

BILL BELLCHAMBERS

Edited transcript of a recording of Bill Bellchambers interviewed by Chris Eldon Lee on 12th December 2011. Transcribed by Andy Smith, 3rd September 2012.

[Part 1 0:00:00] Lee: This is Bill Bellchambers recorded by Chris Eldon Lee on the 12th of December 2011. Bill Bellchambers, Part One.

Bellchambers: William Henry Bellchambers. I was born in Alverstoke, 10th of July 1923.

[Part 1 0:00:20] Lee: So you are now 88? Are you commonly called Bill?

Bellchambers: Yes, these days. The family used to call me Will, but now everybody seems to call me Bill. I don't mind.

[Part 1 0:00:36] Lee: What was your common name when you were down in the Antarctic?

Bellchambers: They called me Bill down there, yes.

[Part 1 0:00:43] Lee: Tell me a bit about your parents. What did your father do?

Bellchambers: My father was a Royal Marine. In fact I come from a long line of Royal Marines: grandfather, great grandfather and great great grandfather. But he was also a marathon runner in the Royal Marines, so he got special privileges.

[Part 1 0:01:09] Lee: Did you not fancy the Royal Marines yourself?

Bellchambers: I would have gone into the Royal Marines but I had poor eyesight and I failed the medical.

[Part 1 0:01:22] Lee: Oh, so you did apply?

Bellchambers: Yes.

[Part 1 0:01:25] Lee: At what age?

Bellchambers: Seventeen when I applied. I then tried to become a writer in the Royal Navy because that was an easier job – easier from the medical point of view – but again they would only offer me the duration of the war. I was looking for a career.

[Part 1 0:01:59] Lee: So what happened instead? Where did you end up in your first job?

Bellchambers: Well I then went to the recruiting office and volunteered for the Hampshire Regiment.

[Part 1 0:02:11] Lee: Right. Did you see active service?

Bellchambers: Oh yes: North Africa and Italy, but mainly Italy. That was an experience.

[Part 1 0:02:28] Lee: When you were demobbed, did you have a career in mind?

Bellchambers: Well I did. I was going to go into horticulture. In fact I went to training college for while, but then the land that my father had was confiscated by the Labour Government to build a school (which they never built). They built housing on it in the end.

[Part 1 0:03:01] Lee: I can tell it still rankles.

Bellchambers: Yes. So I had to fall back on what I knew and that was radio and radar.

[Part 1 0:03:11] Lee: So how did you come to know about radio and radar? That was from your war years?

Bellchambers: Well, I was in the Hampshires and there was a call for volunteers. I forget how it was worded at the time. I thought 'That sounds a good thing.' So I volunteered and they sent me to Swansea Tech to learn radio. I passed that and then they sent me to a radar school up in Bury in Lancashire. I had various other college training: Leicester College of Art and Technology, Northampton Polytechnic in London. So I became a radar technician.

[Part 1 0:04:22] Lee: Had you had any earlier interest in that kind of world? Had you had a crystal set or smuggled under the blankets and listened to short wave radio?

Bellchambers: Not that I recall. No, I was more aviation minded actually. No it was completely new to me.

[Part 1 0:04:46] Lee: How did you take to it?

Bellchambers: Well initially I made hard going but then suddenly it all clicked and I made quite a lot of progress. Of course in those days it was all very hush-hush.

[Part 1 0:05:12] Lee: Oh really? You signed the Official Secrets Act?

Bellchambers: No, I did not. Not as a soldier.

[Part 1 0:05:20] Lee: You were already covered?

Bellchambers: Yes.

[Part 1 0:05:24] Lee: Who was it hush-hush from?

Bellchambers: In general even the local people never knew what went on in these training colleges, the Army ones like the one at Bury. The only freedom you had was on the more advanced courses at Leicester and Northampton Polytechnic, because there you were not dealing so much with radar, you were dealing with techniques.

[Part 1 0:06:07] Lee: How do you mean, Bill?

Bellchambers: Well, you were learning about some of the advanced equipment, not as equipment but as elements of the equipment, such as magnetrons, special valves and so on.

[Part 1 0:06:29] Lee: So you were dealing with the latest technology, were you, the cutting edge?

Bellchambers: We were yes.

[Part 1 0:06:33] Lee: Before it was in common use?

Bellchambers: Yes.

[Part 1 0:06:35] Lee: I guess the trick was not to tell the Russians, right?

Bellchambers: Well yes or the Germans for that matter. So I was attached to a searchlight unit using radar. It was a time when the bombing was coming to an end in London. I was north of London near Stansted. There was not much going on so I volunteered for overseas service.

[Part 1 0:07:24] Lee: So, sorry, I misunderstood. The radar work was during the actual war itself?

Bellchambers: Oh yes.

[Part 1 0:07:29] Lee: Right. I thought you were talking about the post war phase.

Bellchambers: No, no.

[Part 1 0:07:31] Lee: Oh I understand perfectly why it was all hush-hush then. Were you learning things that you were surprised at? Did sometimes the technology take you by surprise, that this was now possible?

Bellchambers: I cannot say I did. I knew it was all new and advances were being made all the time, so it was a case of continual updating of knowledge on what was the latest elements of the equipment.

[Part 1 0:08:10] Lee: How long were you there for, at the radar training school?

Bellchambers: Oh I had several visits. I was first of all at Bury; I was there for about three months. I was also at Twycross, Gopsall Hall in Twycross. That was again several weeks.

