe Cerny had just given to me, and that is I'd become the director of the Botanical Garden. And so the lady who was running the exhibits up at the Lawrence Hall of Science, I asked her if she'd like to transfer to the Botanical Garden, and become the director of education there, and that appealed to her immensely, and she did that. And from then on, life became much easier, because much of what was happening up there had happened under her aegis, and things needed to change.

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Redman: Do you remember her name?

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Carmichael: Oh, yes. If it is appropriate?

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Redman: If you'd like. If you wouldn't mind.

13-00:12:00

Carmichael: White.

13-00:12:03

Redman: I think that's appropriate to say, if somebody was a more appropriate fit for the Botanical Gardens.

13-00:12:09

Carmichael: Yes. And I can talk about her, when she goes there. She's retired now, and she had a very un-firm idea, but the review committee went out pillaring her, just about said the program wasn't worth keeping as we had it, so we had to stop it, and we had to start again. Well, that takes a lot of money, and it was difficult to know how to start, but the first thing we did, I think, was just to clean the place up a bit. We went to Joe Cerny and got money for paint, and we tried to refurbish the whole thing, but then it occurred to me that I had an opportunity through Marian Diamond being — she had been a member of the class of '48 on the campus, and the class of '48, through her influence, had decided to give their class gift to the Lawrence Hall of Science in the form of some sort of exhibit. Well, I met with the class, their representatives, and Marian Diamond, being a life scientist, she wanted something to do with DNA, or some sort of exhibit which was related to modern biological science. But they already something up there, which she had put on the deck up there, and I suggested that we should do something which recognized the place we were in, namely on the margin of the Bay — with probably the best view of the Bay that I've ever seen — and I talked to those representatives of the class of '48, and I said, "I would like to have an exhibit essentially on forces that shape this Bay." And that caught their imagination, and it caught everybody else's imagination, and the class gift, therefore, of about \$500,000 came to the Lawrence Hall of Science for Forces that Shape the Bay. The trouble is \$500,000 wasn't going to do what I wanted to do there, which was get an outdoor exhibit with water and everything else. And I think ultimately it was going to cost about \$2 ½ million.

13-00:14:27

Redman: Okay. Is that what it ultimately did end up costing?

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Carmichael: I think so.

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Redman: Okay.

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Carmichael: So I wrote a grant to NSF — the National Science Foundation — helped by the staff at the Lawrence Hall of Science, and that itself had a kind of trouble, because I didn't know how you wrote grants for exhibits. I only knew how to write grants for research, and I'd been very successful for grants for research,

from the National Science Foundation. But I wrote it, and indeed I think — I forgot what the grant was — I think it was \$1 ½ million. So there we had \$2 million, and the rest — the half million — came from, as I remember, interminable chicken or salmon dinners meeting the advisory council of the Lawrence Hall of Science and anybody else who would show any interest in contributing to Forces that Shape the Bay. And ultimately, we got the \$2 ½ million, and the project was started and opened by — the first spade of groundbreaking was done by Bob Berdahl and me. I've forgotten when, now. And it was completely, and it was before I left — just as I left in 2003 — and I as understand it was, it is a very successful exhibit now, because it's outside, it has the benefit of moving water, it takes every possible part of the Bay and it tries to examine in the context in which it's found, and I think it's made people more aware of where they are in space — geologic space — when they're up there. When I first started it, I said, "If nothing else, it will tell people whether the tide's going in or out in the Bay from the ships." And Bob Berdahl, the chancellor, said, "How do you tell if the tide's going in or out from the ships, Ian?" So I explained to him that if you look at it, all the ships are anchored, but there's a large distance between each ship so they can swing all the way around, depending on if the tide is coming in or out, and they always organize it depending on whether the tide's coming in or out, and they always organize it so the ship will organize itself to face the stream. It will always, as it were, face upstream. "Bob, in your terms, the sharp end goes upstream." And I think a lot of people see it like that. I don't mean to be derisory to Bob. He was a German scholar, and he was very supportive of the Lawrence Hall of Science, but that exhibit really anchored, if you like, the new emphasis on exhibits that were up there. It took an outside space, which had nothing very much going for it, and turned it into something which is quite unusual, almost exotic. Have you seen it?

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Redman: Yes.

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Carmichael: Oh, there you are.

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Redman: I went up there with my sister a couple of weeks ago. But I have a couple of follow-up questions. First is about sort of the culture of peer review that you were used to on the campus. Not only are your manuscripts peer reviewed, but the departments were reviewed by other departments.

13-00:17:44

Carmichael: Right.

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Redman: And it seems as though you brought this philosophy up to the Lawrence Hall of Science —

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Carmichael: Absolutely.

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Redman: — where they weren't really used to that.

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Carmichael: I don't think they had used that before, and I used it repeatedly, so I would say review of exhibits was the first. There must have been ten or 15 reviews subsequently, so it was a weapon or an agent that I used a lot. Because you talk to your colleagues, you talk to your peers, you find out what they think about the way you're doing things, and everybody can find a different way of doing things. Everybody settles down to a way in which they're comfortable, and that's not always the best way of doing it.

13-00:18:28

Redman: Did the people up there see it — exactly as you termed it — as a weapon, whereas before they were maybe used to talking about issues kind of —

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Carmichael: I couldn't tell you what they said before! When I suggested to them that we have this review, and that review committee would meet each one of the senior administrators up there, I think they liked the idea. And I said, "This is an opportunity to put your best foot forward. I want to find out what we can best do with the Lawrence Hall of Science." And I think they took it in that sort of spirit. I think that's how departments took it, too: here's an opportunity to say what you want to do in the future, and this is the only way that the administration actually is going to support your case, if a review committee in fact suggests that in fact this should be done, and must be done, and will increase the effectiveness of the unit. So I've always thought that reviews are very important, and lead to very profound — and usually good — effects.

13-00:19:36

Redman: So, a related question for that, as far as feedback mechanisms. You had mentioned that you were working on developing feedback mechanisms to understand how people were learning from the exhibits, specifically how the students — what they were getting from the exhibits, I should say.

13-00:19:51

Carmichael: Well, that's interesting, because I think that's what the review committee said, that we weren't doing this, and one of the things we didn't know very well is where our clientele was coming from. We didn't know what zip codes people were coming from when they visited the Lawrence Hall of Science, and I tried to encourage people — and I think they did it. They did as quickly as possible. We went to try to measure the source, if you look, of most of our visitors. And you know, we don't get a lot of people, say, from the peninsula. If you want, you either to the Exploratorium, but crossing the bridge is a barrier on the weekend when you've got young kids. What we do draw from is the East Bay, and over in the Walnut Creek and the beginning of the Central Valley. But we

don't draw much — or we didn't draw much — from the San Francisco peninsula.

13-00:20:42

Redman:

Let me ask you about your relationship with the Exploratorium, because it seems that those institutions complemented each other, but they were quite different. The Exploratorium seems to have a real emphasis on exhibits. It's an exhibition space. So, could you talk about that relationship a little bit?

13-00:21:00

Carmichael:

Well, my relationship with the Exploratorium was always very good. It started when Joe Cerny decided to have a review of the Lawrence Hall of Science itself, which turned out to be a review of me, the director, and on it was the director of the Exploratorium. His name is Goery, and he's no longer there now, I believe he —

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Redman:

Could you spell that? I'm sorry.

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Carmichael:

G-O-E-R-Y. I think he left there, I'd say two or three years ago, and I understand he's at the University of Bristol. He had a real knack for raising money, which is hugely necessary if you're going to have good, modern exhibits. You can't develop exhibits on a shoestring. You've got to have imaginative, creative people to design the exhibits, and then manufacture them, and make sure that they are robust, and illustrate the very features to children or young people that you think are necessary. And you need a big exhibit staff that are doing that. We could never afford that. The budget of the Exploratorium is tens of millions a year, just on the exhibits, and ours is nothing like that. It's a tenth, maybe. And I think that's appropriate, actually, Sam, because if the chancellor feels — if, for example, the department of history or department of English is in financial trouble, and he's putting a lot of money into the Lawrence Hall of Science exhibits, I would say, "Hey, first things first. You better look after the department of English or department of history." And so there's always this dilemma. There's never been enough money on the campus to actually throw money in every direction to do the things in the most efficient way possible. We've always had to bootstrap or shoot things. And we try to do the best we can there. And I think that's fine. People at the Lawrence Hall of Science think the university should give them more money, but I can understand — you know, there are larger calls on the money here, and we don't have big budgets, or at least budgets which have any play in them at all.

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Redman:

So, do you think that influenced in some way the desire to get outside grants from places like the NSF?

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Carmichael:

Oh, yes. We were very good at that. All the materials which are published, and designed and published, were supported by NSF. And so I would say at least half if not two thirds of the budget of the Lawrence Hall of Science is funded extramurally from publishers, or NSF, or something like that. Whether that continues to today I don't know, but it was certainly true when I was there.

13-00:23:54

Redman:

But sorry, I interrupted your talking about the Exploratorium and your relationship.

13-00:23:58

Carmichael:

My relationship with the Exploratorium is excellent. I like the people I met there. We try to do joint programs. We met with them a lot. I think they've actually got joint programs now.

13-00:24:10

Redman:

What types of joint programs?

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Carmichael:

I think it's mainly to do with exhibits, but it's also to do with the publishing of materials. Don't forget that Berkeley — its preeminence comes from the materials which it designs from the K through 12 math funds arena, and how these are used in schools, by the young people and also by the teachers. And it's those materials which give them — which give the Lawrence Hall of Science a budget. The Exploratorium didn't have any of that material, and our budget from science materials is in the order of — I don't know, I couldn't tell you now. But let's say it's five or ten million bucks. It's substantial. Although I was very pleased to collaborate in any way with the Exploratorium, what they wanted was an opening into our income stream from the materials which we had been so successful in. I was very antsy about that. I didn't want to give them that. So we tried to maneuver around that. I don't think anybody at the Lawrence Hall of Science wanted to do it. They could have an add-on, but I didn't want to actually open up what we had to do them and share that with them. We didn't have enough breathing room to do that.

13-00:25:32

Redman:

Was there a mechanism to exchange — it seems as though when you walk into the Exploratorium now, there's a whole section where they're building exhibits, and you can see that through the plate glass. Was there a way to exchange publications, which was the strength of the Lawrence Hall of Science, for exhibits, which was maybe the strength of the Exploratorium?

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Carmichael:

Well, think about how differently they're financed. The Exploratorium is financed partly by the city of San Francisco, and it's managed now to have two or three fundraising events every year, which are highlights of the San Francisco social life.

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Redman: It's quite an event, isn't it?

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Carmichael: It's quite an event. And the sort of people that go there have no hesitation about writing checks for \$5,000; \$10,000; maybe \$100,000. It's the hoi polloi of San Francisco go to those events, so they're very successful at doing it. Now imagine the Lawrence Hall of Science, where we have no alumni. The alumni in the University of California come from the instructional departments. And so it's very difficult to raise money from alumni. We do have public events — or we did have public events — which never attracted the same sort of wealth, and fashion, and style as the Exploratorium, but we had one event a year, and that was very successful at raising three or \$400,000, but not the millions which the Exploratorium raised. Because of their city help and due to Goery — his explosion, if you like, of the fundraising into a great social event in San Francisco — he's always been successful at raising large funds than we have. I would say the Lawrence Hall of Science — I don't know what it raises now — but I would say it raises probably \$1 million or so a year from its supporters. Which — if it is as much as \$1 million — is much increased from when I knew it, which is really good. I mean, we have no alumni. If the chancellor wants to raise money, he calls on the alumni, and he gets first dibs. The Lawrence Hall of Science doesn't get that. We're one of the last, because there are no people who have much experience of it. I mean, you've been up there, what? One day! Most students don't go up there at all. The only students that go up there are the ones that get employment, and a lot of the students are employed up there, which is good.

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Redman: Yes, okay. So I apologize, I'm jumping around a bit, but we're discussing a lot of interesting things.

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Carmichael: That's all right. It's all right.

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Redman: So as far as attempting to understand what the students were learning from the programming, how would you do that? Were you asking teachers for feedback after using traveling exhibits, or —

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Carmichael: You know, you'd have to go up to Lawrence Hall of Science and ask them, and the reason of that is this: towards the end of my time up there, we instituted a division or a group of assessment and — assessment and E. I've forgotten what the E stands for. But, to measure just those sorts of things: what students were learning, how they were learning it, and what they were retaining. And that's vitally important. The good part about it is that the National Science Foundation before they allow you to apply for new money, I think, for grants to put up exhibits want some sort of estimate of how you measured the learning and attendance in the past, so we had to be serious

about that. I won't say that Marian Diamond didn't do it, but I never got the sense that we did it very methodically.

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Redman: Okay.

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Carmichael: So it was one of the things that became more and more methodically done when I became the director.

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Redman: Okay. So, now, obviously as the director, you're looking at the big picture, but I'm curious to know if your own experience with your children — watching them go through K through 12 education — did that influence how you viewed the Lawrence Hall of Science, and what it could be?

13-00:30:07

Carmichael: Well, I always wanted the Lawrence Hall of Science to be a bit like the Exploratorium, so that when you went through the front door, a kid would say, "Wow." You know — there was something there which really was dramatic. I'm not sure they've got it yet, and they didn't like my ideas of what that drama should be because of the maintenance problem. For example: if something's moving, people are attached to it. I think we talked about this before. When I used to go the Academy of Sciences, take my kids there, and go there myself, you looked at these dioramas, and they were still, and they showed South African wildlife in their environment. Every grass, every weed, every insect was true to life. It was a really great representation. But kids never look at those. What they do is they dash past that to something which they can interact with, or see moving, like water. Water is a very compelling exhibit for everybody. So I wanted movement of some sort, and I wanted to put a huge fish tank in there, but everybody looked at me with horror, and said, "No, the maintenance problems are huge. It could leak," and all the rest of it. And I said, "Let's try it." But we never did try it. We never got the funding to do it. But as you enter the Lawrence Hall of Science, there's a sort of little wall there. I wanted a fish tank about two feet high, about one foot wide, which would be about 30 or 40 feet long. It could be very compelling for young children.

13-00:31:41

Redman: Right.

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Carmichael: But — "It doesn't work." And I noticed that even Kaiser Hospital has it in all their surgical departments — they have fish tanks.

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Redman: If a hospital can do it, why can't the Lawrence Hall of Science?

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Carmichael: Yes. I know.

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Redman: So one of the big issues that we had talked about before —

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Carmichael: Sorry, one other thing which I wanted to put in early on was a working model railway, because I found out as a consequence of that review committee that the thing which most draws crowds is a working model railway.

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Redman: Really?

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Carmichael: Yes. And apparently the one in the museum in Chicago — Museum of Science and Industry —

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Redman: I've seen that, and I have admittedly played with that for hours.

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Carmichael: There you are. And I wanted to do that, and I interviewed a Russian to do it, but the space and the maintenance problems are huge. So, I approached the East Bay Model Railroad Engineers, and asked them if they'd put one up — if we paid for all the construction, and all the rest of it, if they'd maintain it. But the construction costs and the model costs were too high, because it's always got to work. Most of the model railroads you get, they're hobbyists, so they work about an hour a month or a week, or something like that. These have got to work eight hours a day, day after day after day after day.

13-00:33:06

Redman: That's a lot of wear and tear.

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Carmichael: Lot of wear and tear. And they weren't equipped to do that, so I was warned off that. But it's still true — once again, it's movement, and we can relate the movement to earliest days in California and allow people to sort of think of how it was, so that once again, I'm sure the professionals up there were right, but I lost that one, too.

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Redman: So, obviously you were learning a lot about a new subject — as far as exhibits and what children are attracted to in exhibits — that is quite foreign from an academic geology —

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Carmichael: Oh, yes. Oh, yes. But I was curious about it. I learned a lot more about Lawrence Hall of Science. The way it was administered drove me crazy.

13-00:33:59

Redman: Tell me a little bit about what the organizational state of the Lawrence Hall of Science was when you arrived, and how you wanted to change the day-to-day operations.

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Carmichael: Well the organizational state — it had been analyzed by Nancy Caputo before I went up there. There were many, many, many fiefdoms, the people that had their own funding resources, they looked upon their connection with the University of California at Berkeley as purely accidental, and detrimental in some ways.

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Redman: Now, if I could interject just there — was one of the problems that on the publications, everything said "Lawrence Hall of Science," instead of "Lawrence Hall of Science," comma, "University of California, Berkeley"?

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Carmichael: Well, that's one of the things I picked up on.

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Redman: Okay.

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Carmichael: I made sure everybody had Lawrence Hall of Science, but it had to be University of California at Berkeley. That provoked an outrage. They thought this was absolutely ridiculous, and I said, "No. The University of California at Berkeley is *far* more famous and has far more clout than the Lawrence Hall of Science. You've got to get every sense of recognition you can. Do it. And I won't approve any things going out for printing unless that has that." Now? Everybody does it! Nobody thinks about it. The idea that there was a little war about it is —

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Redman: It seems a little ridiculous.

13-00:32:29

Carmichael: It seems ridiculous! But once again, it was change, actually, Sam. When I came in there, I represented an agent of change, and people don't like change. They're uncomfortable with it, particularly if they're not instigating it, if they become — if you like — one of the pawns moved around by the agent of change, and I wanted to change lots of things up there. I really did. Because I couldn't understand why they were doing them the ways they did it. And one of the things we wanted to change is that we had five or six programs up there, independently funded, doing essentially the same thing, and yet they never talked to one another. They were at war with one another! The competition was very strong, and it seemed to be absolutely absurd.

13-00:36:11

Redman: Do you remember any specific examples of one or two divisions that really had trouble?

13-00:36:18

Carmichael: Well, I can remember the programs. One was called SEPUP [Science Education for Public Understanding Program], and I've forgotten — Science

Education in the Public Interest, or something like that — and the other was called FOSS [Full Option Science System], which is — oh, my goodness. Oh, my goodness. What does FOSS stand for?

13-00:36:39

Redman: I've only seen it abbreviated, so —

13-00:36:41

Carmichael: I will have to go look it up for you. I will look it up for you. But here were two very successful programs, essentially at odds with one another. And it struck me as absurd that here were people doing much the same sorts of things, designing scientific curriculum with a different slant for more or less the same sort of age group in the schools, never talked to one another, and I wanted to break that down.

13-00:37:10

Redman: So do you think that this could be chalked up to institutional — these two programs had different goals, or was it the personalities of the individuals affiliated with those —

13-00:37:22

Carmichael: It was the personalities.

13-00:37:23

Redman: Okay.

13-00:37:26

Carmichael: And that had to change. So another personality came in as the director. I said, "No. Things are going to have to change." The whole has to become greater than the sum of the parts: that was my little slogan, which I used a lot up there, as I think you read, right? So I did reorganize it up there. My predecessor, Marian Diamond, had about two or three dozen — I don't know: a dozen? A dozen and a half? — people reporting to her about all the various programs. I had five people for the whole of the Lawrence Hall of Science — every conceivable aspect of the Lawrence Hall of Science, I had five. And made these directors responsible for all the programs. I didn't want to have to do with that. I didn't know anything about it. I'm not an educator by experience or profession, not in the sense they use it. And in those days, I thought I was just interim — I'd be here for a year, so I would do the best I could for a year. And of course I was prepared to be very unpopular, because, you know, why not? You're only there for a year. But that gave it some strength, so you could do things which maybe if you thought you were going to be there for six or seven years, you wouldn't do. And it had to be done quickly. I was very conscious of the fact you had 100 days to do everything, so I really changed a lot in our first 100 or 250 days, first six months. I did. Everything was reorganized in that period.

13-00:38:59

Redman: It seems as though — unlike many other museum directors, maybe affiliated with Cleveland, or New York museums, or the Science Museum of Minnesota, or wherever — you have another job to fall back on.

13-00:39:13

Carmichael: Yes.

13-00:39:14

Redman: And did that give you somewhat of a —

13-00:39:15

Carmichael: Oh, I don't know about that, but that's always been a great benefit to me, actually, as dean or as a vice chancellor, when I was. If the person who was higher than me didn't like what I was doing, and said, "Ian, I want you to go back to your department," that suited me just fine. I could go back to research which I loved, with students I was very fond of, and doing research which excited me. No, it was a great strength, I think. And Tim knew that. He knew that if in fact all his senior administrators — and I'm not sure I was considered a senior administrator — were active in research, then that gave them the strength to do things which they wouldn't otherwise do, and I certainly used that. But I had a very benign boss. Joe Cerny was a research-oriented man himself, and he always allowed me great freedom to do whatever it is I thought was sensible. He wanted to know what I was going to do, but the only thing he wouldn't let me do was to have much to do with organization of budgets. I think he came from a Puritan family, and his father was a tax inspector, and he always thought I was a bit a rogue when budgets were concerned, but other than the budgets —

13-00:40:35

Redman: No! No! A rogue? We haven't seen that before with you, budgeting. I'm being sarcastic here, but we've had a couple of instances of you —

13-00:40:46

Carmichael: Right. So he wasn't very fond of giving me a lot of leeway that way. In fact, he was very upset when I promise some faculty member about 650 bucks. He thought I was *way* outside my charge, my responsibility. But other than that, he left me alone. Once a month, I was to go and talk to him, as to what I was doing, and so on, and I found working for him extremely supportive and — what's the word I'm looking for? Productive, and almost everything I wanted to do he would support. There were many cases of trouble, too, and he supported me, and it was great.

13-00:41:37

Redman: Okay, so you were answering directly to Cerny —

13-00:41:40

Carmichael: Right.

13-00:41:40

Redman:

But then what was your relationship with Seaborg, related to the LHS?

13-00:41:44

Carmichael:

Well, Seaborg was the chairman of Lawrence Hall of Science. I never knew quite what the chairman does, but he'd been instrumental in supporting it and in getting the thing instituted with the Regents. When he was Director of the Atomic Energy Commission and left that, he decided that he would use — this certain amount of money goes to the Atomic Energy Commission or its successors, the Regents, to look after the national labs. And he and one or two other Regents talked the Board of Regents into giving some of that money into funding a memorial to Lawrence, our first Nobel Prize winner. I think Glen Seaborg was probably our third or fourth, so, yeah, he was up there. He was in his thirties when he got his. So he was an official at Lawrence Berkeley National Lab — an associate director or something there — and he had the title of chairman of the Lawrence Hall of Science. That meant he came to see me once a week, and asked me what I was doing. And I told him what he was doing, but after about one meeting, I said, "As I understand it, Glen, you're here asking me what I'm doing. You're not here to tell me what I'm doing. I'm going to tell you what I'm doing, and I hope you approve, but if you don't, I'm still going to go ahead and do it." So, we had a little sort of two dogs circling one another, and I enjoyed his weekly meeting after that. He could give me good advice. He had never run anything like the Lawrence Hall of Science, but he had been responsible for it in a broad sense with the Regents, but from the day to day running of it, which I was involved with, he'd never had any experience with that, and he was a nuclear chemist at heart. Not that that meant he couldn't have done it. So I think my time with him — the five years I had with him — I looked forward to the meetings when he came in. He was a very egotistical man, there's no question of it. He took notes all the time we had our interview. Those were going to be published. He told me about his great successes in life, that he'd been the only chancellor ever to have a child when he was in office, only chancellor — what was it? — to have a Nobel Prize, or something. He was Glen Seaborg, and he had served — what? Six presidents, or five presidents? And he wouldn't let any little fly-by-night like me forget it. So, it was intriguing, and I enjoyed it, but I wasn't going to surrender to him. No way. My job was to look after Lawrence Hall of Science, *not* keep Glen Seaborg quiet.

13-00:44:44

Redman:

So, let's talk about that, actually. Would you care to share a little bit about the people who did resist your ideas, and were resisting this change?

13-00:44:54

Carmichael:

Well, the first thing to do is if you want to — I had to reorganize it — was to find people to help me do it. The first person I found was a young lady called Jackie Barber, and she thought about it for a couple of days, and then I went back to her office, and I said, "Jackie, I feel as if I'm asking you — this is like a proposal, almost. Are you going to do it?" And she said, "Yes, I'll do it." I

said, "Thank God for that." I said, "We need another director, because it's you looking after this part of the Lawrence Hall of Science site, and someone else." And she then suggested a young guy called Craig Strang, who also proved to be very creative and imaginative, and the two of them are still the directors up there now. And you know what? You should call them. Both of them. Jackie Barber and Craig Strang. They're very creative people. I think they're very responsible. They've done magnificent things for the Lawrence Hall of Science, and they're all working on their programs. In addition, there was a lady there who had been there as an administrator and had looked after the budget, but she and I didn't get along that well, and anyhow, she became ill and she resigned. And so, I took the director of development up there, Susan Gregory, and asked her to become the Deputy Director of the Lawrence Hall of Science, and sort of have a finger in all pies, because she understood it so well, and she's extremely well-informed about every aspect of the Lawrence Hall of Science, and she's been fundamentally wonderful in helping develop relationships between publishers and the Lawrence Hall of Science, and increasing the royalty rates. She's been wonderful at that. So she was the third member of the triumvirate, and then Barbara {Unloe?} looked after public exhibits and public programs. She had been — she was, I think, an undergraduate at Berkeley in entomology? But maybe not. And she was wonderful for looking after exhibits. She got hold of the new missions to look after exhibits, and she did it very well. She realized that things had to change, and she was prepared to change them, and that was great. So I had four people who wanted to change, and I let them take the heat, and it was very good. So I had a weekly meeting with them all. We started at lunch on Wednesdays, and it went on to about 5:00, and I found out what each one was worried about in the week — are you coming to the end?

13-00:47:38

Redman: We've got about five more minutes.

13-00:47:40

Carmichael: Found out what each one of them was worried about, what they wanted to do, and how they were interacting with one another. So I had those five people. It's called the executive committee — X-Com — and I ran the Lawrence Hall of Science with X-Com for six years, seven years, and I couldn't have done it without them. They were a wonderful group of people. They were creative. They were loyal. They always did what's best for the unit, and they were immensely significant members — I think — of the University of California community.

13-00:48:12

Redman: Do you think that was an important mechanism for you to build a community of people around you that were willing to take some of the heat for changing?

13-00:48:20

Carmichael: Yes. Oh, yes. You want to get people who want to change, and have ideas of how to do it, and they had no shortage of ideas of what to do. All I was there

is just to try to keep a balance, and make sure the budget didn't go too wildly out of kilter, and I did, and I didn't get the budget under control very well, but it didn't seem to worry anybody, so on we went. If you want to change something, you've got to find agents for that change and give them the responsibility, and let them go ahead and do it, and then come back and report once a week on what they've done. You must look over their shoulders, because they feel that you distrust them. It's all encapsulated in the aphorism, "Don't get a dog and bark yourself." Give them full responsibility, and let them go ahead and do it.

13-00:49:13

Redman:

So, in doing that, were there moments where people initiated change that you might not have directly or specifically agreed with?

13-00:49:21

Carmichael:

Yes. Absolutely. On the other hand, there were times when I wanted to encourage them to do more. But what I would say is I wouldn't let any staff — I was open to meet every staff member, but if they're going to come and bitch and moan about something for one of these five associate directors, I said they had to come with that associate director. There was to be end runs. And that was one of the troubles of the Lawrence Hall of Science. Everybody was prepared to criticize everybody else behind their back, but never to their face. I mean, you've got to get it to their face. You've got to get out in the open, and the more things are out in the open, the better things are. So after a bit — after they got used to the way in which I wanted to run things, I think it ran very well. And we had big problems, administrative problems. For example, the staff members out there — the academic staff members out there — coordinated the public programs, and they can be promoted at a faster rate than the faculty, which I thought was wrong. I didn't think they should be promoted at a faster rate than the faculty. Promoted at the same rate. And so I got all the regulations and criteria changed for promotions and raises in coordinators of public programs, and it took three years, because the academic personnel office on the campus is run by a lady called Patty Owen, and she's very well informed, but she doesn't move things very quickly, so it took three years to get that thing through, but it's much more advantageous now, because people in the old days were just promoted entirely on time served. Now you can be promoted on merit, and that's a really important aspect when you think that most people want to have their work and their contribution recognized, not their service. So we changed the basis on which the academic people up there were promoted and appointed. Now, for the non-academic staff up there, you couldn't change it, because they come under the campus personnel office, and if you want people to get more money, you've got to show that their range of responsibility has increased. There's no such thing as merit, unfortunately, in the non-academic sphere.

But I got that changed for the academics up there, and there are a fair number of academics up there. I've forgotten what their number are now.

13-00:52:00

Redman: Okay. Let's talk about — for the last question on this tape, I'd like to ask you, just simply put, about geography of the way the campus is lower, and then up on the hill, you've got the Lawrence Hall of Science, which — the pro being that it's got this phenomenal view of the Bay and the city and looks down on the Berkeley campus, but the con of that being that it's separated from —

13-00:52:29

Carmichael: Totally separated.

13-00:52:31

Redman: — the campus.

13-00:52:31

Carmichael: Most people had no connection the campus at all. When I went up there, there were somewhat derisory of the campus, too. They felt that the campus got in the way, and if only they were allowed to do this, that, or the other, they could do it much better. So two things I tried to do is I tried to increase the contacts with the campus, and the contacts came in mainly through the School of Education, because their research — I wanted, as it were, the Lawrence Hall of Science to be part of their research arm, if they wanted one, because we were actually teaching kids, measuring and designing educational materials, and it seemed to me that there was a very good research field there for our School of Education.

13-00:53:20

Redman: And did they agree with you at the School of Education?

13-00:53:22

Carmichael: Yes. Yes. And it's now a very close contact, I believe, with David Pierson, who's the dean of the School of Education, and several other people, and I encourage Lawrence Hall of Science staff members to get their PhDs there. I think I've been on three PhD committees for Lawrence Hall of Science people.

13-00:53:41

Redman: In education?

13-00:53:43

Carmichael: In education. Well, I think it's scientific — it's SESAME? I've forgotten what it stands for now, but it's science education, or something. It's a subset of the School of Education. So the first thing was to try and increase the contacts for the campus. The only other person I did it with was through the advisory council — the faculty advisory committee to the Lawrence Hall of Science — I tried to get more and more faculty members to come up there, and bring their students up there, and have sorts of demonstrations or aspects of research which they could show to kids. And that worked, in a small way. And although the increase in the connection to the campus was very evident, it's still not strong enough, in my opinion. The average faculty member here doesn't see that there's any need, or doesn't have any desire, to have any connection to the Lawrence Hall of Science. Most of them did what I did: take

their kids up there, and that's it. But the other thing is I used to bring staff members down. I think it was once a week. I used to have a lunch with two staff members and two associate directors of the Lawrence Hall of Science in the Faculty Club. And that brought them to the campus, and they had never been to the Faculty Club before, and if you go to a Faculty Club lunch, you're going to see Bob Berdahl, who is the chancellor. I mean, they loved that experience, as well as getting to know the director: me. But they also liked the experience of sort of seeing this person, and that person, and every other person who walked by having lunch in the Faculty Club. And I think that once again sort of made them believe that they are a member of the University of California community, and I hope my successor's doing it, too.

13-00:55:43

Redman:

Very good. Well, I think that's a good place to end this tape, and then we'll pick up from there.

#### Audio File 14

14-00:00:07

Redman:

All right. So, I'm back here with Ian Carmichael for our second tape today, Tuesday, June 19. I'd like to ask again in reading Craig Strong's statement on the conclusion of your time at the LHS, I'd like to ask a little bit about how you improved the academic rigor of the scholarship taking place up there, and a little bit about the relationship between the Lawrence Hall of Science and the faculty advisors from the campus.

14-00:00:43

Carmichael:

It's hard to think of how I improved the academic rigor, except that I introduced the idea that every program should be reviewed. I wasn't content to — success in fundraising from the NSF wasn't sufficient for my purposes. I want to know that we were doing an imaginative, creative job in every way we could, and how could it be improved? And for that purpose, I used review committees, always with outside members. So that improved the academic rigor in the sense that everybody was expected to — in small groups, once a year or twice a year — once a year, some group was reviewed, and they were expected to sort of put their best foot forward for a couple of days to show what they're doing, how they're doing it, how they're measuring it, where they're expected to go in the future, and so on. And they did that to their peers, and the Lawrence Hall of Science used to give them an honorarium to do that, and by and large, it increased, I think, the sense of connection to their peers, it allowed their peers to come to the Lawrence Hall of Science and give their opinions, and also — in my view, most importantly — think about how good the Lawrence Hall of Science was. You know, things were going well up there. Without question, things could be done better, but most everybody was left impressed with the place. So it was that combination of reviewers and the interaction with the programs at Lawrence Hall of Science did contribute increasing the academic rigor. The next thing that did it is I was trying to get more and more faculty involved, in small ways. Every program which had a

scientific or a mathematical connection, I really wanted a faculty advisor on that, and it was just to make sure the materials were okay. So, if anything was published, please get a faculty advisor. And I tried to help a lot in getting that. And the Lawrence Hall of Science liked that. They didn't feel in any way threatened by that. They very much approved of it.

14-00:03:13

Redman:

Was there stress between — a lot of museums have talked about in education departments and curatorial departments — curatorial departments are often used to educating at a college level, and they're used to communicating on sort of an academic Languuage — and this is, again, the curatorial departments, or PhDs will often accuse education departments or educators as breaking things down a little too much, and making things a little too simplistic. Was there ever any tension there?

14-00:03:52

Carmichael:

I never sensed that, but don't forget this is not — there's no archival process up in the Lawrence Hall of Science, so in that sense, it doesn't have curators. It's there essentially to educate the public — the young public — in math and science, and to increase the math and science teaching in schools.

14-00:04:12

Redman:

So do you think that made it easier, then, for the faculty advisors to —

14-00:04:16

Carmichael:

I think so.

14-00:04:17

Redman:

— to understand?

14-00:04:18

Carmichael:

And an awful lot of undergraduates are very pleased to go up there and talk to kids, and the interesting thing is that when the parents brought the kids along, and they saw these undergraduates, they saw their own children, as it were, ten years hence, or five years hence, as undergraduates at the Berkeley campus. It was their most successful operation, and I think some of the engineers were particularly good at getting demonstrations. There's a woman faculty member in mechanical engineering called Lisa Prewitt. She had all sorts of non-intuitive things about how materials break, and kids love that, if you go out and break things, you know? It was very important. And she had her undergraduates up there doing the same thing, and it was a very successful program. I wish I could remember other ones — and there were many others. That was part of my job, to try and find Berkeley faculty to go and take their students up there and contribute to it, and I started a course with a professor of chemistry called Angie Stacey on Frontiers of Science, or something. And that is undergraduates on the Berkeley campus, they get training on how to teach science, and then go to high schools to do it, and we did it in physics, astronomy, I hope they're doing it in biological sciences now, and earth science. And undergraduates could take this course for credit, and get taught

biological science how you teach these kids to do it, and get familiar with the materials you use, and off they would go, out they would go — at their own expense, too, using cars — into the local schools. It was a very successful course — it *is* a very successful course. I won't say it's oversubscribed every year, but I think it's close to that. We made the Lawrence Hall of Science more and more — in small ways — more and more connected to the campus, but it's the big job, and they'll never be really integrated in the campus completely. It has a different purpose. It doesn't instruct undergraduates. And given that, I think — provided the directors are always on the lookout for improving the connections — it's fine. It is well integrated. As integrated as you can expect it to be, under the circumstances.

14-00:06:54

Redman:

Okay. I'd like to ask, again, a little bit more about what the gender issues were at the Lawrence Hall of Science, and what you did to try to address these —

14-00:07:07

Carmichael:

I make a joke of this, actually. I'm not altogether serious. They may have had troubles with me. I never had troubles with a society which is dominated by women. I'm sure they have views on what it was like to work with me, but I was very happy to work with them, except that you couldn't expect quite the same response when it came to asking people to discipline other people. My experience of this is that friendships are more important to women than they are to men, and they don't want to threaten those. Relationships are more important, right? And so they don't want to threaten those. And so that makes — if you like — leadership much more difficult, because you're not prepared to exercise the authority in a harsher way than you would, say, if you were a man. I have put that badly.

14-00:08:17

Redman:

Oh, no. Not at all. I'm curious. I don't really know, to be perfectly honest, how as a dean you would discipline a faculty member, versus how as a director of a museum you would discipline — I understand the need for it from time to time.

14-00:08:31

Carmichael:

For example, there were some times that the reports weren't given on time. Some people were really contentious. And I used to say, "Look, would you please go and ask so and so, give a report. You must do that." That sometimes caused trouble, because on the campus, you could go and take the person face to face, and say, "Listen, you jerk. I've given you six weeks extra, and you haven't done it. Now, damn well do it! If it takes you all weekend, just do it." Whatever it was, the threat to the relationship seemed to be more significant there than I was used to on the campus. Plus the fact that I'd got rid of one or two people up there. In fact, several people up there. When I first went up there, it became clear to me that there were several people up there that should leave. And you know, you can't fire anybody from the campus, but you can

make their life very unpleasant, and they get the message, particularly if they've been serving a long time.

14-00:09:37

Redman: And so how would you do that? Through the review system?

14-00:09:41

Carmichael: Partly through review system, partly through reorganization. For example, the director of human resources up there when I went there was used to reporting directly to the director, and was a sort of general ombudsman — ombudsperson. I didn't want that. Didn't work on the campus. Didn't work there. I didn't want the human resources person sort of sitting around occupying an executive function or role on the Lawrence Hall of Science, so I downgraded her. And within about six months, I think she left, because she didn't like that. She retired. And it happened to several other people. You know, there are times when change is unacceptable to some of the people working with you, and their response to that is, "Okay, if that's what you want, I'm going to leave." Okay. That's fair enough. Has to happen.

14-00:10:42

Redman: Now, what year did you become — remind me what year you became the director of the Botanical Gardens? Was that in '97? Was that a year —

14-00:10:50

Carmichael: A year after.

14-00:10:51

Redman: Okay, so '97.

14-00:10:52

Carmichael: Right.

14-00:10:53

Redman: It seems that you asked one individual to move to the Botanical Gardens from the Lawrence Hall of Science.