[Part 1 0:08:46] Lee: So over that whole period of time that you were learning, could you actually see advances being made, in that window of time?

Bellchambers: Oh yes.

[Part 1 0:08:55] Lee: Such as?

Bellchambers: Well the equipment that I was originally used to was rather crude in many ways. Things like the cathode ray tube – which is now superseded – the cathode ray tubes that they made, the guns were not run very efficiently. Consequently they used to put a ring round the end of the tube to encourage the electrons to impinge on the glass. They could not get it to work, and of course that was 400 volts. There was not much current there but quite often when you took the covers off, you touched this ...

[Part 1 0:09:53] Lee: ... and you got a shock?

Bellchambers: Oh yes, I got plenty of shocks.

[Part 1 0:10:00] Lee: So once the war was over, did you then stay in that kind of work, in the radio/radar work?

Bellchambers: Yes.

[Part 1 0:10:06] Lee: Working for who?

Bellchambers: I joined the Ministry of Aviation. They sent me to Heathrow. That was rather fun in those days because the old vehicles we had were all ex wartime vehicles, continually breaking down. We used to have to go between the airport and the transmitting station which was Fags [phonetic] Road. I dealt mainly with navigational aids, which have now been superseded, but also I had a spell at the transmitting station. That was fun. We were doing a watch system in those days. I was not too familiar with the equipment there. Hard work. Then they sent me up to the Shetland Islands and I was looking after the navigational aids and the communications there – everything from putting up new masts to answering the telephones at times.

[Part 1 0:12:07] Lee: What was your first awareness that there was a place on the planet called the Antarctic?

Bellchambers: Oh that was when I was a boy. I used to read about Scott and Shackleton at quite a young age, I suppose. I cannot remember precisely.

[Part 1 0:12:40] Lee: That captured your imagination?

Bellchambers: Yes. It was always with me you know, that, and when the opportunity arose to go down, I took it.

[Part 1 0:12:50] Lee: Well how did that opportunity arise, because it sounds like you had quite a good career going?

Bellchambers: I did really. I was at Birdlip radio station.

[Part 1 0:13:08] Lee: In Gloucestershire?

Bellchambers: Yes, and I looked after the receiver side. There were two stations: the transmitting station which was stationed our way. We were doing North Atlantic radio-telephone with aircraft. The reason I left was: I was a bit unhappy in some ways I suppose but I saw an advertisement in the *Wireless Engineer* (I do not think it is published today) by the Royal Society, asking for people to apply for ionospheric research in Antarctica. I did not have much hope of getting it.

[Part 1 0:14:16] Lee: Why not?

Bellchambers: I did not think my qualifications were good enough actually.

[Part 1 0:14:25] Lee: Did you understand what ionospherics were, by that point?

Bellchambers: Oh yes.

[Part 1 0:14:29] Lee: So you worked with that kind of area?

Bellchambers: Yes, because the frequencies that we were using were dependent upon the ionosphere.

[Part 1 0:14:41] Lee: So you already had a working knowledge of the ionosphere?

Bellchambers: Yes. Also we had some cooperation there with what was the Radio and Space Research Station, and Dr Shearman from there, he used to come down to Birdlip quite often because he was interested in what was called backscatter. That is some of the energy that is reflected off the ionosphere is also reflected back. The initial backscattering was from the Earth's surface or the sea, and then came back via the ionosphere. I got on very well with him and I learned a good deal more about the ionosphere through him.

[Part 1 0:15:45] Lee: So you and he had made a connection prior to the application for the job?

Bellchambers: Yes, that is correct.

[Part 1 0:15:50] Lee: Was he on the interview board?

Bellchambers: No. The interview board was under the chairmanship of Wordie.

[Part 1 0:15:59] Lee: Oh really?

Bellchambers: Yes and there was ...

[Part 1 0:16:10] Lee: Sloman?

Bellchambers: No. Sloman, he was FIDS. This was nothing to do with FIDS, not in the direct sense anyway. There was a representative of all the disciplines, different disciplines, on the board. There was Met Office, I don't know whether I will find a book in a moment.

[Part 1 0:16:43] Lee: Alright. Just let me get this right in my mind. Did you apply to FIDS or did you apply to somebody else?

Bellchambers: I applied to the Royal Society.

[Part 1 0:16:51] Lee: Right. Who were doing that work on behalf of FIDS?

Bellchambers: No, no.

[Part 1 0:16:55] Lee: So there was no relationship at all?

Bellchambers: There was no relationship at all, except Royal Society were using Crown Agents who also looked after FIDS.

[Part 1 0:17:07] Lee: What did you make of Wordie?

Bellchambers: I liked Wordie. Of course he was probably about my age then. [laughs] He was a very pleasant character, and as you might expect, he knew his Antarctic.

[Part 1 0:17:28] Lee: But you didn't of course? Do you remember any of the questions they asked you? Was it a tough interview or was it a gentlemen's agreement?

Bellchambers: I was very nervous, particularly with the bigwigs on this long table, but no I did not have any difficulty with the questions and I remember Sutton I think it was, who was in charge of the Met Office at the time, he asked me whether I felt I could service the radar which was used for tracking the balloons. I told him I did not doubt I could service it. Anyway following that, they wrote and accepted me. Then, to my amazement, they gave me the leadership of the group.

[Part 1 0:18:33] Lee: I know it is a long time ago, 60 years ago now so you may not remember, but did you ever get the sense that they were sussing you out as a human being, to see what sort of chap you were. Whether you would cope with the claustrophobic conditions at Halley Bay?