14-00:11:00

Carmichael: I think in '97, but, see, I became the director of the Lawrence Hall of Science in January '96, and the whole review — it took me a few months to sort of get the measure of the place, then to have the review — I think we had it in the fall — and then I became the director of the Botanical Garden, and almost at the same time, I asked the director of exhibits to move to the Botanical Garden.

14-00:11:30

Redman: How many staff members are at the Botanical Garden, or were there in 1997? Roughly.

- 14-00:11:35  
Carmichael: Well, staff members — you mean non-horticulturalists? There are a lot of horticulturalists, whose areas are their kingdoms or queendoms — their fiefdoms, right? You don't touch those. So other than those, I'd say about five. That's all.
- 14-00:11:50  
Redman: So, very small.
- 14-00:11:52  
Carmichael: It's very small.
- 14-00:11:52  
Redman: Did you —
- 14-00:11:54  
Carmichael: Probably even smaller than that.
- 14-00:11:55  
Redman: Okay. Did you use that on any occasions, for kind of shifting personalities, to see if —
- 14-00:12:05  
Carmichael: Oh, I tried, but it didn't often work.
- 14-00:12:06  
Redman: Okay.
- 14-00:12:09  
Carmichael: Some people left. They didn't get promoted, and they decided they wanted to get a better job. Although the selection process up there — I think it was pretty thorough — we did, on occasions, make mistakes. And that was a pity. But it's true on the campus, too.
- 14-00:12:32  
Redman: Right. Right. And so you would use those various mechanisms —
- 14-00:12:35  
Carmichael: You'd try everything you could to sort of rectify the situation, or optimize it, if you could. You know?
- 14-00:12:43  
Redman: Okay. Do you feel like that was one of your major duties, or your most important duties at the Lawrence Hall of Science? Figuring out ways to get these personalities —
- 14-00:12:53  
Carmichael: Absolutely. To make the place run better. And so the information, it needed to provide for itself to run more effectively, and the programs had to design and publish. Yes. It had to run better. Some of the controls up there were rather weak, actually, the financial controls and so on. People got just used to a

different style, and we had to change. We had to get into the 20th century, you know? Lawrence Hall of Science — some of those people had been long-time University of California employees and they were very comfortable doing that, and they didn't like the idea that someone — particularly a faculty member. Faculty members are looked upon with a good deal of — obviously, any faculty member up there. Glenn Seaborg was, but he would never take any executive position. So there were two faculty members: me and Glenn Seaborg, and I would have thought we were objects of some dislike, initially. In fact, I know that. Partly because we were faculty members. Well, partly because I was a faculty member. Glenn Seaborg wasn't disliked. I think they'd have liked to have one of their own, as it were, as the director, and they really had no choice in me. I think I was imposed upon them, when my time came, ultimately, for me to leave, I made sure that they were on the selection committee for my successor, and they had every opportunity to voice an opinion about who that should be, and I think that was very beneficial. But the way the campus runs, or ran in those days — Joe Cerny thought it was just an interim appointment for one year, and I was just going up there to look after the place and keep it running, and the fact that I stayed there for seven — I think it surprised everybody.

14-00:14:57

Redman: Tell me about staff council meetings.

14-00:15:01

Carmichael: Well, I think they were a disaster. I was always trying to explain to them what I wanted to do, but I was never very good at public lectures outside my field. I was almost terrified of public speaking. I felt nervous. I sort of looked in the four corners, and looked all around, and I was never very good at doing the very thing which they so good at, which was teaching. I was very not good at that. I could lecture to the students. I'd say I was a B+ / A- lecturer. My forte is not there. My forte is teaching students sort of in the field, more or less one on one, but large lecture classes I've never been very good at, though I always prepared, but I just felt nervous. I just felt, "Most of you think I'm boring, don't you? I know that. I can see it." That's the same feeling I had with the staff council. They wanted to know what I felt about the whole place, and I used to deliver my pronouncements in a rather staccato, machinelike way, and it wasn't good, and Craig Strang made fun of it, and he was dead right.

14-00:16:23

Redman: Okay. So he commented —

14-00:16:27

Carmichael: I didn't like them. I had them about once every — once a semester, maybe twice at the most, but I thought that everybody needed an opportunity to come and ask questions of me. That's what I thought.

14-00:16:40

Redman: Let's talk about that. You encouraged staff members to come to visit you, but if they were under certain conditions, you encouraged them to come with a director of —

14-00:16:52

Carmichael: With their supervisor. I didn't want them just to come and bitch and moan about their supervisor. If they wanted my assessment of what should happen, it had to be in the presence of their supervisor. And that always worked.

14-00:17:07

Redman: Okay. Were there cases when they were allowed to come without their supervisor, if they had an idea about —

14-00:17:12

Carmichael: Oh, yes. Oh, yes. It was only if they had a complaint to make about some way they were being treated. But then the staff council was to give everybody an idea of what was happening, and what I wanted to change and why, and give people an opportunity to ask questions. I don't think people asked questions as much as I'd like them to have done, and I felt uncomfortable in the face of all those people. I don't know why. But yet I was quite comfortable dealing with them sitting down. My knees used to hurt. I'm not good in that.

14-00:17:58

Redman: Okay. Okay. But it's probably a good thing that you recognized your strengths and weaknesses.

14-00:18:05

Carmichael: Yes. It was fine for them to laugh at me about it. And it's very important.

14-00:18:11

Redman: Okay. Could you talk about that?

14-00:18:13

Carmichael: Oh, yes. If you're going to get anywhere, a director's got to be seen as somebody who bonds the unit together, and the unit can bond together in dislike of the director, or dismay of the director, or something. In my case, it was the horrible staff council meetings. They thought, "Oh my God. How can he run such an ineffective staff council meeting?" And they were right! I couldn't do much better than they. I feel sort of shy.

14-00:18:44

Redman: Okay. But you think that was a good mechanism for the staff to bond?

14-00:18:50

Carmichael: I think it turned out to be that way. It wasn't done by design. It was me trying to be competent when I really couldn't be competent. I'm not that good at speaking in that community, and yet all of them are, and they couldn't understand how I wasn't.

14-00:19:10

Redman:

Okay. So at this time, you were the director of the Lawrence Hall of Science, the director of the Botanical Gardens, a faculty member, and up until 2000, you were still working as a dean.

14-00:19:24

Carmichael:

Yes. And two officers.

14-00:19:28

Redman:

So, we talked about earlier in the interview that you would come in on any given days earlier in your career, and you would spend half of the time in your office in the geology department, and then you would go to California Hall, and spend half of the day there. So now you're balancing, what? Five jobs? Instead of two or three jobs? So I'm curious how you spent your day.

14-00:19:57

Carmichael:

Well, all of one afternoon and lunchtime, I went to the Botanical Garden. Botanical Garden is a very small unit, and runs quite well of itself. The major problems it faced were funding and reorganization of its relationship to the Friends of the Botanical Garden, and I could do that, having got to know them all. Now, what I did to get to know them all is I went there and met with them individually for an hour or so, and listened to what they had to say, then I met with them all as a group, and told them what I thought about it. I think I was sort of tongue-tied in that meeting. Now I find out that none of them had really actually had their horticultural expertise looked at professionally, so I thought, "Well, we'll review them." And so I brought in some people from the various botanical gardens to come and review them, and the horticulturalists there really liked that, because they could get different ideas about how you put this planting out, and those plantings, and all the rest of it, and how you dealt with the archival problems. And they seemed to like that consequence of the review. My concern with the Botanical Garden, other than that, was the relationship to the Friends of the Botanical Garden, which seemed to have to provide all the funding.

14-00:21:35

Redman:

Can you explain what the Friends of the Botanical Garden was — or is?

14-00:21:39

Carmichael:

They're gone, now, or they've been, maybe, reinstated. They raised funds, and then they gave it to the director to support whatever programs they thought was beneficial or appropriate. I didn't like that. I thought it seemed to me that the director and the staff should make up their minds about what should be done, and so my concern with the Friends of the Botanical Garden was, "I think you've got too much influence here." And so what I did is I instituted admission to the Botanical Garden, which caused a riot.

14-00:22:24

Redman:

How much was admission, out of pure curiosity when you first started?

- 14-00:22:30  
Carmichael: I wish I could tell you, but I think it was like \$2.50 or something.
- 14-00:22:32  
Redman: Okay, so pretty reasonable.
- 14-00:22:33  
Carmichael: And one day it was free.
- 14-00:22:35  
Redman: Okay. One day a week —
- 14-00:22:36  
Carmichael: It was free. But that meant that that money went straight to the Botanical Garden. It could be used by Botanical Garden in any way the director of the Botanical Garden thought was fit, and so it cut down the income of the Friends of the Botanical Garden, but in order to introduce admission, I had to put a small building in there, which could take admission, and it caused an uproar. Never had admission before. Everybody disliked it. Now, it's accepted. I think the admission's gone up. They depend upon the income. It gives them a flexibility and a latitude which they never had before, and the place is flourishing as a consequence. I mean, it's got new front gates, and things like that.
- 14-00:23:25  
Redman: It's busy, seemingly, *all* the time.
- 14-00:23:37  
Carmichael: Pardon?
- 14-00:22:38  
Redman: It's busy, seemingly, all the time.
- 14-00:22:29  
Carmichael: Yes! It's got new this, that, and the other, and it's all as a consequence of first the admission, and secondly, I think, the reinstatement of the Friends of the Botanical Garden without the same function. They became too powerful politically. The director had very little opportunity to do anything other than they dictated, and I didn't think that was appropriate. And so we had a full-scale conflict, which took place in California Hall, and as the head of the Friends of the Botanical Garden said, "By charging admission, you're going to put us out of business." And I said, "I don't think you should be in business." And Joe Cerny happened to side with me.
- 14-00:24:14  
Redman: Okay. And so, actually, I'm sorry —
- 14-00:24:17  
Carmichael: I think the present director probably thinks I probably did it badly. It could have been done more expertly. And he may be quite right there, but I think

he's got the advantage of the fact that I took the heat, and he's got about \$100,000 a year, if not more.

14-00:24:35

Redman: From admissions?

14-00:24:36

Carmichael: From admissions, which he never had before.

14-00:24:37

Redman: Okay. So about one afternoon a week, you would go and do those meetings with the staff of the Botanical Gardens.

14-00:24:42

Carmichael: Right. Right.

14-00:24:47

Redman: How much time were you spending on a day to day basis at the Lawrence Hall?

14-00:24:54

Carmichael: I'd say every afternoon.

14-00:24:56

Redman: Okay. And then —

14-00:24:57

Carmichael: Every afternoon, either at lunch or after lunch.

14-00:25:02

Redman: Okay. And then your mornings were spent —

14-00:25:06

Carmichael: Well, the early mornings were spent in my lab, and the later mornings were spent in California Hall.

14-00:25:12

Redman: Okay. So, obviously this would do —

14-00:25:15

Carmichael: And the reason for doing it that way had nothing to do with the academic requirements of the place. It had to do with parking.

14-00:25:25

Redman: Oh, really? Can you explain that a little bit?

14-00:25:26

Carmichael: Yes. Yes. Because I could park in the morning near my campus office, right? Because I used to get there half past seven, and so I could get a park there. The director had a parking slot for the Lawrence Hall of Science, his own — or her own. Had I worked at the Lawrence Hall of Science in the morning, I

could never have got back on the campus, because all the parking slots were taken, right?

14-00:25:52

Redman: Right.

14-00:25:53

Carmichael: So I did it that way, and it suited Joe Cerny fine, suited me fine. It was done entirely on my parking.

14-00:25:59

Redman: That's fascinating.

14-00:26:00

Carmichael: And then I came back at 5:00. I always used to come back to my office about 5:00 or 6:00 for an hour.

14-00:26:06

Redman: When people had left?

14-00:26:08

Carmichael: When people had left, and there was always available parking then, too, so I could park right close to my office.

14-00:26:13

Redman: So by this time, you're spending roughly how many hours a day in the lab?

14-00:26:20

Carmichael: Two, three. That's all.

14-00:26:21

Redman: Okay. Okay. So were you —

14-00:26:23

Carmichael: And Saturdays. I did spend Saturdays.

14-00:26:26

Redman: So did this affect the number of graduate students that you were taking on, or your research?

14-00:26:33

Carmichael: Oh, yes. I was getting — by the time I had gone to the Lawrence Hall of Science — 1976, '77, I was 67.

14-00:26:43

Redman: Oh, sorry — 1997, you mean?

14-00:26:45

Carmichael: Yeah, sorry. Did I say that? 1997? I was 67. Yes. And I was running down, and my career had peaked. I don't know how much I was running down, or whether it was a big drop off on the other side, but was certainly — my efforts in research were diminishing. I had one or two — at the most — graduate

students there, from about five or six. So it was very different, and I managed to keep five or six going all the time I was just a dean, and Joe Cerny was very supportive of that. He always allowed me to travel to Mexico, and do whatever it is I needed to do to support that graduate student effort. But it was in later life — towards the end of my career — that I went to the Lawrence Hall of Science, and I really didn't have anything like the same sort of effort in research that I had ten years before, or certainly 20 years before. So it wasn't a great loss to me. It wasn't a great deprivation. I always used to tell him that, that one of the good things about it is that if you had an active faculty member, he or she would not want to spend a lot of time up there, because there's nothing up there to do for their research, and I didn't mind so much, because my research was more or less over. I was writing stuff, but it was not cutting edge material.

14-00:28:11

Redman:

How did you feel about that? Were you pleased with what had happened, or did you miss — did part of you miss —

14-00:28:20

Carmichael:

Oh, I missed part of it, but on the other hand, after I got into the Lawrence Hall of Science, after about the first six months, I realized what a great opportunity this was for me, and I became more and more grateful to Joe Cerny and Nancy Caputo for giving me the opportunity to do that, and then from then on, I got more and more attached to the people up there. I more and more relished my connection to them, and I got more and more involved with the functions of the Lawrence Hall of Science. I was ultimately trained by Susan Gregory to raise funds, to be nice on demand — which is a very necessary component of fundraising — and research slowly but went. I used to read the literature, and I used to have a postdoc. But by and large, the amount of work I used to do had gone. And, you know, I'm very happy — looking back, I was very happy that happened in the way it did. I was given something new to do, and I liked that, and the Botanical Garden, I thought, was new, too. I'm so grateful to Joe Cerny and to Nancy for actually giving me — right at the end of my professional life — a new opportunity to go and do something quite new, in a segment of the university which most people — nobody acknowledges exists, or don't know exists.

14-00:29:54

Redman:

Can you compare a bit with some other faculty members that you've seen, either earlier in your career, or people that were your colleagues that were your same age who were at that same stage of your career?

14-00:30:07

Carmichael:

Yeah, there was a good friend of mine. He died a couple of weeks ago.

14-00:30:10

Redman:

Oh, I'm sorry to hear that.

14-00:30:13

Carmichael: He came in 1970. In a general sense, he was the same sort of field as I was.

14-00:30:19

Redman: What was his name?

14-00:30:21

Carmichael: His name is Professor Harold Helgeson. He was a geochemist, as I am believed to be, in part. And he spent his life looking out for graduate students, and writing a very effective research program. He's a very distinguished guy. I don't think he ever served on an academic senate committee. He was never the department chairman. I don't think he ever did an administrative job in the department. He was just fulltime research.

14-00:30:54

Redman: And did that suit his personality, or —

14-00:30:57

Carmichael: It suited his personality.

14-00:30:58

Redman: Okay.

14-00:31:04

Carmichael: But the funny thing is, without being derogatory, I don't think my research was only 50% of his, if you see what I mean. I was only 50% a researcher, because for so much of my life, I was an administrator, and I never felt that at the end of the day there was a significant difference in our impact.

14-00:31:32

Redman: As?

14-00:31:33

Carmichael: Scientists and researchers. He might say, "Hey, you didn't come close to me on this, that, and the other." And maybe the students might say that. But I don't think there's a 50% difference, and that's what I was. For 22 years, or something, I was a 50% employee or 70% employee of the department, because I had these other jobs.

14-00:31:56

Redman: Okay.

14-00:32:00

Carmichael: So I don't think I lost. I think I'm an example of what the campus has always known, that if you want something done, find a busy person. I just fitted it in.

14-00:32:12

Redman: Yeah, that's interesting. So do you have other thoughts on the Lawrence Hall of Science that are on your brain, maybe other exhibits or changing of the day to day operations, or what you were doing?

14-00:32:30

Carmichael:

The Lawrence Hall of Science has a function in this university, but I don't think it's reached its full potential, and that's not the fault of the Lawrence Hall of Science. The population of the state of California is changing dramatically. The Central Valley is essentially — I won't say completely Hispanic, but it is certainly non-English-speaking native. A huge proportion of the population there is non-English-speaking first language. It's either Hispanic or some part of Asia. The schools over there are not very good. The University of California is seen to them as being some distant aspect of heaven knows what, because essentially all the campuses on the coastline, when you think about it. Davis is not, and Merced is not. But by and large, their experience of the University of California is very tangential, very distant. And my view is that it behooves the University of California to run something like the Agricultural Extension Service, and call it the Educational Extension Service, and to make sure that the programs of the Lawrence Hall of Science for math and science are in every high school, and every middle school, and every elementary school in the Central Valley. My view wanted to be essentially from the transverse ranges up to the Oregon line. That's expensive, but I think it's a necessary investment in the future, because I think Hispanic kids in the Central Valley, if they are well taught in math and science, it will benefit the state. They will see that the University of California — their parents will see it — as part of their educational progress, and they will look upon the University of California not as some distant organism with which they no connection, but as something which has influenced their lives. And they are going to vote. And 20 years from now, I'm not sure that the voters of California are necessarily going to support the University of California in quite the same way as it is at the moment. We're a good competitor to Harvard, and to Princeton, and to Yale, and to MIT, and to Caltech, and to Stanford, and everything else. We're the only state university that comes anywhere like that, and this is the only campus that — well, much of the other campuses, too, but Berkeley preeminently does run those other private universities — give them a good run for their money. I don't know whether the population of the state of California 20 to 30 years from now is prepared to do that. It will only do that if in fact the University of California is seen to be part of their lives, and if I was the president, I would make sure that an increasing component of the University of California was part of the school lives of the people of the Central Valley, and I would make sure that happened. One of the agents of doing that would be the Lawrence Hall of Science. And I tried to do that, and I got it up to Reading, and I got it way up into Northern California. I got it into Siskiyou County, and Modoc County, and to Shasta County, and to Del Norte County — counties you've probably never heard of — and it works in a small way, but it was funded by a foundation up there, and this foundation's very pleased to work with the Lawrence Hall of Science, and to continue it, so that's great, but we must expand that. The future of the Lawrence Hall of Science, I think, is tied to the future of the University of California, and will contribute to the future of the University of California, but it has to be done in an imaginative way, in which we participate in the education of the schools.

14-00:36:36

Redman:

Okay. Okay. I have two final questions that I'd like to take on. First, I'd like to ask you about your election to the Royal Society in 1999, and what that meant to you, coming near to the end of your career, as you put it.

14-00:36:56

Carmichael:

Well, I was delighted to be elected. The Royal Society is the oldest scientific society in the world. It was instituted in 1663. It's been continuously running since then. If you live in England or in the Commonwealth countries, if you're elected to the Royal Society, you invariably use the initials FRS after your name, when anything is written to you, and you sign anything. It's always with the letters FRS behind it, so it has an enormous cachet in England. Over here, it's seen as equivalent, I think, to membership in the National Academy of Science, but election to the Royal Society if you're over here, it used to be much more difficult, because there was a sort of element of a rat deserting a sinking ship, you know, when I came to the United States. If you were that good, why don't you say here and help this country, rather than going to California, right? So they weren't inclined to elect me. That's my suspicion. So that's why I was 69 when I was elected, and I was first nominated when I was 39, so it took a time, I think, for people to overcome their antagonism to the fact that I wasn't — I don't know, whatever goes on in these elections. Anyhow, I went there and to the ceremony, to be inducted, and that's a very exciting event, because you have to sign a book. They make you practice the still nib and Indian ink, and you practice ten times, and then you can sign in the book, and then they show you the book. Isaac Newton has signed it. Charles Darwin has signed it. All the great scientists have signed this thing, and you see them, from the 1660's. It's an amazing revelation of the continuity of science, and that you've been elected to join this august group. It made you feel good. I took my daughter here, and she loved it. I took my younger daughter there, and she loved it. I gave a lecture there with the other new inductees, and that was nice.

14-00:39:22

Redman:

What did you lecture on?

14-00:39:23

Carmichael:

On something — how volcanoes contribute to our atmosphere and our oceans, and it was for 20 minutes, or something, because every inductee — there are about 40, and I'm not sure it's 20 minutes. It's ten minutes, when I think about it. Every inductee is given a time to do it, and you've only got — what? — a day, and if there are 40 of you, you can't have too long. And then there's a dinner at which you're sworn in, as it were, and you shake hands across the mace of the Royal Society, which was given to them by King James, when the Society was founded, and it's a really good window in the historical past of the UK, and I liked that. What the significance is over here? Nothing, very much. You don't use the letters after your name here. Nobody does, in this country. I'm not a member of the National Academy of Sciences. I'm not sure that I ever would be, and I'm very content not to be. I like the way I am. I'm very

happy to be just a fellow of the Royal Society. It suits me just fine, and I'm delighted to be a fellow. There's a certificate which says it there. I think it's hanging up on the wall there. You can go read it. It's a very exclusive club for people who are in the science, and it's a sign that you've been beaten a drum and done okay.

14-00:41:19

Redman:

Okay. Do you feel as though that recognition is perhaps the most significant at the end of your career?

14-00:41:33

Carmichael:

I think it's most significant from England. I think it's not in the United States. All the medals I got here, I think are significant, and I'm very pleased to have those, and I think I deserved them, looking back, but I was very, very amazed when I got them. But now I think, "Okay."

14-00:42:01

Redman:

Okay. I'd like to close today's tape with — and now this is, admittedly, a pretty challenging question, but if you could offer any advice to a new professor or advanced graduate student, what would it be?

14-00:42:18

Carmichael:

To a new professor? Let's start with the new professor. You have to take teaching seriously, which means that you've got to put an effort into doing it, but you've got to make sure your research is good. If you're going to get tenure, you've got to make sure that the research is imaginative and creative, and follows on all the things which we believe are part of you when we appointed you. Don't ever think that Berkeley will sustain itself without first-rate research and scholarship by its young faculty. That's the core of what this campus is all about. Having said that, you put your best foot forward, and do your teaching. You should leave administration alone until you've got tenure, not because I think you're not any good at, but because I don't think it should get in the way, and you've only got six years to get things together, and six years can go very quickly. You're possibly young, and you've possibly got a family, and all of the sudden — whew! — six years have gone by, and you haven't done this, you haven't done that, and haven't done anything else. But if you can set your sights on — I won't serve on an academic senate committee, I will do some department service, but not very much, and the chair will make sure you shouldn't do very much, but you should spend your time on your scholarship or your research, and do the best you can on teaching. You shouldn't short circuit teaching, but you mustn't devote so much time that you're taking time away from your scholarship and research. That's not what the Berkeley campus is about.

14-00:43:57

Redman:

Good. Yes. Okay. And now for an advanced graduate student?

14-00:44:01

Carmichael:

An advanced graduate? A grad student at Berkeley — it's a fantastic campus, in the sense that there's nothing that's not represented here by somebody who knows what they're talking about, so you can pick up any course or meet anybody you wish, and you should take advantage of that to round out your education while you're here. You have six glorious years here, seven maybe, or eight, if you're in the humanities, and you should use that time to greatest of your advantage. You should delve into every possible aspect of the ancillary subjects to your own so that you become broad and versatile, and that's what will lead you to a great job, I hope. And the Berkeley campus encourages that — I hope — because the departments of the humanities, and the social sciences, and the sciences are so good, and the people in them — usually — are real authorities that it's worthwhile tracking them down, either taking a course or meeting with them, or something like that, to expand your horizons so that when you become an assistant professor somewhere, you can also expand your own students' horizons, and contribute to the academic prowess of the department that you just joined. So keep it broad. You're not going to have many free hours in which to enjoy yourself. Your freedom is going to be rather constricted. You have to work really hard, but that's fine, and I think you're going to have to learn hard, too. Those two have to go together: learning hard and working hard. They're different. And I think seven years on the Berkeley campus is wonderful. I'm sorry that — I don't know what the living conditions are like. I've never had to do. But I imagine you have a nice apartment, you've got a girlfriend or a boyfriend or something, life can be pretty pleasant. But if you haven't, don't worry. Just get ahead with it, you know? Sooner or later, someone will turn up for you. I'm sure that's true.

14-00:46:20

Redman:

So, do you have any other thoughts for today on this tape?

14-00:46:30

Carmichael:

Well, I've been at Berkeley for 40 years. I've had offers to go to private universities, and I think the thing that's kept me at Berkeley, as much as anything else, is I'm very proud of the fact that a state university, run by the state of California, can give Harvard and Stanford a run for its money. That's very important to me. I suppose it comes from my socialist training or upbringing in Britain, where all universities were — in my day were free. I don't think they are now. But if you can get in, anybody can go to university. Maybe that's true at Harvard, but the pyramid's got pretty narrow. But the University of California system is so broad now and is so effective, I think it's a great tribute to the people of California, and I've always been very proud to be contributing to its prowess and its distinction. There are many things wrong with it, but that's wrong with any agency, and there are many things that should be put right. But I've had my change to make the things wrong and put things right in the University of California, and I think everybody should try and seek to defray the responsibility or the obligation they have to the university as they grow more senior. I think that when you've made your name and you are seen as somebody of distinction, I think that's the time when you

start taking the load for the younger people, so that you can come in. They don't have to teach those Mickey Mouse courses that you have to teach. They're free to do the scholarship. They're free to do the research which you were allowed to do when you came here. And I think that obligation has to be accepted by the senior faculty. I like the way the graduate students are treated here. In my day, they were part of the selection committees for new faculty. I think it's very important. They were members of review committees. I don't know whether they are now. I thought that was very important, too. So the graduate experience here, I think should be second to none. I just hope they're supported well. I don't know whether that's true now. But I'm pleased to have been at a state university — *the* state university — which everybody in the world knows is good. I'm sure Harvard would say they're a little bit better. I've been on review committees at Harvard, and so on, and yeah, I can see why they're a little bit better. When you've got \$25 billion to throw at something —

14-00:49:05

Redman: That's hard not to be.

14-00:49:06

Carmichael:

It's hard not to be. So I'm envious of that, but that's all. And I'm delighted that Mike Heyman — and it was Mike Heyman — started out the development office here, so that Berkeley is picking up its alumni and shaking them down for the contributions which every other university expects from their alumni. Mike Heyman's started something very good, then, I think. I hope it continues and flourishes as much as it seems to be. Although it's awkward that there's so many new buildings being put on the campus, because for so many years when I was here, there were no new buildings, and Mike Heyman started it with Biological Sciences B, I think it was — oh, no A, and B was something else. After 25 years or something, that was the first new building, and it was great. And it is great. And the campus is going ahead. I'm sure it needs even more money, but the buildings are going up. I'm suspicious — frankly — of the stadium. I was a very enthusiastic athlete when I was young. I don't like professionalism in sports at American universities, particularly basketball and football, and I don't see why we should become sort of the — what is it? — the training farms of the professional leagues. I think that's terrible. But that's the way the alumni want it, and that's the way the population want it, and we have to provide entertainment for our alumni every — what? Six or seven days a year? — in the stadium, but to spend all that amount of money on that stadium for that amount of entertainment strikes me as absolutely absurd, when so many things are wrong in the main function of the campus — instruction, and so on. But that's the chancellor's call, not mine.

14-00:51:07

Redman: Okay. Any other thoughts? This has been a fantastic session, I think. This has been really great.

14-00:51:13

Carmichael:

Okay. No, it's been fun. Looking back on what I've read so far, I would like to talk to you about research again at some stage. I want to do that also when Becky {Langeer?}'s here. I want to talk about what it's like to be running the reviews and what I found out about the campus, because for a time, when I was doing the reviews, Sam, I knew more about the campus departments, I think, than anybody else. So I'm looking forward to talking a little bit about that. I'm going to have to go think about that a bit more. Being a chairman, I think I dealt with. I don't think anybody wants to know how you do a chairman.

14-00:52:11

Redman:

Ok, thank you.

**Interview 8: July 5, 2007**

## Audio File 15

15-00:00:07

Redman: My name is Sam Redman, and I'm sitting down today, July 5, and I think this is the first time that I've ever remembered the date at the start of one our interviews, but I am here with Becky Lange and Ian Carmichael, and I've also lost track of the number of sessions we've had. We've done over 130 pages of interview so far, and today, we would like to talk about science, and geology, and the history of Ian Carmichael's work, his own personal work. So, I'd like to turn it over to you guys, and maybe, Professor Lange, if you could tell me a bit about yourself, and how you met Ian, and how you guys started to work together.

15-00:00:51

Lange: Right. Well, I was an undergraduate at Berkeley, and I didn't meet Ian until the very end of my undergraduate career, when you have to go out and take field camp. You have to take a field course. There was another professor who taught the first four weeks, and then Ian came up to teach the second two weeks.

15-00:01:11

Redman: Okay. And where was this field course?

15-00:01:14

Lange: This was on the east side of California in the Poleta Folds, and then, Ian, you took us up to —

15-00:01:20

Carmichael: Benton Ranges.

15-00:01:21

Lange: Benton Ranges. Right. Should I go into all the stories?

15-00:01:25

Carmichael: Yeah. Go on.

15-00:01:27

Lange: Well, I remember we had bonded quite a bit with the other professor. You know, four weeks, and the whole class, and everything. There was about — I don't know — 25 of us or so. We had been up all night working on our reports, and all this stuff, and got up the next morning without any sleep, turned in our reports, packed up because we were moving further up north behind the Sierra Nevada, and it was our understanding that we would have the next day off, because we had been working solidly, and one of the vans shut down, and I guess that was the first time you came down. But anyway, we finally set up camp — so it was a very exhausting day. And so, again, it was our understanding that we would have the next morning off, the next day off. So Ian's now in charge of us, and he informs us — to our shock and

dismay — that we are not having a day off. And so the first time I met him, me and all my fellow students, we thought he was a real... A hard ass, as they say. And so he took us out in the field that day. But what's interesting is that those two weeks that my group — that we had with Ian — of the 25, nine of us went on to graduate school.

15-00:02:49

Redman:

Oh, wow.

15-00:02:50

Lange:

That's pretty common in geology. If you want to do anything, you usually have to go on. The interesting fact, though, is that of the nine of us, I think all nine went on in igneous. And that decision, I really believe, was set during those two weeks, because he took one day off — I think you did it three different field trips — but he took a day off, and he took us on a field trip. Split us into three groups, and so for each of us, we'd go off for a day with 12 other students with Ian, and he showed us the Mono Craters, and all these volcanic features, and the Long Valley Caldera, and he just made what he did seem so exciting. I think it was his personality. We'd end up at Nicely's, at the bar. So he was a fun professor. He's hardnosed on the one hand — you know, made us work really hard, and so at first, we really didn't like him at all, but then he was also enormously fun, too, so it was this work hard, play hard that was very much his signature. It really affected so many of us, and I personally was supposed to do a senior thesis with another professor, and he came up to visit us at field camp before Ian had come up, and told me that it wasn't going to work out, and I was going to map around Mount Diablo. So I was without a project, and had wanted to do a senior thesis, and so it was while I was at field camp that Ian suggested that I could do something with him and one of his postdocs, John Stebbins. And that led me to work up at the Lawrence Berkeley lab that final fall semester — I graduated in December. That got decided when I was out at field camp, when I first met Ian.

15-00:04:44

Redman:

Okay. And so, did you then go directly into graduate school?

15-00:04:51

Lange:

Well, I graduated in December. So, this was the summer, when I first — and I got involved with doing this senior thesis, so when I came back in the fall term, I was still taking classes, but I was going to get involved with this project, and Ian had two postdocs — well, one in particular, Jonathan Stebbins, who's now a professor at Stanford, who had been a grad student of Ian's, and I was going to measure the enthalpy of transition —

15-00:05:19

Carmichael:

Good.

15-00:05:19

Lange:

— of lucite and other minerals. When Ian mentioned them, I had no idea what they were. The idea of working in a lab on these minerals — it sounded kind

of exotic. I would have preferred to have been doing something outdoors, but during the summer, I also was invited to go down and be a field assistant. He always had one or two undergraduates go down to Mexico and be a field assistant, and so I was invited at field camp to do that, starting in January. The reason I got picked was because I was one of the few undergraduates who was going to be graduating in December.

15-00:05:57

Redman:

Okay. Now, Ian, when you're selecting undergraduates at this stage to work with postdocs to help do research, what were you looking for? Were you looking for — you can go ahead and answer that.

15-00:06:12

Carmichael:

Well, I had a field program in Mexico, and it involved taking one to two or three vehicles down there every year, and each student going down there doing the research for his or her PhD needed some assistance, and the assistance was provided by two or three undergraduates. We called them field assistants. And they went down there for the whole period of the three or four months. Was it four months?

15-00:06:46

Lange:

No, no. It was —

15-00:06:46

Carmichael:

Two to three months.

15-00:06:47

Lange:

Two to three. Yeah. Two months.

15-00:06:49

Carmichael:

And they ran a camp, and so on. So everybody could get experience of what it was like to run a field research project in Mexico, and by and large over the 30 years I did it — 25 or 30 years I did it — most of those undergraduates who were field assistants I think prospered enormously. Almost none of them had been to Mexico beforehand, so here's their first experience of a different culture. Secondly, nobody had actually sort of cooked or camped at a field investigation before, although they'd been to field camp, and that increased their experience, and their interest in the sorts of things that I was interested in. So I used to teach part of field camp, and invite what I thought were the best students — the students with the most initiative, and so on — if they'd like to come to Mexico the following year. And that's how it started. I took — I think — in all, about 45 undergraduates down to Mexico, and I must have had a dozen PhD students down there. Was it? A dozen?

15-00:07:55

Lange:

If not 15.

15-00:07:57

Carmichael:

Yeah.

15-00:07:57

Redman: And many of those undergraduates then subsequently —

15-00:08:00

Carmichael: No, they didn't. A lot of them became — some of them became school teachers, some of them went onto graduate school, but they didn't necessarily go onto graduate school in my subject, but it was just their final year at Berkeley, and I really wanted to give them some experience of doing it. And they seemed to be resolute, and had a lot of initiative, and so on. Sometimes they came from geography, they didn't come from geology. And I think one girl actually came from economics at one stage. She was the girl with the birthmark all over her face.

15-00:08:43

Lange: How did you get —

15-00:08:45

Carmichael: One of the students —

15-00:08:46

Lange: Oh, so the grad students —

15-00:08:47

Carmichael: The grad students selected her.

15-00:08:49

Redman: Okay.

15-00:08:49

Carmichael: And I let the graduate students go and find these people, if they could, because they were going to have to live with them, day after day after day after day, and go to the market, and camp, and get water, and cook, and clean up the camps and the dishes, and so on. And I didn't have any impact, or I didn't intrude in any way on the selection.

15-00:09:10

Redman: Okay. So they would select them as GSIs, or —

15-00:09:12

Lange: Well, you selected the year I went, because —

15-00:09:18

Carmichael: Yes, I selected you.

15-00:09:18

Lange: — you were there at field camp.

15-00:09:21

Redman: So what type of research were you doing in Mexico?

15-00:09:26

Carmichael: Is that question for me or for Becky?

15-00:09:27

Redman: Both of you.

15-00:09:28

Carmichael: You answer it. [laughter] What do you think I'm paying you for?

15-00:09:34

Lange:

[laughter] Yeah, exactly. Exactly. Well, when Ian was first down there, down in Mexico, it was completely uncharted territory, and this is the interesting thing to step back a minute and talk about his research program, because on the one hand — he really had two distinct arms to his research, on the one hand — at least by the time I came on the scene, my consciousness of what Ian was doing when I finally was a senior undergraduate and was introduced to his program — what they were doing in Mexico, it was completely uncharted territory. So, it was a subduction zone setting, and they were studying the arc volcanism — the subduction zone volcanism down there, and it was really — they were the first people to map it, to first describe what was down there, and so on. In many ways, that kind of research is very time and labor intensive. The roads were terrible then, but on the other hand, we were able to camp and do all that sort of stuff, so there really was at that stage a lot of just describing what was down there, some of these active volcanoes, and just figuring out the timing and the sequence, and so on. Now, what he was doing in the meantime back in the lab was very ahead of its time, in terms of quantifying, measuring the thermodynamic properties of silicate liquids, making measurements that had really never been made before at such extreme conditions — really high temperatures, materials that are liquid, so they flow, so you have to contain them in special conditions, so very challenging. So at some point, we need to return to that whole thing. Now, Ian himself, though, like so many of us got interested in geology because we loved being outdoors. One of the powerful things about being both down in Mexico and working on the real rocks, and then also making the measurements is that not only was he aware of when we were making these measurements, we've got to make them so that we develop a model that the geologist out in the field can then use. So, if we're measuring the density of silicate liquids, we can't just measure these simple liquids, we have to measure natural liquids so that when someone's out in the field and they pick up their rock, and they want to calculate what was the density of this particular rock, magma, as it was rising through the crust, they have a model to do it, whereas kind of in the past, people were working on very simple liquids that didn't always have iron or both oxidation states of iron. So having said all that, there was still a lot of what was being done in Mexico was still — by necessity — at the stage of collecting and describing. So it really had a descriptive quality to it. Whereas what was going on in the lab was much more quantitative, much more mathematical, thermodynamics, and again, way ahead of everybody else in the community.