Bellchambers: Well there was an element of that, I think, because: I cannot remember the name of the chap that was on the board, but they were asking questions which ...

[Part 1 0:19:09] Lee: About your temperament?

Bellchambers: Well I suppose so. Now I recall that they did ask questions about it being isolated down there. Did I feel I could live under those conditions and work with others? Yes.

[Part 1 0:19:46] Lee: And you got a letter saying 'Please come and join us.'?

Bellchambers: Yes. Of course I thought then I would have to leave the Ministry of Civil Aviation, but then they wrote and said that they would get my secondment from the Ministry so that suited me fine. I think it suited them too.

[Part 1 0:20:16] Lee: So at that point or shortly after that point, did you then know where you were going to go. Did you know you were going to go to Halley? Had you heard about the IGY (the International Geophysical Year)?

Bellchambers: Yes, well I knew it was the International Geophysical Year but I do not think I knew until shortly after I had, amongst others, an invitation to go and see Fuchs in Victoria Street. That is when I suppose I learned about the two expeditions going South together and that we were going to Halley Bay and he was going to Shackleton.

[Part 1 0:21:24] Lee: Tell me about that process of getting down there in those days. I guess you sailed all the way?

Bellchambers: Yes. We left London Docks. I have forgotten the name of it now but it was near London Bridge, and we sailed on the *Magga Dan* which was a new ship and the Royal Society had a yacht in which they followed us downstream. There was quite a good crowd to send us away actually. Butler's Wharf, that was the name of the place. First stop was Madeira; we stayed there I think, about 36 hours and then on down to Montevideo.

[Part 1 0:22:36] Lee: When you say 'we', was this the entire Halley Bay staff going down together?

Bellchambers: Yes, and Fuchs' expedition.

[Part 1 0:22:45] Lee: Oh right. OK.

Bellchambers: We stayed a few days in Montevideo and then went to South Georgia where they were still whaling in those days. We took on board a lot of Australian beef when we were there, just stowed it on the decks because it was cold. That was pretty tough meat, that was! And then of course we went into the ice. That was a new experience because suddenly everything went calm as you approached the ice. It was evening time too and the weather was quite good. Suddenly everything was calm. That was very special. Then of course we were in the ice, but I must say that in reading (and I have re-read it recently), Fuchs blames the sea ice for the delay in getting to Halley Bay, whereas in fact what happened was: the *Magga Dan*, you could con the ship from the crow's nest and the repeaters had to be synchronised. What happened was they coned the ship for a while from the crow's nest and then they did not re-synchronise the two. The result was we turned south, right into the hard stuff, but he does not acknowledge it, but that was the reason. Of course it was not Fuchs' fault; it was the crew's fault.

[Part 1 0:25:12] Lee: So when you got to Halley Bay, what actually was there? Was it '56 you arrived?

Bellchambers: We got there January '57.

[Part 1 0:25:24] Lee: What was to be seen, if anything, at Halley Bay?

Bellchambers: We steamed along the ice cliffs for a couple of days I think it was, and then we landed and of course we also had the *Tottan* coming down. She was ahead of us actually because she had avoided the ice. One thing that struck me then, which had not struck me before, was how cold it was now, although the sun was shining. We were on a heated ship, in cabins. It was quite nice. Of course the Advance Party had put up the hut and they were waiting for us when we came in. We then had to unload not only the *Magga Dan* but the *Tottan* as well, and we only had these Ferguson tractors which were terrible things.

[Part 1 0:26:47] Lee: In what way?

Bellchambers: Well they were farm tractors. All they had was chains on, and they used to bog down and you could not pull a very heavy load, particularly during the daytime so quite often we had to work at night-time. So called night-time; it was daylight all the time, but when the surface was harder. But even so, we used to get bogged down. Anyway I think it took us about five or six days to unload the two ships.

[Part 1 0:27:41] Lee: What kind of state was the hut in? How sophisticated was it? Or is that the wrong word completely?

Bellchambers: Well it was largely a bare hut, and of course they had the small power generators in the hut, which had to come out, because we had a new hut to build for the diesel generators. We had a number of huts to build. There was the magnetic hut, the balloon hut, ... What was obvious when we got there was that the snow already was well up the sides of the hut and there was a big windscoop downwind from it. Of course it had windows in, the last thing you wanted there. So quite early on the hut got completely buried and the only way out was through the roof, so that had to be constructed.

[Part 1 0:29:12] Lee: You say that the conditions in general in Halley Bay in '57 were little different from those of the Scott and Shackleton expeditions you read about as a boy?

Bellchambers: That was my view. I suppose the clothing was more advanced, but we were in a big bunkroom. There were two bunkrooms: one was big, one was small, so that housed all 22 of us. That was heated by stoves. All the usual things like keeping the ventilators clear from snow and so on. You had to do everything for yourself, well not for yourself but for everybody. Snow had to be melted for water. The toilet was a barrel set in the snow inside the hut initially, with just a wooden top on it. Then when the barrel was full up, it had to be carted out. Now of course when the hut got buried, we could no longer do that so what we did was we made a big drop by keep pouring boiling water down. It melted a big hole and we had to keep it going that way.

[Part 1 0:31:29] Lee: Inside the hut?

Bellchambers: Inside the hut.

[Part 1 0:31:31] Lee: So there was a hole in the floor of the hut, down to the ice below?

Bellchambers: Yes, but in order not to ... The only thing that was taken outside was ... We always used to use the pee-can before we went and sat down because otherwise that would have frozen down there in no time and made things difficult. So I think the only thing we took outside was the pee-can.

[Part 1 0:32:11] Lee: What about other domestic things like washing clothes and even washing yourself.

Bellchambers: On the first occasion I was there we had a bath. That came round every ten days. That was the opportunity to wash your clothes and to have a bath but of course you had to make the water ready for yourself. There were two of us normally on each day. We had to fill the tank, make sure it was heated properly for your bath and for washing the clothes.

[Part 1 0:33:00] Lee: How did you get rid of the used bath water?

Bellchambers: That was bailed out most of the time. It used to have to be bailed out and taken outside, because it did not work satisfactorily to put water down in the snow.

[Part 1 0:33:31] Lee: It does all sound rather fundamental.

Bellchambers: Yes.

[Part 1 0:33:37] Lee: Did you take to that, because ...? How did you cope with those kind of primitive conditions, for want of a better phrase? Did you adjust to it naturally?

Bellchambers: Oh I think so. You have to be adaptable down there. If you cannot adapt, you would not survive. The second time I went down, we did not have a bath; all we had was a watering can with a hose on the end. You filled that up with hot water and you had a shower.

[Part 1 0:34:18] Lee: You watered yourself?

Bellchambers: Yes.

[Part 1 0:34:28] Lee: So you had to build a hatch in the roof to get out of the hut, and a stepladder I guess inside.

Bellchambers: Yes. Of course that was convenient for the auroral observer as well.

[Part 1 0:34:48] Lee: But wasn't there a danger that the snow would settle on the hatch, on the outside?

Bellchambers: No because there was mainly drift snow, and it normally drifted from the same direction. Occasionally we had a snowfall. Also the heat from the hut used to help to keep it clear I think.

[Part 1 0:35:18] Lee: So what about the working conditions, then, because you had to set up was it a 'beastie' you built?

Bellchambers: Oh we had what was called a beastie, yes. We had other equipment as well. We had two transmitters, pulse transmitters. We had to set out a number of small aerials to measure the drifts in the ionosphere. I had to erect a 75-foot mast for the ionospheric transmitter. I also built the feeders for the base transmitter and put those aerial masts up as well.

[Part 1 0:36:33] Lee: Were you building this gear actually in the Antarctic?

Bellchambers: We were putting the masts up, yes. I mean we had to construct gantries to carry the insulators and the feeders. There were two big rhombic antennas that I built, so that was eight 50-foot masts in the case of those. That was where my experience in Shetland came in useful. So they all went up without any great difficulty but of course the real problem was: I mentioned earlier there was this when the drift on the hut, downwind there was the hollow and of course that soon filled in once the hut was buried and then the strain came on the stays (on the mast). There was always something to do there.

[Part 1 0:37:59] Lee: Were you getting interesting results from your ionospheric experiments?

Bellchambers: Oh yes.

[Part 1 0:38:05] Lee: Was this the first ionospheric work in the Antarctic?

Bellchambers: No. It was the first at Halley Bay. Previously there was one (it was at the same time) at Port Lockroy. That was the highest latitude one at that time.

[Part 1 0:38:26] Lee: So what kind of results were you getting, which impressed you?

Bellchambers: We could follow the development of the ionospheric layers and also we could measure the height of those. We used to sound, normally, every quarter of an hour on the ionosonde. But then we did measurements of absorption, and there were Special Days when we did extra runs. What we could tell was the effect, as one might expect, of sunlight on the upper atmosphere, but also we began to study the effect of sunspots because there was a degree of correlation between the aurora and what we used to call blackout, when you could not see anything because the absorption was so high, low down. So we were able to measure the E-layer, F1, F2 and the amount of absorption.

[Part 1 0:40:28] Lee: Were some of these figures taking you by surprise or was it exactly what you expected?

Bellchambers: In quiet conditions, it was more or less what we expected. What we did not know was how the ionosphere would behave in a magnetic storm, that is when the sunspots – the particles from the sunspots – hit the Earth's magnetic field, how they interfaced with that. You see Halley Bay was in a very fortunate position because we were at high latitude, 75° 35', but at the same time the magnetic latitude (that is from

the magnetic pole) was very low. It was about 66. So we could separate things which were due to the sun exposure from those which were due to the sunspots.

[Part 1 0:41:56] Lee: So your equipment was able to tell you when sunspot activity was happening?

Bellchambers: Yes. [sound of teacups clinking and biscuits being munched] We were just outside the auroral zone at Halley Bay. The result is that when you get magnetic activity, the auroral zone expands, so we came directly under it and you could see this effect quite easily, what was happening with the upper layers.

[Part 1 0:42:55] Lee: How reliable was the equipment you were using?

Bellchambers: I would say very reliable. Do you mean from the breakdown point of view.

[Part 1 0:43:13] Lee: Mm.

Bellchambers: The ionosonde was the one that gave us more trouble than anything. We had a big transmitter for the absorption, a more powerful one, which was handmade at Radio and Space Research Station, and that never gave us much trouble at all. But there was always the calibrations to be done, to make sure that what you could see was what was happening.

[Part 1 0:43:58] Lee: What were you doing with the information you got? Were you able to then send it straight back to the rest of the planet, so to speak? Was it going back to London?

Bellchambers: No, we never sent back detailed information. We wrote up what we were seeing and that was sent back.