Now, as an undergraduate, I thought the idea of going down to Mexico — I was just delirious with the idea, and I didn't know I was going to stay for graduate school, I just — oh! *That's* what I wanted to do. And when he

suggested — because I was looking for a research project — that I could do something — and you had John Stebbins available, and he was in between projects, and we really need to talk about the NMR spectroscopy, because that was huge, but anyhow — I think that you hadn't had a long history of having undergraduates do research projects up there, but I just came along at the right time, when you had a postdoc who was a little bit at loose ends, and I was asking you if I could do something, and so — and he was already going to bring me down to Mexico as a field assistant, and there had been a long tradition of that, so I really liked the idea of going down to Mexico, because you hike up volcanoes, and be outdoors, but interestingly, the project I got involved with with Jonathan taught me so much, and I think later my postdoc at Princeton, and my faculty slot at Michigan — I'm not sure those would have happened if I hadn't done both. And that's the secret. If I had gone to work with anyone else at Columbia University, or Stanford, or whatever, I would have either done fieldwork or I would have done experimental work, and Ian was the only one who really where you had the opportunity to do both.

15-00:14:40

Redman:

Let's talk about — now, this is a question stemming from my ignorance of what an academic article in geology really entails, but — reading Ian's work, would this have been apparent in being able to see, "Wow, he — in order to accomplish this research — has done work in the field, and complicated with in the lab that's ahead of its time." Would that have been apparent right from the get-go?

15-00:15:06

Lange:

It would have been apparent to anyone looking at his CV, and certainly his peers — the professor at Caltech, and Columbia, and MIT who nominated Ian for — he's won every medal in the book — so those guys who nominated him for all these medals, they were very aware, and they appreciated that Ian was someone who could apply — the conclusions and discussion sections of our thermodynamic papers always had applications, whereas most of the other people who were also making thermodynamic property measurements never had that. Like {Pascal Rochet?}, and {Donding?} — they didn't have it. And so there was always that linkage, but it really has to be spread out over 20 or 30 years. If you took just one paper down in Mexico, especially back 20 years ago, 30 years ago, that first paper, or those papers down in Mexico were often describing the volcano, which meant collecting, the whole rock analysis, Ian did the wet chemistry analyses for it, cutting a thin section, microprobing, and in fairness, I don't think that those papers by themselves were earth shattering.

15-00:16:25

Carmichael:

I agree.

15-00:16:26

Lange:

But later, because of that body of work, there was something that the idea of when magmas rise up from that and they're buoyant — they're hot, and they're

buoyant, and they have dissolved volatiles in them, dissolved water, so they rise up. For years — again, back 20 years ago, ten years ago — well, 20 years ago, when I was a grad student, we all thought that magmas rose, and they crystallized, because they were cooling down, because as you move up in the crust, it gets cooler and cooler. So we always thought that the crystallization of magmas was driven by cooling. Everyone thought that. As a consequence of being down in Mexico — it was 20 years — and we found these unusual lavas that had the same composition as the lavas come out of the huge, majestic stratovolcanoes. Whenever anybody — including Ian — first went to any kind of subduction zone, everyone was drawn to the big, majestic stratovolcanoes, so Mount Shasta, Mount Saint Helen's, Mount Rainier and the equivalents down in Mexico, so Ian was working on Colima — North America's most active volcano — Ceboruco — you know, the big centers. But then right about the time I was a grad student, this cinder cone field had been discovered that had some unusual lavas associated with it, and that drew Ian's attention, but amongst them were lavas that were erupting that had the same bulk composition as the stuff coming out of the big volcanoes, only they were either crystal core, or they only had these {hydrosphenic cores?}, and in the meantime, Ian had been doing experiments with students, and he was really one of the very first to recognize that what was driving the crystallization was degassing — the loss of volatiles — and to full explain that, we'd have to draw a phase diagram, which involves thermodynamic properties, and all of this. So the people who had been in the field all the time would see these lavas, and they wouldn't get it. They wouldn't understand it, because they didn't have that thermodynamic and experimental background. The people doing experiments didn't get it, because they weren't in the field seeing the difference. And so I think that's a classic example where — and Ian was the one who said, "Look, this lava here, which has no phenocryst, and this one that comes out of the major stratovolcanoes that's chock full of phenocryst, they're the same, and this one just has come up and erupted before it degassed." Now, the reason why this is so important is that it change everything about how we think — first of all, it changes our ideas about how much water is in these magmas, because most of the time, we were studying the lavas after they had degassed quite a bit. That was what most people were focused on, and because of Ian's insight, we began to realize that there was a lot more water. Like five times more water than we had previously thought, and this is fairly recent. I'm talking the last five years, now, where this idea is really seeping out to the community. And it is a little difficult to explain this, because —

15-00:19:56

Carmichael: You're doing very well.

15-00:19:58

Redman: Yeah, you're doing a fantastic job.

15-00:19:59

Carmichael: You are.

15-00:20:00

Lange:

Well, and I don't think it would have happened, Sam, without the fieldwork on the one hand, and the experiments on the other. And sometimes Ian will say to me, "Oh, I think our work in Mexico hasn't — " He'll make the comment that he understands that all his medals, all the citations, they all talk about the experimental — the thermodynamic stuff, and they don't mention Mexico, because it was true that a lot of what the early days of Mexico was descriptive. You know, collecting it. And a lot of people were doing that. So it wasn't that different from what other people were doing. But you were drawn to it, and I think he was drawn to it, and we were all drawn to it. When I was an undergrad, if I thought doing a graduate PhD with Ian meant *only* doing experimental work —

15-00:20:49

Redman:

You wouldn't have wanted to do it.

15-00:20:50

Lange:

Forget it. And if he had said only do the fieldwork, I probably would have. But he says, "No, if you're going to work, you're going to do both." And I knew that this experimental thermodynamic stuff was — I knew it was exciting, and hard, and that was attractive, in a way. But it's kind of like — I'm going to go for analogy right now, and stop me if I'm going too far, but they talk about like in biology, you have all the molecular, and the DNA, and all this, and when that was first breaking out, the people who did taxonomy were considered boring, and descriptive, and yesterday, and now, what they've realized is that the both together is so important. The people who understand all the branchings, because they know the taxonomy. So, it's kind of analogous. So what Ian had going was on the one hand, the field work, which is a little more descriptive, plus the experimental work, and that was rare. You were one or the other. And it put all of us in position, so when I interviewed for my job at Michigan, and my siblings — my academic siblings — because even if some of us mostly worked in Mexico or mostly worked in the lab, we had group meetings. We were deeply exposed to each other's research, and personally I did do both. When I then went to give an interview at Michigan, there would be some people in the faculty who said, "I want someone who can go out and teach field camp and knows what a rock is, and can apply all this thermomermo to a real magma, and get a sense of a big picture. We're geologists. We're not material scientists." But on the other hand, there were people on the faculty saying, "I want someone who's going to go to the 21st century, and not just do more — "

15-00:22:36

Redman:

So you're catering to both desires for —

15-00:22:38

Lange:

In a sense. Both prejudices. But more important than that, you just have the insights. They inform one another.

15-00:22:44

Redman: Right.

15-00:22:47

Lange:

Deeply. They absolutely do. And so, I've tried to continue in that spirit myself, but when I look back, and think about who else I was considering working for — and again, when I was an undergraduate and I was applying for grad school, he gave me a list, he said, "Don't stay here." He said, "You shouldn't stay at Berkeley." And the reasons for staying were all personal — friends, family — all the wrong reasons. I didn't even understand, really, how wise in the long run it was to stay, but looking back, I would have just been a lab rat — there's very few people who I could have had this both experience to, and I think my career has blossomed. And all our siblings. So one of the questions we all ask: what was it about Ian? Why was it that he had so many of his graduate students succeed in academia? Because it is really quite legendary, not just in our discipline — absolutely in our discipline — but it crosses disciplines. I mean, there aren't very many faculty at Berkeley — I mean, his colleagues have some people in academia, but not like two thirds in top places. So what was it about Ian? And a lot of us try to talk about that, and I think it's a combination of what I've been talking about — having the field base, plus the experimental, and then I think the other thing goes to his personality, which is just the enthusiasm, and the charisma, and the imagination. He just made what we were doing, whether it was enthalpy of transition of caliothelite, which I now know is pretty third order, but he made it seem so exciting, and as I learned how to make the measurement, and learned what was involved, I began to realize, "Well, this is probably not that important." But it set me up to pursue really important things, and to understand what Mark {Iorso?} was doing, which was all this thermodynamic modeling.

15-00:24:53

Redman:

Let me ask a question about that enthusiasm. Now, when you were getting someone ready — because you've told me before that your job was to get a graduate student to the interview, and what they did at the interview was their job, and if they messed it up, that was their thing, not your fault.

15-00:25:14

Carmichael: Not the talk.

15-00:25:15

Redman: Not the talk.

15-00:25:15

Carmichael: No.

15-00:25:16

Redman: Okay.

15-00:25:16

Carmichael: The talk, that was practiced many, many, many, many times before.

15-00:25:21

Redman: Okay. Now, what about — would you make phone calls to people on search committees, or write letters, or communicate with them at all?

15-00:25:30

Carmichael: I'd never initiate a call to another university saying, "You should look at one of my students."

15-00:25:35

Redman: Okay.

15-00:25:36

Carmichael: No, no. That I would never do. Nor would I interfere once they were part of a selection process, you know? A short list.

15-00:25:44

Redman: But people would call you as a reference?

15-00:25:45

Carmichael: Yes. Then I would give them my best opinion about A, B, C, or D. I would try and explain to them why I thought that this particular student was top of the heap, and how he or she was going to be famous 20 years down the road, which of course is what every university wants to know. How is this person going to turn out 20 years down the road?

15-00:26:09

Redman: And part of explaining that, no doubt, is believing in your research program, and the way the field is going over the next 20 years, because you have to sort of make the assumption that you've set them up to do something over the next 20 years.

15-00:26:27

Carmichael: Well, yes. Frankly, I suppose I've had about 30 students that are now still active professionally, and I think they're all active, and they're leaders. I mean, they're not in the backwaters.

15-00:26:42

Lange: I'll say one thing. We had a 60th birthday party for Ian back — it was right after I had left for Princeton, and we had come back, a lot of us, for a birthday party for Ian, and Jonathan Stebbins, who is now a professor at Stanford, and he got up, and he made a comment. He said, "I think every good idea I've pursued in this career so far, which is very successful," he said, "Everyone one of those ideas started with Ian." And the other interesting thing about if you were to profile all of us who were his students, and what we all specialize in, it's incredible diverse. We are not all just clones of Ian. Some focus on fluid dynamics, magnaphysics, others are into NMR spectroscopy. Others are field-based physical volcanologists. Others are — I mean, it's just a remarkable diversity. And that's the thing. Ian was so generous with his ideas. He had had these ideas, research ideas, that were really good — ideas that you could not just run with for a thesis, but really expand on —

15-00:27:49

Redman: Run with for a career?

15-00:27:50

Lange: For a career. And like each one kind of did that. And I think the one he was so generous is because they just came so freely. And didn't your good friend make a comment, Dave Walker, he said, "It's kind of hard, because I give my best ideas to my students, and they run with them," and he's happy for them, but it's like, "Hey!", you know? And Ian just gives his ideas out freely, and so I think that that's another thing. Just very generous with his ideas, I think because he just had so many.

15-00:28:26

Carmichael: Could I introduce one more topic about Mexico?

15-00:28:27

Redman: Sure. Great.

15-00:28:29

Lange: Yeah.

15-00:28:29

Carmichael: I think that as we went by, Mexico taught me something which I wanted to avoid. In fact, I decried or derided, and that was tectonics. I did get involved with that, because firstly there were earthquakes down there, I mean contemporaneous earthquakes, and secondly, the faulting down there is so magnificent that led us to believe that in fact the continent was being fractured — the continental margin was being fractured. And that led to — and I'll let you take over from that.

15-00:29:02

Redman: Right. Now, let's talk about that, because this is one of the great discoveries in geology of the 20th century.

15-00:29:07

Lange: Yeah. This is great, because this also puts Ian in his era, his age and context. When Ian was a young PhD student, pre-plate tectonics, and he was really interested in magmas, and his — again, what he is known for, his cutting edge insight, way ahead of the pack had to do with thermodynamics, and quantifying what we call the intensive variables of magmas, being able to quantify the pressure at which the crystals in the magma grew, how much water was in the magma when those crystals grew, what was the temperature of the magma — all those things, because if you can know that, you can know so much, and that was just a pipe dream, when he first wanted to go after this. And now it turns out that one of the reasons Ian was so interested in what we would consider rare magmas — not very voluminous in terms of the igneous economy, as he puts it, but these weird ones, because they would have lots of different minerals that you could work with, and you could write reactions involving the liquid phase, you could constrain the activity of silica, you could constrain the oxygen fugacity with these mineral phases, so he was

particularly interested in these alkaline kind of weird magmas that weren't really that abundant. And again, the reason he was is because he could work with them thermodynamically. And so one of the weird things is that when we were down in Mexico, and we discovered this unusual cinder cone field, he was drawn to it because it included some of these weird potassic magmas, but in the end, it wasn't those {minets?}, these potassic magmas, that ended up being so interesting. It was the run of the mill {andocites?} that had no phenocrysts that ended up being the real — so there was serendipity.

15-00:30:55

Redman: Let me ask you about cinder cones —

15-00:30:57

Carmichael: GPS.

15-00:30:58

Lange: Yeah.

15-00:30:58

Redman: Were cinder cones — they were less sexy than the big —

15-00:31:03

Lange: Yeah. When you were down there in Mexico, the big stratovolcanoes were the sexy things —

15-00:31:10

Carmichael: That's true *all* across the world.

15-00:31:13

Lange: Yeah.

15-00:31:13

Carmichael: People's eyes are drawn to a mountain which is 10 or 12,000 feet high, or it's erupting.

15-00:31:16

Lange: Covered with snow, and in an active, erupting violently.

15-00:31:18

Carmichael: Right. Right.

15-00:31:20

Redman: Therefore your science is drawn to —

15-00:31:22

Lange: Yeah.

15-00:31:22

Carmichael: That's right. And when you see around the foot of those things a little cinder cone which is — what? — 4 or 500 feet high? You think it's trivial. But there very often is a story in those which is exciting and unusual, and it was only because one of my graduate students — I encouraged one of my graduate

students to go and sample a cinder cone field that in fact it led to many revelations in Mexico, which I think are fascinating.

15-00:31:48

Redman: Okay. Fantastic.

15-00:31:49

Lange: But so now going back to tectonics — so Ian was interested in the magmas, and these intensive variables, and so even when he went down to Mexico — and he originally — way before my time — was everywhere. He was in Africa, he was in the Aleutians, he was in New Guinea, right around — I guess — five years or so before I came on the scene, or maybe ten years, he got involved with Mexico, and sort of settled there. That was going to be his field area. And when he first went down there, he wasn't interested in this plate tectonics stuff, because he had never been brought up in that tradition. He was interested in the magmas, and getting their intensive variables, and that was his quantitative science. That was his rigor. So he really didn't have a lot of time for arm waving about plate tectonics, and it was while he was down in Mexico — and again, this was a little bit before my time — working with other graduate students down there, the tectonics were so obvious down there. There's a piece of — where we were working, that part of Mexico was in the process of being rifted away, just like Baja California.

15-00:32:52

Redman: Okay. Actually, can I pause just for one second? I realized — All right. Sorry for that interruption. Where were we?

15-00:33:02

Lange: Okay. So Ian, starting in about the late 1980s, Ian became more and more interested in the tectonics, which — as he will say — was a real swing for him. Now, for the rest of us, by this time, the kind of students he's working with, we've all been raised in plate tectonics. We can't even think about what we're looking at unless we understand the plate tectonic setting, and so on. But for him, it was more recent. Well, he became really interested in the tectonic setting of this particular part of this subduction zone setting in Mexico, and made contacts with seismologists, geophysicists, and this very new field that was opening up in geophysics, which is using GPS to detect really small, ten years' worth of plate motion, so you have to have these really super sensitive GPS stations. And so again, this is late 1980s, so this is pretty new technology. And so you got involved with four other guys. Almost all the others are geophysicists, and they put in a continental dynamics proposal, not to the normal petrology / geochemistry program that he always went and got his funding from, but from this other program, with these other geophysicists, and it would have been for a multimillion dollar proposal. You were doing this when I was — by this time, I was probably an assistant professor at Michigan, so I was just hearing about it. What was interesting is that the geophysics parts would get *canned*, but his part — which had to do with quantifying the intensive variables of the magmas — would get rave reviews

in this continental dynamics panel, which was a big surprise — you thought it would be the opposite. So they wouldn't fund it, but they said, "We'll fund Carmichael's part." And so he ended up — he would get funded to do his part, but they didn't have the money to do the GPS. So what Ian did was take the money that was supposed to go to do more of what he was known for, and he brought down Chuck {DeMets?}, on your nickel, and funded him to set up these GPS —

15-00:35:30

Redman: Was it partially — did the funding agencies not believe, or did they not trust, that GPS would be — what was the bias there?

15-00:35:39

Lange: [whispered] Yeah, what was that?

15-00:35:40

Carmichael: The bias had been the reviewers.

15-00:35:42

Redman: Okay.

15-00:35:43

Carmichael: NSF doesn't have a sort of position on its own. NSF reflects the reviews from which a proposal is sent, and I suspect what happened is that the reviews in those days were not persuaded that putting a GPS network into western Mexico was going to get anything — that maybe the tectonics were very slow. The resolution is — what? — in the order of about — well, in those days, it was about a millimeter, or a fraction of a millimeter, and unless you're going to get several millimeters a year, you're going to have to wait an awful long time before you've got a signal which is above the noise. Well, as luck would have it, we put in a network, and we surveyed it in. We put GPS receivers on every single one of those stations in that network, and within six months, we got a magnitude 8.2 earthquake right in the network. It was unbelievably luck. And it was serendipitous. And so for the first time, we'd actually measured the earth — the position of what was happening in happening in the earth tectonically — and then, bingo!, there was an earthquake there, and you could see the extent to which the earth had moved. I mean, meters.

15-00:36:57

Redman: So, let me ask, then, when an event like this happens, where you're absolutely in the right place at the right time, and you've caught it, and you've documented it, then what?

15-00:37:08

Lange: Well, can I interject here? What's interesting is that the reason they put this GPS network in was not to capture the earthquake. It was in fact to see if they could see this piece of western Mexico moving —

15-00:37:21

Redman: Very slowly.

15-00:37:22

Lange:

— following, and then we knew that earthquakes occurred along this subduction zone, and that you *could* catch an earthquake, but that wasn't their goal. Well, by catching this earthquake on the side, they could write up these papers, especially this young assistant professor at Wisconsin — this Chuck DeMets fellow — he could write up these papers in gory detail — unprecedented detail — about what happens during a subduction. The release of the upper plate, and it springs up, and the decay back, and this set him up, then, for future funding, and so he was able to fund going back down and putting in GPS stations, and suddenly the reviewers — the peers — it really helped open their minds to what he was trying to do. So, because of the earthquake, which had nothing to do, really, with the separation of the plates, they were a little more open to putting in these GPS stations, and now he's beginning to say something about what's happening with the movement.

15-00:38:27

Redman:

Okay. Fantastic. And now it's partially because the GPS are so much more —

15-00:38:32

Lange:

And now they're cheaper, and they're better, and they're —

15-00:38:34

Carmichael:

And he's still there. He's still got a research program down there.

15-00:38:38

Lange:

He's actively funded. Yeah.