[Part 1 0:44:26] Lee: On a yearly basis?

Bellchambers: From Halley Bay. Communications were very difficult at times, unreliable, but I think (as I said in my answer to the questionnaire thing) radio operators were using Morse code at that time, with Port Stanley, and they could often work through terrible conditions, terrible ionospheric conditions that is, and of course if they missed a part, they could ask for a repeat. So yes, we were not that isolated in that sense. We also had a circuit with London at times, but that was very unreliable. We ??? [inaudible] the BBC actually, at that time.

[Part 1 0:45:31] Lee: Were you aware of what was happening to the information once it got to London? Were you seeing both sides of the process; not only the gathering of the information but also how useful it was to other people later?

Bellchambers: Yes, because Dr Piggott at Radio and Space, he was the expert on the Antarctic upper atmosphere and he would write back to me. Also he wrote a paper which he gave me credit for, while I was still down there.

[Part 1 0:46:26] Lee: Did you get out much?

Bellchambers: I did.

[Part 1 0:46:30] Lee: Because it was not really a sledging station, was it?

Bellchambers: No, that was the trouble. To start with of course, none of us had any Antarctic experience. Even the base leader, Colonel Smart, only had I think a fortnight up in Canada, northern Canada. It surprises me, thinking back, that the Royal Society could consider putting 22 people down there with no experience of the Antarctic (none of them) and expect them to stay in their huts. So the first thing I did in my spare time was to go on a long ski trip. We went down the coast, three of us, skied down not a great distance – 17 miles I think it was – but at least it gave us some exercise. Jim, one of the meteorologists, he put up snow drift stakes so we could measure them again to see what the drift was. Then I got a bit more ambitious. I wanted a sledge we could take a tent on and stay overnight but there was no sledge. There were several little 6-foot sledges for carting boxes around the dump and I decided to build a sledge in my spare time.

[Part 1 0:48:40] Lee: Describe it to me.

Bellchambers: Well first of all I had to get the runners and I got the runners from two of these small sledges. That was hickory. I decided, because there was hard sastrugi, it was better to have a rigid sledge that you could bounce over the sastrugi. Otherwise with these flexible sledges which FIDS used to use, those used to dig in. You would have to lift it up and push again and then it would be level again. So I decided to build a Greenlanders' sledge. The only thing that worried me was joining these two runners together to make a long runner. All I had was Araldite so I tried to make as good butt joints to this join, and it lasted. So that was the sledge that we used. We were able to then go travelling for three or four days.

[Part 1 0:50:19] Lee: This was all manhaul, wasn't it?

Bellchambers: Manhaul, yes, but great fun.

[Part 1 0:50:31] Lee: Any snags on the way? Did you hit any crevasses or ... ?

Bellchambers: We got down to the crevasses – the crevassed area to the south – but the only time I fell down a crevasse was near the base.

[Part 1 0:50:54] Lee: What happened?

Bellchambers: I was walking with two others, just out for a bit of exercise. I was walking along lighting my pipe in the lead and suddenly: down I went. But fortunately there was a snow bridge and I landed down this snow bridge, but with their help I managed to scramble out. But I often felt the snow bridge would go. Yes, my own fault; I wasn't looking where I was going. There was a bridge on top, that was what I broke through. I should have seen that, seen the signs of it anyway. But then I landed on a lower snow bridge. I was more annoyed I lost my matches.
[laughter]

[Part 1 0:52:01] Lee: Just to digress for a moment, were there any regulations about smoking pipes inside an Antarctic hut, or smoking anything inside an Antarctic hut? Because fire was always a worry, wasn't it?

Bellchambers: Oh we had fire drills and things.

[Part 1 0:52:18] Lee: You didn't have to go outside for a cigarette or a pipe?

Bellchambers: No. Lots of the lads used to smoke cigarettes, which I dislike anyway.

[Part 1 0:52:31] Lee: So on these manhaul home-made sledges, you went out for three or four days, did you? Was it purely recreational or were you doing some research work as well?

Bellchambers: No, I would not say research work, but we were doing some observations. What we were originally trying to look for was a way up the Dawson-Lambton Glacier (so-called but it is not a glacier). The overspill of the ice onto the shelf there. It was thought to be a glacier and certainly it has a glacier front into the sea. Always we took a meteorologist with us and he used to do wind-speed measurements and accumulation studies. On one occasion we decided that we would go for a week. That was going to be special. The second night on the ice shelf we experienced the wind rising and you could see these little whirlies, like little tornadoes and they run around. I had never seen them before. I thought 'Well that is indicative of a storm coming.'

Bellchambers: So we decided to pitch the tent and by then it was really raging. You know the tents had a leaf that came out and you could pile snow on those, you see, to keep the tent ... But of course the wind was so strong, it was blowing the snow away as quickly ... We had to keep going outside to put more snow on. Jim, who was measuring the wind speed, he had a hand anemometer. The last reading he got before it broke was 80 knots. We were there two days I think. We were making plans for what to do if the tent went because clearly there was that likelihood any time. But anyway we hung on and suddenly it dropped but that was really the end of our trip. We had lost too much time so we had to come back.

[Part 1 0:55:59] Lee: Just going back a little bit. In your notes you very kindly supplied, you talk about the first year (1957) was the most memorable. 'Our scientific observations were very exciting, as we discovered new phenomena.' I wanted to ask you that question. I don't think we quite got to the end of it, did we? So what were you discovering that was breaking new ground with, I presume. your ionospheric work?