15-00:38:41

Carmichael:

And it was really nice, because it was a program not only with this young person, Chuck DeMets, who was at Wisconsin, but it included —

15-00:38:49

Lange:

Joann Stock.

15-00:38:49

Carmichael:

Joann Stock, from Caltech, two people from the USGS, whose names at the moment I've forgotten, but I'll put in the text, and it included Mexicans, so it became a very international group, all concerned with, "Hey, can we measure what's happening tectonically in this part of western Mexico?"

15-00:39:11

Redman:

Let's talk —

15-00:39:12

Carmichael:

Can I finish?

15-00:39:12

Redman:

Yeah, please, do.

15-00:39:13

Carmichael:

Okay. Now, the reason it was so important came from — what Becky first said was when she and I were down there, and I was looking at these strange lavas called {minets?}, which are highly potassic, they seemed to be confined only to these valleys. We call them rift valleys. These are rift valleys in which clearly the earth had extended, and it is because of their connection to those rift valleys, and the earth clearly at that part of the continental crack had clearly extended, that drove me to try to measure how fast was it extending, and how recent was that extension, because some of those lavas were pretty young. So the valleys in which they had to be, in which they were found, were clearly young. So it was clear to me that over the last million or so years — which is an age to you, I know, but to a geologists, it's yesterday — a lot of motion had taken place in western Mexico. It was illustrated by the localities of these rare potassic lavas, and secondly, every now and again, you got a small earthquake, and so it became obvious to me that we had to go and measure that with a GPS system, and I had to go and get geophysicists to help, because I had no credibility. The funny thing is, as Becky said, when we put the project into the appropriate NSF agency, they canned the geophysicists, and I got away with it, and so I had to — what's the word?

15-00:40:41

Lange:

He wasn't given money to put in GPS stations, he was given money to continue the excellent work he was doing on magmas and going after their intensive variables, but he thought, "Well, I'm just going to take the money I have, and instead of doing same old, same old, I'm going to spend it and give it to you guys to work with you to set up these GPS stations." So you had your grad students at the time occupying these GPS stations with this young assistant professor from Madison, and again, it captured the earthquake, and it launched it off, and now this guy has — now it's seen as really important. I mean, the same story really is true for the Bishop Tuff. We should talk about that, too.

15-00:41:24

Carmichael:

Right. All right. Well, so, Mexico has flourished, because firstly, when I went there, it was almost a wasteland. Nobody was interested in it. The reason I got interested in it was purely due to a graduate student who is now a professor at Tulane University, and he said, "Let's go down there," —

15-00:41:43

Redman:

What was his name?

15-00:41:44

Carmichael:

Steve Nelson. Somewhere in the text I've given you, I want to put a list of all the students I had, because rather than go through the text and insert a name here, there, and everywhere, it's appropriate — I think — to list them all, because I could overlook them, and I don't mean to overlook them. Now, where am I?

15-00:42:07

Redman: Okay, sorry. He's at Tulane, and he got you interested —

15-00:42:11

Carmichael: Oh, he got me interested in Mexico. As Becky said, it started in a very small way. Here is a mountain. It's an active volcano. It has been active in the past. It has evolved. It's collapsed. It's erupted again. It's collapsed again. And it was very exciting in its own right, but it was very descriptive. And it didn't have a great deal to do with the way the earth was actually working in that part of the world, in that part of the earth. It was traditional, descriptive volcanology. Was it not?

15-00:42:44

Lange: Right. Right. I mean, eventually, it all relates, and you got into it all, but you have to start somewhere, and so when you go down there, and no one's ever walked over this volcano before, no one's ever mapped it before, no one's ever sampled it before, you have to start. And so this fellow he just mentioned, Steve Nelson, is one of the individuals who did so much, first with Ian, and then as an assistant and a professor himself with his own students, of going down and doing the initial, back-breaking mapping which is so crucial for secondary studies to come in. So, I come in now with my group, and we do intensive argon dating, and we're building on that previous work, which is less glamorous.

15-00:43:36

Carmichael: It's very much like — you've got to describe the taxonomy of the beast before you can start to understand how they originated.

15-00:43:42

Lange: One person's done all the taxonomy, then you can swoop in and do this targeted study, and get a lot of cred, you know?

15-00:43:49

Redman: Standing on the shoulders of giants.

15-00:43:51

Lange: Exactly.

15-00:43:51

Carmichael: Right. But the taxonomy is big, heavy stuff. It takes a lot of time.

15-00:43:56

Lange: It's slow, and it's not necessarily appreciated that much. Now, as a student doing it, it's great, because you get so much experience, but if you just have a series of those papers, then you're not going to get as much attention, but it's necessary. So that's the other advantage. We got that hard, fundamental, and fun — frankly — experience of going out and collecting the lavas, and hiking up the hills, and camping. We loved it. But it was descriptive. But still, you're staring at all these thin sections, you really got the nuance of what things look like in the field, but those papers we wrote up were not earth-shattering in and

of themselves, and I think what got us our jobs was the combination of having the more unusual and very quantitative experimental stuff over here, plus we could function in the field, and better yet, we knew how to connect them.

15-00:44:57

Carmichael:

I think going back a little bit, before going to Mexico, Becky talked about trying to use thermodynamics to understand the way that rocks cool, and crystallize, and originate, and so on, and that's always been a great interest of mine. The first example of using it, actually, came from my interest in obsidians and ash flows in California and the west. That leads me to probably my most — at the present — renowned student, who went out to study what's known as the Bishop Tuff, which is the Long Valley Caldera —

15-00:45:38

Lange:

It's a huge, explosive eruption.

15-00:45:39

Carmichael:

Do you want to take that one?

15-00:45:41

Lange:

They call them now — if you watch any of these Discovery programs, they call them super volcanoes, like Yellowstone — these huge volume, explosive eruptions, and most people now know about the ones in Yellowstone —

15-00:45:55

Redman:

Which is going to kill us all —

15-00:45:57

Lange:

Well, yeah, but if it ever goes, it will be a major event, because it's — you know — 2,000 times the size of Mount St Helen's eruption, so it's pretty significant. But the Long Valley eruption was just on the east side of the Sierras, and in fact where I did my field camp work, it's right there, so he took us around. But you had a colleague — a senior colleague — who was 30 years older than you were —

15-00:46:26

Carmichael:

Right.

15-00:46:25

Lange:

Who had studied it for his PhD thesis in the 1930s, and Ian recognized that this was an example of a magmatic liquid that erupts explosively all at once — you know, a thousand cubic kilometers — what's the size?

15-00:46:40

Carmichael:

780, I think it was, or 380, is it?

15-00:46:43

Lange:

No, no. The age is like 760 —

15-00:46:45

Carmichael:

780. Yeah. It's about 450 cubic kilometers.

15-00:46:49

Lange:

It's a — we should know, but we don't — it's a huge volume, all at once, and as a consequence, as a snapshot, and it also has something like ten or 12 different mineral phases, only 5% crystallized, so Ian could apply his thermodynamics. It had the right mineral assemblages. So he wanted to work on it. He got his guy, Wes Hildreth, to work on this body, and when Ian went to NSF — National Science Foundation — to work on this, to raise money, to do this quantitative application of thermodynamics to this — what we call ash flow — sheet — pyroplastic flow — NSF thought, "We've never heard of this. We're not going to do this." The peer review people go, "We never heard of this," so it wouldn't get funded. But Ian was getting funded for other things, so he found the money to squeeze money aside to fund this fellow. Well, when Wes published his thesis, it really made the study of ash flows high fashion, and there was a period of a decade or more where *everybody* went out to study ash flows the way Wes and Ian had, and it really put that out on the map, and people have gone back to this body — this rock outcrop — and for study after study after study, the NSF right now — our program — probably has three or four funded projects — people around the US — to study that same body. It's had more NSF funding — people go back to study the melt inclusion. It's just gone on and on, and we've learned so much, but it began with Ian, and NSF didn't want to touch it.

15-00:48:36

Redman:

Could I ask just for a one- or two-sentence response on that? We've talked a little bit about the NSF reviewers, but is it generally a conservative process, where the NSF reviewers, if there's something that they don't recognize, they'll tend not to fund that?

15-00:48:53

Lange:

Yes, and yet the program director will sometimes intervene, if the PI is someone who has a good record, and I think Ian had that. The other thing Ian did: all those years he was funded for Mexico, he would combine into a single proposal his thermodynamic property measurements with his Mexico work. You really can't do that now. It's not possible now, but he did it then, and it's a way that he got the funding for Mexico, because that is harder to find, because everybody wants to go out and collect rocks from a volcano. It's hard to distinguish yourself, whereas funding for the thermodynamic properties was just — everyone needs that measurements, and no one is in a position to make them. But where Ian was smart was that you would combine them, and that was great. And he had a program director who would — Sometimes the reviews came in good, sometimes they came in not so good, but everyone loved the thermodynamic stuff.

15-00:50:04

Carmichael:

I'd like to interject a comment about reviews. For 17 years, I was the executive editor of a scientific journal, and the publication rate in that was about 50%, and my suspicion — and it's only a suspicion, Sam — is that when

my proposals were sent out to review to various people, some of those people were rejected authors.

15-00:50:34

Redman: So it wasn't a blind review on their side? They knew —

15-00:50:38

Carmichael: They knew me.

15-00:50:38

Redman: Okay.

15-00:50:39

Lange: Oh, yeah.

15-00:50:39

Carmichael: But I didn't know them.

15-00:50:41

Redman: Okay, so they wouldn't have to guess —

15-00:50:44

Carmichael: Oh, no.

15-00:50:44

Lange: Oh, no, no. They have to know who you are. That has been done, because they have to know whether or not you're likely to — when you put in a proposal, you have to show what you've done on your last proposal, so you can't be anonymous that way, but the reviewers are anonymous.

15-00:50:58

Redman: Okay.

15-00:50:59

Carmichael: Now, it's a suspicion.

15-00:51:01

Redman: Does that affect your students?

15-00:51:03

Lange: In what way?

15-00:51:03

Carmichael: Why?

15-00:51:04

Redman: In applying for funding? The fact that maybe an NSF reviewer — let's say, just for the sake of discussion, if a reviewer has a grudge about getting articles rejected by a journal that you've edited, would they see your students' proposals —

15-00:51:20

Carmichael: No, I don't think so. I got some extraordinary comments. I can't remember them now, but they were given at —

15-00:51:27

Lange: He has one like, "Carmichael will continue to bumble and stumble in Mexico until one of his students shows him what the rocks mean." [laughter]

15-00:51:38

Carmichael: I mean, that was an NSF proposal! The other is that "Carmichael did some quite good work in the seventies and eighties, when he had some good students." You know?

15-00:51:44

Redman: Ooh — ouch.

15-00:51:47

Carmichael: Oh, yeah. They can ouchy.

15-00:51:48

Lange: Oh, they're hysterical, because Ian was the man behind it all, so they were amusing more than anything. I would say that for us students, we had the benefit both ways. When you work with Ian, you'd see this generous side. He was a hard taskmaster, and he could be tough to take, you know, when you're a grad student. Very demanding. And so he had a bit of that reputation, because he had high standards, and lots of things got rejected, and people knew that if you were his grad student, you were getting beat up pretty regularly, so I think there was a certain amount of sympathy we engendered. They're like, "Oh, man! You worked with Ian? Oh, my God! How'd you do that?" A certain respect. So we got sympathy, we got respect, and then if you had the big C on your forehead, if you graduated from Ian's program, and they knew if you could get through him, if you got through your orals, and he would sign off on your PhD, if you could survive five years with him, the peers out there — there tended to be quite a bit of respect. Doors sort of flew open for most of us, because of our association with Ian. So, I don't think we got the grudge. I think we got sympathy. It worked to our favor. Now, the other interesting thing about Ian's profile is that — I don't know if you've touched on this — but because Ian came to this country — are our 55 minutes —

15-00:53:27

Redman: We'll do two minutes, and then —

15-00:53:28

Lange: Okay. Because Ian came to this country from England, he didn't really have the support network that those of us who then worked with Ian had. So what happened with him is that Ian would make friends with the best and brightest — these younger people coming along — and he helped. He would write the letters for the guy at Caltech, and helped his promotion — Ed Stolper, and Dave Walker — and they became really good friends, and they tended to be

younger than Ian by five to ten years, 15 in some cases. And the other thing about Ian, Ian never paid any attention — he's the most apolitical person. He'd just say what he thought, he would be very honest in everything, and that didn't always win him friends, but it was when these guys came of age, and they said, "You know what? Ian should be nominated for all these metals like ten years ago." Because he didn't have an advisor in this country. He didn't have academic siblings in this country. It took this younger generation of professors at the places — MIT, Columbia, Caltech — when they came of age, they began to nominate Ian for all these awards, and he then —

15-00:54:44

Redman: And raise his profile, and —

15-00:54:45

Lange: Well, his profile was always high, and people would say, "Oh, my God, Ian," because everyone knew who Ian Carmichael was, but he just hadn't been put up for these metals, and starting about the time that I was a grad student with Ian was when it really started. My first year as a grad student, he got the Bowen Award, and then the floodgates opened up, and over the next several years, he just got every metal in the book. But it was delayed a bit, and it was delayed because he didn't have that mentorship in place in this country, whereas for all the students of Ian's, we had Ian, plus we had — I had my older academic siblings, and they will help. You know, "Hey, we should nominate so-and-so for this metal." So all of us who were Ian's students, we've had the advantage of having the Carmichael name, and not just the Carmichael name. I have all these academic siblings, and for me, I don't know where I am. I'm more toward the end of the generation. But all these famous Carmichael students who did so well, so that when I come along, "Oh, you're another Carmichael student," so I got the benefit of all these other people ahead of me who did so well — Bruce Marsh, Wes Hildreth, Frank Spera, Mark {Iorso?} — they've all... And they helped me in my career. They wrote letters and stuff, so all of Ian's students have had that advantage, that Ian didn't have. So that's one interesting difference.

15-00:56:14

Redman: Fantastic. Well, this would be a good place to change tape, and then we'll pick up from there.

#### Audio File 16

16-00:00:06

Redman: Okay. So, to pick up again, actually, we wanted to talk about how we got a nickname of "That Bastard," instead of Dr. Carmichael, or Professor Carmichael, or —

16-00:00:20

Lange: Yeah. The —Lange

16-00:00:22

Carmichael:

I'd like to address that a little bit, because it comes from — I suspect — from my perception of how you train students to be forerunners in getting a job. To get a job in a university — and most of them wanted jobs in a university — was very competitive. It always has been. In all the years I've been in Berkeley, in the 40 years I've been in Berkeley, to get a job in a university was never easy. There were always a bunch of people there you had to compete with, and it seemed to me that one of the things you had to compete with {inaudible} is your versatility. If you were to and talk to another department about what you were doing, you couldn't just talk in a narrow way about your research. You had to demonstrate your research addressed bigger problems, and that you could address these bigger problems in different ways, and so that there was a versatility to your approach. You had more than one skill. In my view, it was very important. That lead to the fact that very often you had to stick around in graduate school for maybe a year longer than you wanted to do. But looking back, although I may have asked many of them to stick around for another year — and that was true of Hildreth, for example — I always paid people. They were never asked to pay for themselves, and also looking back is if I disagreed with the students in how they interpreted their data, then I didn't want anything to do with being a coauthor, and I disagreed with Wes Hildreth on his famous PhD thesis on the Bishop Tuff, because he believed something, and I didn't believe it, so I told him to go publish it by himself. For many years, a lot of people used to say to me when I was giving a talk, "Hey, don't you know the work about Wes Hildreth?" And that was amusing to me. But Wes Hildreth had every right to publish it with his ideas, and his beliefs, and his conclusions from his data. I might say — in my own defense — he's changed his mind completely, and he and I are in complete agreement nowadays, but he —

16-00:02:30

Lange:

Yeah. His ideas are now known to be wrong.

16-00:02:32

Carmichael:

Right.

16-00:02:32

Lange:

But they evoked lots of debate, and so very healthy for the field, but they did end up being wrong.

16-00:02:39

Carmichael:

So the "Bastard" part was well earned, because it was to try and give people several weapons, if you like, to demonstrate when they went to interview at a faculty job. And I'd say almost without exception, if they wanted a job in a university, they got one. Is that true?

16-00:02:57

Lange:

Well, I'd like to comment more on the Bastard thing, because you seem to think it was one extra year. Most of us took five years, which is the standard, so that really wasn't so much an issue. This is my opinion about what it's like

to work with Ian, and I don't think this is conscious on his part. I think it was unconscious. In general, Ian was *really* hard on first and second year students, especially first year students, and tended to have a really great rapport with fourth and fifth year students. Now, why? And I don't think it was conscious. And of course, if you're an incoming student, all you know is that whatever you're doing, it's wrong and bad —

16-00:03:41

Redman:

And he hates *me*.

16-00:03:43

Lange:

And he's getting on great with the senior guys, the older ones. Okay, so what would happen is that when a first year student came on the scene, Ian immediately wanted to talk science with them, and they wouldn't know squat. And Ian would find this absolutely unacceptable, ridiculous, and if they had to sit in on his class, just seeing them sitting in the back there when they could be off doing research just irritated him, and I don't think it was conscious. I think he just wanted to talk science with these people, and they didn't know anything, and you just had a really hard time with that, and that student would suffer, and their orals would be coming up, and Ian would like, "I can't believe you don't know this, I can't believe you don't know that," and he couldn't take the disgust out of his voice, and in the meantime, the senior students knew everything, and Ian would be talking with them, and so this poor student — everyone around you knew all this stuff, and you didn't know anything, but then what would happen is gradually — and you'd go off on a project, and pretty soon, you would start to know more than Ian did, and Ian would fight you: "That's not right!" And if you would win an argument — and he'd fight you hard — he *loved* to lose an argument. He would be thrilled if you could prove him wrong. He'd fight you like crazy, and you would think, "Oh, God. Now I'm really in for it," because you stood up to him, you told him he was wrong, but you would gradually notice that his attitude towards you was different. He would be — you know? And it was this very slow process. You almost didn't realize it was happening. So our first few years, we thought he was a bastard, we thought about quitting, we thought about leaving, and we knew that we could never measure up to these guys who seemed to be in favor, but then by the time you were in your fourth year, you'd see the poor sod coming through, and history would repeat itself. The other thing is that he had no tolerance — I mean none! — for things like if you hadn't ordered equipment ahead of time, so that if the furnace broke, we were always — he always wanted the data yesterday, and it wasn't because he wanted to get all these papers out. He was just so curious. He wanted to know what the measurement — just this enthusiasm, curiosity. So we'd start something, and he'd want it yesterday, and so if the furnace broke and you didn't have the replacement elements already preordered — of course you could. You could order, and money was never an issue. We always had tons of funding for research, and if we had just not been on top of it — and that's the expression. If we were not on top of it, organized ahead of time — oh, boy. We would get

it! I mean, he had *no* tolerance for that. We had to have our act together. I think that's one of the things that I learned. You just didn't even tell Ian about something if you had blown it along those lines. You tried to hide it from you, because had no patience for that. But if something broke, he was understanding of that, but if you weren't prepared to fix it [snaps fingers] right now, there was no reason for that. But anyway.

16-00:06:52

Redman:

Two questions. First, I'd like to ask if a lot of your students did quit within the first two years, or at one point, you told me that you had asked students to leave, and I'd like to ask about that, and then also, I'd like to hear from Professor Lange about how you work with students, and how it's similar or dissimilar in style.

16-00:017:19

Carmichael:

I couldn't tell you about the students that left. I'd say most of them persisted. Of the 40 I've had, I'd say I've remained close friends or good friends with 20 to 25. Fifteen have just — you know, for one reason or another, we've just grown apart, and of those 15, seven of them got PhDs with me, and I don't know where they are in their careers, I don't know what jobs they're doing —

16-00:07:53

Lange:

Well, they're not in academia.

16-00:07:54

Carmichael:

It's not in academia, so I don't know what they're doing.

16-00:07:58

Lange:

Yeah. He's pretty close to all of us who have stayed in academia, which is the majority of us, but to answer your first question, Don Snyder and myself, we really are the key spot in Ian's stack of students, and there's Victor Kress, Paul Wallace, Kevin {Ryder?}, Gordon Moore, {Donicka Bladder?} behind me, and that's it. Now, if you go above me — older than I am — Don Snyder and I came in together as first year students after a period in which Ian had about —

16-00:08:43

Carmichael:

Five.

16-00:08:43

Lange:

— eight students — five, eight students not work out all at once. He had had all kinds of star students: Wes Hildreth, Gail Mahood, Frank Spera, Bruce Marsh, Mark {Iorso?}, Mark Rivers — brilliant, extraordinarily bright people who have gone off and been at the top universities, and then he had a whole string of people who didn't work out, and I don't know if it's kosher to name names, but —

16-00:09:14

Carmichael:

Mike Bailey, Mike Wopat —

- 16-00:09:16  
Lange: Mike Bailey, Mike Wopat, Dan Stein, Joan Harris, Scott Greg —
- 16-00:09:23  
Carmichael: Right. That's it.
- 16-00:09:25  
Lange: Okay, six people. Then Don and I come along, and I would maintain it was a little hard on us, because Ian looked at us and thought, "You guys are going to be just one more." And so he was trying to figure out whether we were going to be in the bin with the losers — that's all they'd had for — or whether we could be in the tradition of the guys ahead of time, and so I think that Don and I broke that bad streak, but we had tough times with him, because he wanted us to — well, Don Snyder was very brilliant, so he detected that right away, but I wasn't so sure about me. So it was hard. It was hard, because he did have people who quit on him, or more often than not, Ian would fire them. You tended to fire before they quit. And what he would do is he would write them a letter and tell them. Isn't that what you would do? So Don and I would just wait for the letter. We never got the letter, and I was going to be damned if I was going to quit.
- 16-00:10:38  
Carmichael: The principle being, actually, if I had to look back — and it was looking at the notes, too — is if I thought I could learn from a student, then I'd keep that student. If I thought I wasn't going to ever learn from that student, then that led to that letter. "Go work with someone else."
- 16-00:10:56  
Redman: Okay. So you didn't necessarily ask people to leave the university?
- 16-00:11:01  
Carmichael: Oh, no. No, no. That was not my job. I just didn't want to be their research advisor any longer.
- 16-00:11:07  
Redman: Okay. So they would —
- 16-00:11:10  
Lange: Go work with someone else.
- 16-00:11:11  
Redman: And would they often stick around, or —
- 16-00:11:13  
Carmichael: Yes! Some of them stuck around, and some of them didn't.
- 16-00:11:15  
Lange: Some, yeah. Half and half. He had a reputation for a lot of students being fired by him, and so that added to if you said, "Yeah, I worked with Ian." "Oh, you mean you made it all the way through?" They knew that he had a reputation for firing students, and very few faculty fired their students, because usually,

you're just grateful to have a student whom you can work with. You know, it's a buyer - seller's market? So Ian would fire people, and that's not that common.

16-00:11:53

Redman: Okay. Interesting. So, Ian, to switch gears a little bit, if you don't mind, I have a few questions from the other Ian, and I'm forgetting his last name —

16-00:12:03

Carmichael: Gibson.

16-00:12:03

Redman: Ian Gibson. I have a few question from Ian Gibson.

16-00:12:05

Carmichael: Oh, really?

16-00:12:06

Redman: Yes. And he had several science-related questions, and I might need some help on pronunciation. He wanted to know if when in Iceland if you were disappointed to find highly altered rocks at the center of Thingmuli. Is it Thingmuli?

16-00:12:25

Carmichael: Yes, that's right. Disappointed—Let me put that in the context. When I went to Iceland, I was really interested in fresh rocks, because fresh rocks gave me everything I wanted to know. I wanted to know about the composition of lavas, and the composition of lavas, the quintessential thing when they were fresh is they represented, or they came close to representing, what they were like when they were hot and magmas. Now, when you got to the heart of Thingmuli the volcano, it was clear there was an incredible amount of alteration there in the lavas, and it took me a long time to realize that what had happened is that it'd become intensely altered because there was a hot poker, as it were, just underneath it, which is what you expect in a volcano. So after a bit, I realized that it was just a normal geological phenomenon. I couldn't do with the lavas what I wanted to do with the lavas, but you couldn't avoid the significance of what you were observing, namely that these lavas, though altered, had a story of their own, and the story of their own was matched up with the cone sheets, which was that there was a hot poker, if you like, which is high up in the earth's crust, and because of that, the water was circulating quickly, and that circulating water was altering the composition of the lavas. So after a bit, from my initial disappointment came my enthusiasm that in fact we had a phenomenon which was an insight into a way that a volcano evolved.

16-00:13:59

Redman: Okay. Good answer. Thank you.

16-00:14:01

Carmichael: Is that wrong?

16-00:14:02

Lange: No, that's a good answer, I think.

16-00:14:05

Redman: Okay. So the next question he wanted to know, or wanted to hear a little bit about, was about having to abandon samples because of weight constraints in the PZ-19 van in Iceland, and a little bit about that.

16-00:14:20

Carmichael: Well, I'm glad he remembered it.

16-00:14:23

Redman: Could you tell me a little bit about your relationship to Ian Gibson when you answer this?

16-00:14:26

Carmichael: Ian Gibson was an undergraduate student. He was junior to me at Imperial College, and he went to Iceland my second year, and he was also being supervised by this lecturer, George Walker. George Walker had this old fashioned and rather fragile station wagon called an Austin — A-40, I think it was — and George Walker had no mechanical aptitude whatsoever. He was a brilliant field geologist, and no appreciation, really, of how vehicles work, and how you take a vehicle through stream beds, and so for. So when he looked at my pile of rocks, which I'd collected, and he was going to take me back to Reykjavik so he could put his car on the boat, he said, "You can't take all those." And I said, "Oh, you've got to. I've collected them, I brought them back on my back," and he said, "Well, we'll take some of them." But then the car got stuck in the middle of a river somewhere, and both the tires went flat, and he didn't know how to deal with that, I didn't know how to deal with it, and he made me take most of the rocks out — most of the samples out. So somewhere in a river or on the banks of that river are the samples which have got numbers on them, which I had to discard so that George Walker could get that damn vehicle out of the river and back into Reykjavik. One of the interesting things is this — in all the years I've been with students, it's never worried me to let them drive my car, even if it was owned by me, or the university car. It seems to me that they're just as good at driving as I am. George Walker would never let me drive his vehicle. *Never*. And I'd come out of the Army, I'd driven all over dirt roads and all the rest of it. I was a much better driver than he was. I could have dealt with the problem. I took photographs of his vehicle stuck in the middle of rivers, and he said, "I won't give you a PhD if you ever publish those." [laughter] So I couldn't even keep those photographs! I had to give them all to him. So he was very sensitive to any implied criticism about the way he drove, and I had to abandon a lot of the samples. What did it make me feel? Goddamn furious, Ian Gibson! Goddamn furious, it made me.

16-00:16:47

Redman: That's another good answer. So, Ian, I also wanted to know a little bit more about the technological breakthrough of XRF, and how did the new

technology influence the thought on petrogenesis, and a little bit about XRF replacing wet chemistry, and I feel like we've talked about that a little bit, but it might be good to elaborate on.

16-00:17:10

Carmichael: Well, XRF as a routine instrument was coming in just about the time I was finishing my graduate work, and XRF in those days was very good for the trace metals. Trace metals are essentially the concentrations of metals in rocks which are less than half a weight percent, let's say.

16-00:17:29

Lange: Parts per million.

16-00:17:30

Carmichael: Or 500,000 parts per million, something like that. So less than half a weight percent. The particular elements they're concerned with are strontium, and barium, zirconium, and that sort of group. XRF is really good at measuring those. Up until that time, you had to do that by wet chemistry, and wet chemistry had a really hard time, because strontium has many properties just like calcium, and so when you determine calcium, you've also got your calcium contaminated with the strontium in the rock, so it's very difficult to separate the two. But by and large, when I was a graduate student, I didn't worry about the strontium, and I didn't worry about the trace metals that were so important. With one exception: I did worry about zirconium, because that became enormously important in a particular group of rocks I became interested in. So XRF was never available to me, really, in the times that I did my graduate work. It subsequently became not only important in Berkeley, when I came here, not only for the trace metals, but nowadays, it does the whole lot, and that's — I think I explained that somehow to you, I think it was, that it took me a year or two years to analyze my wet chemistry, my 100 rocks. Now you can get that done in two weeks.

16-00:18:59

Redman: Okay. Yeah, I mean, it's just totally —

16-00:19:01

Carmichael: By instrumental.

16-00:19:02

Lange: But I'd like to interject something. First it was XRF that came along, and now that's been sort of replaced by what we call ICPMS, Inductively Coupled Plasma Mass Spectrometry, but — there's a big but here — with the ease of being able to analyze the whole rock composition, including the trace metals, it really engendered a whole — I'd say that something like 80% of igneous petrology went down that path of looking at the trace metals, plotting trace elements versus this, that, and just playing trace element games, and there's been a loss of knowledge in the body field of thermodynamics, because trace metals don't influence — we refer to it as what metal's going to crystallize out when, and so on. Back when Ian was a student, an appreciation for phase

diagrams and thermodynamics was greater than it was by the time I was a grad student in terms of the field as a whole, and some have argued that our discipline, igneous petrology, has hit something of a dead end because of too much emphasis on all the trace elements. So that's another reason why being a Carmichael student has been so potent, because we have been deeply involved with the thermodynamic properties, thermodynamic modeling, and understanding that, and keeping that knowledge alive, and training students with that knowledge, and so on. And so there's been a downside to this —

16-00:20:41

Carmichael: Instrumental bent.

16-00:20:41

Lange: — instrumentation, where people — there's been a certain loss of knowledge in basic thermodynamics, and people forget that hornblende is only stable above a certain temperature, and people invoke it under absurd conditions, because they just want to use hornblende because it holds certain trace elements, without any awareness of its stability. I mean, I exaggerate, but there's a lot of truth to what I'm saying, and it's correcting, now. It's correcting.

16-00:21:11

Carmichael: I'd like to add something to what Becky said. I was trained as a wet analytical chemist, and I think I must have analyzed 1,000 to 12 or 1,500 rocks, and by and large, the high precision of that wet chemistry was not worthwhile on those rocks. What it was worthwhile on was the minerals, which became probe standards, and it was very successful there. But in Becky's time, and just prior to Becky, it became even more valuable analyzing the synthetic liquids, which she put together, and some of her predecessors put together to do experiments on. There's no way you could analyze those with the precision you needed, except by wet chemistry. Is that right?

16-00:21:55

Lange: So, for example, I measured the density of these multi-component silicate liquids, so some of the liquids were simple, like silica, alumina, soda, and the others had alumina, silica, calcium, and so on, and this way, with a finite number of liquid compositions — like 25 — we could sample an enormous compositional space, of which natural liquids occupied a small subset of this nine-dimensional component space, and because we found that the partial molar volumes added linearly, we were successful in doing that, and the same thing happened with heat capacity measurements, with drop calorimetry to measure enthalpies, with sound speeds to measure compressibility. Because Ian analyzed the liquids — experimental liquids we worked on by wet chemistry, if you're trying to extract a partial molar quantity, not only do you need to know what the bulk density is, or the bulk volume, but you need to know exactly how much silica's in there, exactly how much alumina. If you have an error there, then you're going to have error when you try to say, "Well, what's the partial molar volume of silica in this sample?" And so there have been one or two other groups making similar property measurements, but

they would go and send their samples out to XRF or ICPMS with larger errors, and it would introduce an order of magnitude more error on their model than we had, and so having Ian do the wet chemistry was crucial. I continue to do these kinds of experiments, and what I'll do now is I'll take the wet-chemically analyzed glasses, and we'll use them as probe standards so we can get close to the same quality, but we have actual glasses with these similar compositions, but I have my own personal standards. So that's been huge. The wet chemistry was huge. And again, it's serendipity, again.

16-00:23:55

Carmichael:

And it really goes back to Ian Gibson's question. I went from wet chemistry to wet chemistry plus XRF for the trace metals, and then, I've gone completely into XRF now, with two exceptions: it's very difficult to get the oxidation states of iron except by wet chemistry, and that's an enormously important feature of any all-volcanic rocks. So, Ian, we haven't gone totally instrumental yet.

16-00:24:25

Lange:

And that is a whole other branch of research that Ian's pioneered, and owns, really, which is the oxidation state of magmas, and realizing that magmas from different tectonic settings have very different oxidation states and that the process of subduction is a way in which the mantle becomes oxidized, because the oxidizes sea floor goes down and releases fluids that are very oxidizing, and it's Ian's work that has allowed us to quantify exactly how oxidizing, and so Ian has a couple of — well, I don't know — half a dozen papers having to do with the oxidation state of magmas that have astronomic citations, all because he was one of the few who knew how to analyze ferric/ferrous, and with the instrumentation, people stopped analyzing ferric/ferrous. They just do total iron. And Ian kept at it, and he needed to do it, because it influences what minerals will crystallize out when. It ends up being a very important intensive variable, the oxygen fugacity, and for Mark {Iorso?}, who developed the thermodynamic model with Ian — that's another one of my academic siblings — he had to know what the ferric/ferrous ratio was in these magmas, so Ian got different students and postdocs to make these measurements, and these papers have huge citations, and you didn't anticipate it! But they've ended up being some of the most highly cited papers, and then you wrote a single author paper in '91, sort of pulling it all together and explaining what it all means, and that paper has a few hundred now.

16-00:26:09

Redman:

Okay. Okay. Now, Ian Gibson did have one additional question that was a little bit more political: he wanted to know, or have your perspective on, how Imperial College changed shortly after you left. Apparently, there was an exodus of several faculty members left, and graduate students. Can you remember that at all?

16-00:26:34

Carmichael:

How it left *after* I changed. That's hard to respond to, but I can sense what he's getting at. When I was at Imperial College as a young lecturer, I shared a room with a really bright, imaginative, creative scientist, John Ramsey, who was a structural geologist. And he and I had very different ideas about how departments should be organized. Up to that time, the department of geology at the Imperial College was very good in one field — structural geology — and by and large rather conservative, rather traditional in all other fields, of which mining geology is probably its most preeminent field. Then when I left, the department head decided that rather than go and recruit people on a national basis, he just went and appointed somebody that he thought could teach. And remember in those days — it came to me when I was correcting that — the English didn't recruit you to do research. My job description when I became a lecturer was to teach. Had nothing to do with research. And so the heads of departments there were very much more concerned — with the possible exception of places like Oxford, and Cambridge, and Edinburgh, and so on, were much more concerned with making sure the program could be taught properly. And so you tended to hire people who could teach. And so they got a succession of people who taught, but they weren't terribly interested in what was being taught. Nowadays, we would look at it and say, "Yes, you're a good teacher, but you're not teaching up to date material. You can't be that good a teacher. You may be fluent, and you may be well organized, but unless you know modern day material, you're not fulfilling your function." But in those days at Imperial College, no, that wasn't the case. The department chairman didn't want, or didn't feel necessary, to get a bunch of people who are — if you like — trying to push back the frontiers of science. So when I left, frankly, they got someone who was totally second rate, and they got another two or three people like that, but they were convenient, they'd taught well, and I'd say for ten years, the students were probably taught traditional, conventional petrology very well.

16-00:29:01

Redman:

Okay. All right. So we can get back to Mexico or —

16-00:29:06

Lange:

Actually, I have a couple thoughts. I wanted to talk about Southwest Mississippi State and Harvard. Okay?

16-00:29:15

Carmichael:

Okay.

16-00:29:16

Redman:

Okay

16-00:29:17

Lange:

So one of the ways that Ian would motivate us or chew us out — and it would happen at different times — he used to threaten us with Southwest Mississippi State, and I don't even know if such an institution exists, but he would say to us, "If you don't get this done, you're going to end up at Southwest Mississippi

State!" And you really began to feel like you wouldn't have a choice. Like you couldn't leave the field, you couldn't go teach grammar school somewhere, you would *have* to go Southwest Mississippi State, and live there forever. So that was a famous one. The other thing he would do is — and I can remember this so vividly, because he would be seriously upset with us — you know, chewing us out, either I'd be the focus, or someone else — because we hadn't ordered something, or messed up somehow, and he would say to us, "Listen. In three years, you could be a professor at Harvard, and then what are you going to do? You can't get away with this when you're at Harvard. In three years, you could be at Harvard." And you would sit there, and you were thinking, "Okay. He thinks I'm completely useless, piece of poop, and yet he's also anticipating that in three years, I'll be at Harvard." And you realized that he — and I also was very well aware of the people ahead of me who indeed were at places like Princeton and Stanford, and so I knew he was serious. And so you felt like really did believe in us. He really did believe that we could be at Harvard, but we did have to get our act together. We had to be more responsible. And so it helped to push us further. That's the other thing. I recognized with other faculty at Berkeley, and occasionally with my own colleagues at Michigan, that they really don't believe that any of their students will ever match them. They just expect that they're never going to be as brilliant and as accomplished as they are. It's just a given. And Ian was quite different. Ian had this attitude toward us that he expected us to match him, and excel, if we could. He would be really disappointed — I mean, you could detect it — if we weren't matching him. So that was an easy way to disappoint him, is to not go on and excel. And you had a number of really brilliant students, and he was really close to those guys, who would do all this mathematics and math that you weren't familiar with, but you were most comfortable with students — as you say — who you were learning from, and very uncomfortable with students who were less than you. Yeah.

16-00:32:04

Redman:

Okay. I noticed on your online CV that you've had several PhD students, and you have a couple right now, and you've also worked with master's students, and undergraduates. How does Ian's style differ or how is it similar to your style?