Bellchambers: Yes, well we were able to see the effects of the magnetic activity because that had been measured separately. We could see the decrease in the ionisation at one level and the increase of another. When I say 'level', I mean 'height'. In the UK you never see these effects and how quickly they occur sometimes. Looking back, one of the things we used to do was to make what was called an f-plot. It was, if you like, a frequency plot. We had time along the bottom; frequency going up. We could plot the critical frequencies of the various layers on this f-plot every quarter of an hour throughout the day. Then you could compare this

with the previous day and so on, and you could see how the changes came about. So we were able to get a picture of the onset of radiation from the sunspots to the time the magnetic field calmed down again.

[Part 1 0:58:47] Lee: This was all ground-breaking stuff because it had not been done in the Antarctic before?

Bellchambers: No.

[Part 1 0:58:52] Lee: Did it feel important at the time? Did you have a sense of special occasion about it all, or was it just what you did?

Bellchambers: I did not think of it being particularly clever or anything but I was aware that we were making the observations which were of value. I had two other fellows with me, working on the ionosphere.

[Part 1 0:59:28] Lee: Was the work you were doing going to change the way we went about organising our communications on the planet?

Bellchambers: Well it is possible but you see the start of Sputnik changed everything.

[Part 1 0:59:51] Lee: How do you mean?

Bellchambers: Well, satellite communications came into being. We were able to track Sputnik down there. Because we were at such a high latitude, we could get the various track bearings of Sputnik any time it came round. There was a lot to be learned but I think (and this was a decision I made in later years) was to give up ionospheric research because of satellites. The reliability of satellite services today is ... They can send information back in real time from Halley Bay to Cambridge, something we could never have done.

[Part 1 1:01:12] Lee: Let us just pause for a moment. I will just change the tape. Thank you.

[Part 1 1:01:15] [End of Part One]

[Part 2 0:00:00] Lee: This is Bill Bellchambers recorded by Chris Eldon Lee on the 12th of December 2011. Bill Bellchambers, Part Two.

[Part 2 0:00:10] Lee: There were, Bill, one or two rather unusual incidents in your first couple of years at Halley back in the '50s. One in particular concerns a leopard seal.

Bellchambers: Yes.

[Part 2 0:00:21] Lee: What happened there?

Bellchambers: Robin Smart, the base leader, and I used to go down to Emperor Bay as it was called then, quite often, mainly to look at the penguins. He was doing a study of them. There were no penguins on this trip when we went there. There was open

water. There was sea ice but there was open water farther out. We approached the ice edge and there was this what turned out to be a leopard seal. Robin was convinced it was a seal. I had seen seals before, both the crabeater and the Weddell seal and this looked like a different thing altogether. So I thought at the time it was a ... because of his head too, that it was a leopard seal. It just sat there with its head on the ... and Robin went up to it and even tapped it on the nose. I stood back. I was not convinced. Anyway we both withdrew a bit and then suddenly this leopard seal leapt out. We both ran. I am convinced that all that saved us was that we had taken off our packs and put them on the sea ice.

[Part 2 0:02:40] Lee: Your rucksacks?

Bellchambers: The rucksacks yes. This seal stopped to look at them and by that time we were out of range.

[Part 2 0:02:49] Lee: Were you ever reunited with your rucksacks?

Bellchambers: Oh yes. The seal went back eventually into the water. Robin was not convinced even afterwards that it was a leopard seal.

[Part 2 0:03:08] Lee: The Midwinter's dinner, which nearly turned into a bonfire?

Bellchambers: Well we were all sat down at table and Robin had this silver lamp – a spirit lamp – which had been given him by his fellow officers I think. He decided he would light it. He put paraffin in it and suddenly the whole thing flashed up. He jumped back but David Cansfield, who was the fire officer, he had a fire blanket and he managed to smother it. The reason was: he put cold paraffin into the lamp which then expanded and of course it overflowed. It just went....

[Part 2 0:04:17] Lee: Robin Smart, your base leader, was he accident prone, because it was him that had a medical problem?

Bellchambers: Yes. He fell on the ice in Emperor Bay, not while I was there. I was not with him at the time. He had his camera inside his anorak and he fell down. This broke a rib which then punctured a bile duct. He was very bad. It was touch and go with him at one time.

[Part 2 0:05:01] Lee: Really?

Bellchambers: Oh yes.

[Part 2 0:05:04] Lee: What time of the year was this? Was this in the winter?

Bellchambers: I think it was early spring; it must have been.

[Part 2 0:05:25] Lee: So an evacuation was possible?

Bellchambers: Not then. Not in those days, no. There was no possibility of getting him out.

[Part 2 0:05:36] Lee: So what was done about it, Bill?

Bellchambers: They got medics in London giving advice. I remember the carpenter built a wedge to keep his knees up. I think that helped a bit but we did not have the medicine that was necessary, on the base. But they did have some down at Shackleton and Fuchs agreed to send up the planes as soon they could dig it out, with the medicine. They also sent up their doctor. But although we put out a beacon for them to home on, for some reason they went right by. I think they were following the ice cliff and then they got the ice cliff up the Dawson-Lambton and so passed south of us. Anyway they were getting short of fuel so they had to land and they were about 70 miles north of us. Then Fuchs decided to send up the Otter to locate them which they did, but I always remember listening to them on the radio because Alan Rogers, the doctor at Shackleton, was phoning England. I do not know where it was relayed from but he was talking about them flying over the Dawson-Lambton. It was a bit of a joyride for them I think. Anyway I prepared a sledge and a tractor to take us out to where we thought they were but Fuchs said not to go unless the weather got worse. So John Lewis, the pilot of the Otter had tried. So we never went. They refuelled the Auster and they both flew into Halley Bay, no problem.

[Part 2 0:08:53] Lee: And what happened to Robin?

Bellchambers: Robin by that time was on the mend. He was able to walk out and meet them. No we were very worried about him at one time.

[Part 2 0:09:12] Lee: But he recovered fully?

Bellchambers: Yes, he did and he got promoted to Major General afterwards.

[Part 2 0:09:24] Lee: Where was Fuchs at this time? Was he not actually on the TAE then?

Bellchambers: Yes.

[Part 2 0:09:30] Lee: So he was phoning instructions from his tractor somewhere in the Antarctic? When you said 'Fuchs arranged for, agreed to send a ...'

Bellchambers: Fuchs was still at base, at Shackleton. They had not started yet.

[Part 2 0:09:44] Lee: But when it did start, were you able to follow its progress at all, the TAE across the continent?

Bellchambers: Yes at times we did but I did not listen in much. I was never impressed with Fuchs as a leader.

[Part 2 0:10:11] Lee: Why not? What was missing?

Bellchambers: What was missing was getting people to do things. He left them to their own resources and things did get done. We let two people go down to help him out and they were absolutely disgusted with the state of the place down there. He was such a nice chap, Bunny, but he could not tell people 'This must be done.' or 'That

must be done.' He delegated but he did not follow up to see it was done, which was, in my view, surprising.

[Part 2 0:11:11] Lee: Whilst we are still talking about Robin Smart, the reason why he was in the Emperor Bay was to try and find out about the mating habits of emperor penguins?

Bellchambers: Yes.

[Part 2 0:11:23] Lee: What did you discover?

Bellchambers: Well we had been going down quite a lot, normally during normal day hours even though it was winter. We never saw any sign of any sexual activity at all, and the view that was expressed at that time I recall was that the emperor penguin mated before they came down. I suggested to Robin one day 'Perhaps we should go and camp out at night as they might be like some humans.' So we went down and pitched a tent on the sea ice there. There were something like 100,000 emperor penguins there, all hooting away and every so often we would go out and have a look round and see whether anything was happening. Then suddenly we saw two of them 'at it'. Then it was obviously quite a common thing.

[Part 2 0:12:49] Lee: They mated at night?

Bellchambers: Yes.

[Part 2 0:12:53] Lee: Even though it was daylight?

Bellchambers: No, there wasn't daylight.

[Part 2 0:12:57] Lee: There wasn't? No, it is winter isn't it, yes? And you were able to establish the gestation period then?

Bellchambers: Yes, that's right.

[Part 2 0:13:05] Lee: Was this the first time it had been observed, the gestation period?

Bellchambers: Well we thought it was, but I understood that the French, at Terre Adélie, had discovered the same thing a few days before us. So I was told. I don't know.

[Part 2 0:13:22] Lee: I have got the sledging report here from your 1957 expedition, using the original 6-foot manhaul sledges. It was Easter Sunday, 1957. 'One single day journey, of 26 miles, took place on Easter Sunday '57. Then the next real chance to go sledging was not until after the winter was over.' That was when you put together your super-duper sledge isn't it?

Bellchambers: Yes. The first time we took the sledge, I cannot recall what the date was but it was only a two-day affair I think.

[Part 2 0:14:13] Lee: 'During the winter, Bellchambers dismantled the two worst of our 6-foot sledges and made one 10-foot 6-inch manhauling sledge.'

Bellchambers: That's right.

[Part 2 0:14:23] Lee: 'The upsweep of the runners in front was increased by steaming and bending. Ground clearance was increased, and the rear handlebars were fitted.' Does this ring bells? 'And then a compass was fitted to the rear handlebars. Manhaul harnesses were made out of broad canvas and terylene rope was used to make the traces, but we had no sledging wheel. TAE kindly supplied us with some of their spare meters and it was the intention to make a wheel but this was never done. Therefore all routes and distances had to be worked out from bearings taken on fixed points. For 1958, a 12-foot manhaul sledge, with Tufnol runners, has been requested, complete with sledging wheel and meter.' Did it ever arrive?

Bellchambers: Yes, it did. Yes. It wasn't popular.

[Part 2 0:15:17] Lee: It wasn't?

Bellchambers: No, because it was bendy.

[Part 2 0:15:24] Lee: OK. Let us move on then, to How many years were you there then in the 50's? How many winters did you do in the 50's?

Bellchambers: Four. Well I did '57, '58 and then '64, '65.

[Part 2 0:15:38] Lee: So let us move on then to the '60s. What happened in the '60s ('63) to lead you to go back South again?

Bellchambers: Well the Royal Society asked if I would go again for the International Years of the Quiet Sun. That was the opposite of the IGY, when the sunspots were rarest. Well I mentioned earlier Dr Piggott, he wanted me to go as well. I thought it would make a nice pair of researches, sunspot max and sunspot min.

[Part 2 0:16:40] Lee: How would they know it was going to be a year of minimum sunspot activity?

Bellchambers: They cannot be sure. That is why it is a year long. But normally it is an eleven and a half year cycle.

[Part 2 0:16:58] Lee: That had been observed over the last few decades?

Bellchambers: Yes, over the last hundreds or so years. Precisely when it comes, you do not know, but having it as a year, you are sure to get it (the peak or the lowest number).