16-00:32:21

Lange:

Well, the other thing that Ian did with us is that once or twice a year, you'd take us to — was it Henry's? — he'd take us over to Henry's, and we'd have drinks, and then we'd have dinner, and Ian would pay for it. Every Tuesday, we had a seminar, and we'd have dinner, and Ian would always — every single Tuesday, he'd buy half the bill, so dinner would cost us four dollars, or something. So he was very generous with us that way, and also we were always supported. So he would be on us all the time about papers and about experiments. We never had accomplished enough. It was impossible. Again, we'd start a project, and it should have been done yesterday. In fact, that was always the mentality. That was hard, but we always were financially

supported. If we needed a platinum crucible, we would be — [snaps fingers]. He always had the money. He'd always raise the money for us. Anything we needed to do our research, we had, so we were never without that. So for myself with my students, I've tried to maintain that situation for them. They always have support through the summer, anything they need for the lab, always make sure that I've raised the money for them to do anything they want, and then ride them hard to get things done. I don't think I've had — Michigan is not Berkeley, and so I think the caliber of student is not the same as at Berkeley, but I guess everyone thinks that. But I also realize I don't have Ian's personality. I just don't have his charisma, I don't have his — you know, I'm not the same, so I can't replicate what he was able to do with us, but what I have consciously tried to do is shield them from funding issues, their salary — that's always there — and so in that sense, I've really tried to mimic him that way, and make sure they go to meetings, always have the money to go to meetings, and so they have every opportunity to succeed, and if they don't, it's not because those sorts of things were not taken care of. But he's a hard act to follow.

16-00:34:46

Carmichael:

Have you got any more questions from people from outside?

16-00:34:49

Redman:

These were the questions that were specifically geared towards science, so I thought I would get those in. He also did ask about the weather conditions in Iceland, and I don't know if we had talked about that, but several of the other questions that he had asked, we had talked about. For instance, how you had come to work in Iceland, after initially thinking that you were going to work in Africa, and so forth.

16-00:35:17

Carmichael:

Before you sat down, there was a book there. It's a gray book — gray cover.

16-00:35:23

Redman:

Oh, is it just underneath the sweatshirt there? Is that it?

16-00:35:31

Carmichael:

That's right. Now, I'm looking at the biographical memoirs of fellows of the Royal Society, and in it is the obituary and biographical memoir of my research advisor, a guy called George Walker. I didn't write this at all. It was written by two people who I know. But in this biographical memoir, there's an interesting sort of insight into what I did: "George," that's George Walker, my research advisor, "although an enthusiastic and skilled mineralogist, was never particularly interested in petrology and geochemistry. In eastern Iceland, this gap was filled by I.S.E. Carmichael (FRS 1999), George's first graduate student. Carmichael was given the daunting task of mapping the Thingmuli silicic complex, an isolated and largely uninhabited mountainous area at the head of {Revafjorda?}, characterized by notoriously poor weather. Carmichael completed this work, although the subsequent geochemical

investigation was handicapped by George's forcing the student to discard half of his samples on the long way back to Reykjavik, when the excessive weight caused one of the wheels of George's long-suffering van to fall off.

Carmichael was undeterred, and is now in his sixties. The {inaudible} paper on the geography and petrology of Thingmuli has become a landmark in petrology." Okay. Now, that, I find interesting in an obituary of my research advisor.

16-00:37:04

Redman: The notoriously bad weather is even —

16-00:37:07

Carmichael: Well, that's your answer to the notoriously bad weather. I've no idea who wrote that. Actually, it could have come from Ian Gibson, the person that suggested that, but neither of the people who wrote that obituary know me to that extent, and I don't think they'd know that part of Iceland had notoriously bad weather, so I think it came from Ian Gibson himself. So he's been sneaky. He's asked us to tell about something that he knows more about than we do.

16-00:37:27

Redman: Interesting. Interesting. Okay. We'll talk a little bit about field conditions, thinking about — in Mexico, obviously the weather must have been —

16-00:37:48

Lange: Lovely.

16-00:37:49

Redman: — a little bit nicer than in Iceland.

16-00:37:52

Carmichael: Oh, yes. It's very much nicer. But mind you, I always went in the wintertime, and there were good reasons for that in Mexico. That's when the vegetation is down.

16-00:38:03

Lange: It's dry.

16-00:38:04

Carmichael: And it's dry, and the cornfields are down, and so you can see where the dirt roads are. Once the cornfields are up, and the corn seems to grow — what? — five or six feet, and that's when they get their majority of their rainfall, in the summer, it's very difficult to find your way around. And the maps in Mexico for the gross features are good, but when you want to get to a volcano, you've got to find out all those little dirt roads, which are probably unmapped. Becky tells me things have transformed incredibly in the last ten or 15 years, but when I started down there, the roads were the number one sort of constraint on what you could get to, because climbing through the thorn bushes was not easy stuff.

16-00:38:47

Lange:

The amazing thing: through the nineties, the globalization. Nineties, just things changed dramatically in Mexico, and my era as a graduate student with Ian was the eighties, and so what I remember, we would drive down there, and we would camp every day, and we would drive around these dirt roads, and just pull over to the side and camp. That is not as safe today, and roads that were dirt and isolated are now paved and fast-moving traffic, and so you can't really camp. And the tradition down in Mexico — people don't really camp in Mexico. That's what poor people, homeless people do, so camping — at least in the eighties — was a little bit unusual, but it was also relatively safe then, in a way it isn't now, and what I remember about it, it was just magical, because we'd be working all day, and we'd just pull over somewhere, and bring out all the camping gear, and make ourselves dinner, and sit around the fire, and go to sleep at 9:30 or 10:00 at night, and get up at 7:00 or so — I mean, sleep like nine hours! Whereas back here in Berkeley, we were getting five hours, and sleeping our tail off. But just laying your bag down — no tents. We didn't need a tent. It never rained. We'd be down there in the dry season. And just looking at the stars, and just sitting around a campfire, usually reasonably warm. It was magical. Just all those night upon night upon night, camping in just backwoods areas of Mexico, and now when I go down, we usually fly down, we rent a vehicle, and we stay in like a dive hotel. We won't camp, and we'll just get up — so it's different. We ship our rocks back, and then we get on the airplane. We got to an Office Max in Guadalajara or Tipec, which didn't exist back then, and we FedEx our rocks back to Michigan, so it's completely different, and I feel badly that my students are not experiencing that magic of time slowing down, and camping out, and we'd meet the ranchers. This one guy Luis would invite into his home, and we'd go back year after year, and he would come and visit with us, and so that era has passed, and my students, we go down there for one week, and we can get a lot done — two weeks — but we're not down there for ten weeks. I mean, it was very inefficient. The vehicles would break down, we'd be in the repair thing for a day or two or three —

16-00:41:30

Redman:

But you'd planned for that, essentially. I mean —

16-00:41:31

Lange:

We were down there ten weeks.

16-00:41:32

Redman:

— you'd know.

16-00:41:35

Lange:

Yeah. It was just different. Time slowed down. You were more on Mexican time, and again, it was magical. Every now and again, Ian would get a student down there who didn't like it — didn't like the camping, had allergies, or somehow. Most of us who went down there *loved* it, and we loved camping, and we loved hiking through wherever. But it is true that agribusiness,

agriculture, big business agriculture has hit Mexico, and so now when I have gone down and tried to map, my students and I have access to digital elevation models, software GIS — geographic information systems software — things that were just not available back in the eighties, and we can make exquisite maps now, and do very intensive argon dating of these lava flows, so that we can ask questions now that couldn't be asked back in the eighties. We still have to access the volcano, but we can even do that in a way that we couldn't do back in the eighties, because with the massive big business agriculture, they've gone in, and the flanks of the volcanoes that were *thick* with thorn bushes — impenetrable — have been stripped away, and they're planting agave for tequila, or they're planting sugar cane. And they go to the shallow slope of the volcano, and it's only when it really steepens that they're not planting, but by that time, you get the outcrop, and you could scamper up. So we can now drive — like Sanganguey, Volcan Sanganguey — I told Ian I put in a proposal to NSF to map it in great detail and date it, and you said, "You're crazy. You're not going to go near that volcano. It's just surrounded by thorn bushes." Well, in the last five years, they've put in all these new agave fields and sugar cane fields, we've gotten right up, we've been able to sample everything, and it would have been utterly impossible. So there have been things that have enabled someone like me coming behind Ian, and my students, with the digital elevation models of the roads, and so, so many more things we can do, so we feel privileged, in that sense. We can do more in Mexico scientifically, *but*, we can't just pull over and camp out. We find more padlocks on fences. It used to be there were no padlocks on anything. You could just go in. Now? Land ownership is much more —

16-00:44:10

Redman:

Formalized.

16-00:44:10

Lange:

— formalized, and things are no trespassing, so we're running into those issues, that we only encountered in the US. So there's been that change.

16-00:44:19

Carmichael:

Becky's talked about doing the geology as a graduate student down there, but I think the experience that the field assistants had was something which was so worthwhile for them. They were down there for eight to ten weeks, as Becky said. They weren't going to be professional geologists, necessarily. This was just a continuation of their undergraduate experience, and they were going to become schoolteachers, or I don't know what they were all going to do. Some of them did become graduate students, but not in Berkeley. But for the first time, it was very nice in the evenings, because some of them wanted to read *Winnie the Pooh*. Others wanted to do this. In each case, they brought their individuality and their tastes down there, and I think some of the best times I've had and they've had were just sitting around a campfire at night and just telling stories about where we've come from, what we're trying to do, and where we're going, and all the rest of it. I hope that the 40 or 50 undergraduates who went down there as field assistants look back with as

much favor on that experience as I looked back on having them down there. You spend your first year down there as an undergraduate, right? So.

16-00:45:33

Lange:

Yeah, my first time down there was as an undergraduate who didn't know I would be a graduate student with Ian. I was in the act of applying to other schools, and I became really good friends with his grad students, and that was part of my reasons for staying. I did the easy thing by saying, but it was a mind-opening, mind-blowing experience. I grew up in Oakland — that's why I'm here now, because my folks are nearby, but I had never been out of the state, let alone the country. I had never experienced a foreign language. I had never driven a vehicle on a dirt road. All of it was new. Had a little bit of camping experience, but not a lot. It was just an incredibly exciting experience to do be down in Mexico, and so I think I can identify with what all those 40 other undergraduates experienced. I think the graduate students, too, for many of them, it was a first —

16-00:46:28

Carmichael:

Oh, yes. I don't want to make the distinction, but this was a chance for undergraduates to experience what a research program was like and not become research students or graduate students themselves, and that was important to me, that somehow we could anchor a little bit of Mexico into the undergraduate world.

16-00:46:47

Lange:

And you also had a tradition of inviting another professor or two. You invited Ed Stolper at Caltech, and Don {DePaulo?}, at the time, at UCLA, and —

16-00:47:01

Carmichael:

{Kilink?}, and {Everway?}.

16-00:47:03

Lange:

Professors at different universities — Ian's peers, as it were — to come down for a week, and —

16-00:47:10

Redman:

Oh, great. Let's talk about that a little bit.

16-00:47:13

Carmichael:

Go on, then.

16-00:47:13

Redman:

Who would you select? These professors were in the discipline of geology, but in a different subdiscipline?

16-00:47:22

Lange:

No, no. They were in our discipline, but they were at other institutions. So Art {Becher?} was at UCLA. So Ian tended to pick people who were prominent igneous petrologists, which is what we are —

16-00:47:37

Redman: Right.

16-00:47:38

Lange: — at other universities, and in many ways, it was brilliant, because these were the guys who might see your proposals, and might see your papers, or sometimes — I don't know if you were quite doing it for those reasons, but people who were largely experimentalists. One interesting thing about our discipline is that it tends to be the case that the people doing the experiments tend to be the most famous, the ones with the most metals, the ones at the most premier institutions. And again, that goes back to the people doing the experiments tend to be — everyone needs that experimental data, whereas the people doing the fieldwork who *only* do fieldwork tend not to get recognized as much, getting back to what we were talking about earlier on. So Ian tended to invite the experimentalists down, and expose them to what he was actually doing in the field, so it did tend to lean toward the — although you did invite Charlie. Did Charlie ever make it down?

16-00:48:38

Carmichael: No. Nor did Cathy {Hashmond?}.

16-00:48:41

Lange: Yeah, he invited a couple of field-based people. And it's interesting, the field-based people are the ones who ended up turning him down: "Well, next year." But the experimental types, they — [snaps fingers]. They asked —

16-00:48:50

Redman: They loved having the opportunity.

16-00:48:51

Lange: Oh, yeah. To go with him? Oh, yeah. They leapt at it.

16-00:48:55

Redman: Let me ask about — obviously, you were inviting both people that were doing experiments and people that were in the field, but —

16-00:49:04

Lange: Well, in our discipline.

16-00:49:04

Redman: Right. And we talked a little bit earlier about giving ideas to graduate students, and it seems as though you were happy to share ideas before they'd gotten to the stage of publication, and before even getting to the stage of conference presentations, and so I'd like to ask a little bit about — you hear scientists all the time being concerned about being scooped.

16-00:49:29

Lange: Right.

16-00:49:29

Redman:

And about how it's to your benefit if you share ideas, and bounce ideas off of people, and learn from people, and ultimately, these are going to be the people that are reviewing your ideas for the NSF, and for journals, and for peer review. I know that's a little bit of an abstract question, but —

16-00:49:49

Carmichael:

Do you want to start?

16-00:49:50

Lange:

Well, sure. I think that it's hard — because Ian had the field program in Mexico, there tends to be a certain unspoken turf thing. People weren't going to come down and work on the same volcano Ian was, because they're like, "Well, no. Carmichael's there." So there wasn't a worry about getting scooped on place. In terms of the experiments, Ian was the only one — certainly in the US — doing these kinds of experiments. They were very unique. So there's absolutely no worry about getting scooped on that either. With NMR spectroscopy, he was the first one with a lot of these things. So I don't think it every occurred to you about being scooped.

16-00:50:40

Redman:

Okay.

16-00:50:41

Carmichael:

Do you want to talk a little bit about NMR, because that —

16-00:50:44

Redman:

What is NMR?

16-00:50:46

Carmichael:

Okay, there you are. See.

16-00:50:48

Lange:

Do you want to do it, or do you want me to do it?

16-00:50:48

Carmichael:

You do it, a little bit, because —

16-00:50:49

Lange:

Okay. Well, I was on the scene, so when I was a graduate student — in fact, when I was his undergrad, transitioning to grad school, Ian had had a graduate student — this Jonathan Stebbins — who stayed on to be a postdoc, and the idea was that he was going to work on this ultrahigh temperature calorimeter to measure the enthalpy — again, thermodynamic property — of silicate liquids at *really* high temperature. That was a really big deal, a very expensive project, but there was a time delay between getting the funding and building the apparatus, and so here he had this postdoc who's just twiddling his thumbs, so one of the things this guy did was to help me with this little side project, but in the meantime — this is classic Ian. Ian, how did you know Alex Pines?

- 16-00:51:41  
Carmichael: I don't know.
- 16-00:51:42  
Lange: Alex Pines is a chemistry professor who was involved with NMR spectroscopy —
- 16-00:51:46  
Carmichael: Nuclear magnetic resonance.
- 16-00:51:48  
Lange: Yeah. And so Ian thought — Ian constantly was doing this. He'd be funded to do A, but he'd take half of that funding for A and do B. That's another thing I've learned from him. You've got to do that.
- 16-00:52:03  
Redman: So that wasn't a problem?
- 16-00:52:06  
Carmichael: It turned out to be a problem.
- 16-00:52:07  
Lange: Yeah, most of the time, NSF is better about it than DOE.
- 16-00:52:12  
Carmichael: Right.
- 16-00:52:13  
Redman: DOE is?
- 16-00:52:13  
Lange: Department of Energy. But it ended up being brilliant, even though — so, DOE tends to be more, "We gave you this dime to exactly this." NSF is, "You're intending to do this, but just do something brilliant." Okay? Well, NMR spectroscopy had been traditionally applied toward low temperature fluids and minerals, and a lot of biological applications, and so on, and you thought, "Look, I've got this money. I'm going to hire a postdoc in chemistry." So Ian brings in this guy, Jim Merdoc, to do NMR spectroscopy on some minerals, and everyone at this time wanted to know what the structure of liquids are — liquids at high temperature. Magnetic liquids at high temperature. If you quench a liquid, it quenches to a glass, so people had been doing a lot of different spectroscopic techniques on the quenched glass, and thinking, "Well, that'll give us the structure of the liquid, because when the liquid freezes into the glass, it freezes in the disordered structure of the liquid," so glass is different from a mineral with periodic structure, but we knew that liquids were different from glasses, because they had thermodynamic properties that were different, there was a big difference in lots of property, so Ian had this idea — do you want to do it?
- 16-00:53:35  
Carmichael: No, you go ahead.

16-00:53:36

Lange: Okay, so Ian had this idea for how to actually do an NMR spectroscopic measurement at the high temperature where the silicate liquid is a liquid, and this was a huge big deal, because everything had been done a low temperature on the glasses, not on the actual liquids, and the idea — you got it from a piston of a —

16-00:53:57

Carmichael: No.

16-00:53:57

Lange: Of a —

16-00:53:58

Carmichael: Steam engine.

16-00:53:58

Lange: — train. Of a steam engine. So the furnace is here, and the magnet for the NMR is over here, and you can't put this furnace into the magnet. You know, it wasn't going to work. So what he did is just designed this piston so that it would go in and out of the furnace so quickly it stayed at temperature, and when it pulled out, they would take the NMR spectra, and when it went in, it would heat up, and it was just so fast that they were able to — and I made a bet with this man. He owes me \$1 million, because a couple of years after, they had published the results of this first NMR spectra on a liquid — they published it in *Nature*, and I made a bet with you that you said you'd never published a paper in *Nature*, and I said he had in the last ten years, he said he hadn't, and we bet \$1 million, and I reminded him of this paper on this NMR spectroscopy, but that's a side issue. But it was a huge breakthrough, because up until this point, people thought that silicate liquids were like polymers, like hydrocarbons, were chains, and so if you melted a particular mineral, different minerals have different — some are frameworks, some are chains, the silica tetrahedral are linked together in different ways with different minerals, and we had all thought — I was taught as an undergrad, and up until Jonathan did his experiments — that when you melted those minerals, those polymers, the way the silica tetrahedra would link together persisted in the liquid, and what Jonathan and Ian showed was that with the NMR spectroscopy, which is at a radio frequency — you know, on the electromagnetic spectrum, it's the radio frequency range — that the silica oxygen bond, which is covalent, extremely strong, the strongest bond there is, actually breaks and reforms, and breaks and reforms, and this totally blew away our concept of how a liquid differs from a glass or from a crystal, and it explains so much. It explains the enhanced compressibility, it explains the enhanced thermoexpansion, it explains everything of why the liquid is so utterly different than the glass, why a thermodynamic property measurement on the glass, which is easy, is not —

16-00:56:17

Carmichael: Valid.

16-00:56:17

Lange: — analogous to the liquid, and you have to actually make the property measurement of the liquid, and so that was a huge, big deal, and Jonathan Stebbins has gone on to Stanford, and all he does is NMR spectroscopy, and he's got his hands full, and that's all the guy does.

16-00:56:34

Carmichael: On liquids.

16-00:56:35

Lange: Liquids. And he's a guru in that, and he was originally going to work on high temperature calorimetry, which he did his thesis on, and so on.

16-00:56:46

Carmichael: He went down to Mexico for one year, even.

16-00:56:47

Lange: Yeah, he even went down to Mexico, but there's so much to do. Just opened up this field, and it's just one example of that. There have been many others.

16-00:56:54

Redman: Fantastic. Well, I have to change tape here, and so we'll take a little bit of a break.

[End of Interview]