[Part 2 0:17:23] Lee: Why was it valuable to witness that and to record it?

Bellchambers: As there was a likelihood of being little activity on the Sun, then there should be fewer storms and so the main effect on the Earth would be solely the solar rotation.

[Part 2 0:17:59] Lee: Right, so were able to kind of get a base reading, if you like?

Bellchambers: Yes.

[Part 2 0:18:02] Lee: An uninterrupted or undisturbed set of readings.

Bellchambers: That's right.

[Part 2 0:18:06] Lee: OK, good, thank you. You did some sledging on that trip as well, a bit more organised this time?

Bellchambers: Yes.

[Part 2 0:18:13] Lee: There was a trip in November, for three weeks, in November to December '64, and you were going out to set up a new ionospheric station, a remote station. So we have got to a point now where there were stations outside the Halley Bay base itself?

Bellchambers: Yes.

[Part 2 0:18:29] Lee: Can you tell me about that?

Bellchambers: Well it was rather strange how it happened really, because when I was at Radio and Space, preparing to go South the second time, there appeared in the equipment room there an American ionosonde, which was only about this size.

[Part 2 0:19:00] Lee: A large suitcase.

Bellchambers: I cannot remember what the number was. I thought to myself 'That is useful. You could carry that on a vehicle.' So I asked if they would like to give it to me for the expedition, because I then thought: while we could measure drifts at Halley Bay, drifts of the ionosphere, we could not tell whether they were just localised phenomena or a much broader one. I thought 'If we can get Belgrano and Halley Bay and this other station ?? [incomprehensible], we could measure the drifts over that area.' I then had to find some mobile generators, and of course I did not have much money in the budget, because Beynon at Aberystwyth, who was controlling the budget, wanted as much of the grant as he could get for his university.

Bellchambers: Anyway I got two small petrol generators and again I suppose I made a mistake because up on the plateau the air is dryer and the slip rings wear badly on the generator. That was the trouble; they broke down after a while. So we did not get a very long run. Also the ionograms which I got from Belgrano were not very good quality. So although we could see one or two features, it wasn't really a scientific job. But of course they did meteorology out there as well. There were two of them left in this caboose, and as Fuchs said, it opened the way to the Pole, that way. Gordon Bowra – he was the doctor on the second spell – he had done a lot of sledging down

there and he led the team as far as the route was concerned. But I must admit that the trip from the ice shelf up onto the plateau was a bit hairy: 25 miles of crevasses. But I will say the tractor drivers do their job because when you start to go, there is only one way you are going to get out and that is: give it the gun and keep driving, because you will get rid of the soft snow and you will get some harder stuff underneath, and you get out. That happened several times, well three or four.

[Part 2 0:22:42] Lee: In the sledging report, which is November 1964, you were now ascending and you reach Stake 1052, at about 6000 feet. '... although as the barometer was broken, there way no was of checking this. The effect on the vehicle performance was considerable.' So presumably the high altitude really did not ... The tractors did not like the altitude. Is that correct?

Bellchambers: They did not pull as well on the higher altitude, the Muskegs. Of course we had a big load, going out. We had to pick up drums as well, of fuel. Coming back there was no problem because we had lighter loads. Also, I suppose, we were going downhill.

[Part 2 0:23:41] Lee: And the ionospheric station you set up only lasted for a short time, you say?

Bellchambers: Yes. It was only active for a short time. About six weeks I think.

[Part 2 0:23:54] Lee: How were the results, generally speaking? Did you get what you wanted in terms of the low sunspot activity readings?

Bellchambers: Not for the outlying one, no. It was regrettable, but I have to admit it was a bit of a failure, from an ionospheric point of view.

[Part 2 0:24:16] Lee: Did you enjoy it?

Bellchambers: Oh yes.

[Part 2 0:24:18] Lee: And was it different, now you were working under FIDS I guess? Did that make a difference from the Royal Society? Was it better organised, worse organised?

Bellchambers: There was more, I was going to say disciplined attitude. I think the Royal Society, once they gave you a job to do, they left you to do it, whereas with BAS there were always restrictions on certain things. I say restrictions, limitations is probably better.

[Part 2 0:25:04] Lee: Would that be because BAS was more aware of what might go wrong?

Bellchambers: Possibly, yes.

[Part 2 0:25:17] Lee: I am thinking now, of course, of the following year, in October '65 when the Muskeg went down the Tottanfjella crevasse and three guys were lost: Wild, Wilson and Bailey.

Bellchambers: Yes.

[Part 2 0:25:30] Lee: What was your first knowledge of that?

Bellchambers: I was listening on the radio because we had not heard from them. In the ionospheric hut I had a very good receiver there, so I used to listen as a broadcast.

[Part 2 0:25:51] Lee: What did you hear? Did hear Ross himself?

Bellchambers: Yes, and then I realised there was this terrible tragedy. I went across to the main hut and they had got the message too.

[Part 2 0:26:09] Lee: They knew as well, did they?

Bellchambers: Yes, they had heard the message.

[Part 2 0:26:12] Lee: They had heard themselves?

Bellchambers: It was a disaster that should never have happened, in my view.

[Part 2 0:26:20] Lee: Why do you say that, Bill?

Bellchambers: Only one other person knows my views on this, and that is Gordon Bowra. Apart from Dai Wild, none of the others had any dog training. They never did any dog training during the winter or the early spring. So none of them, including Ian Ross, did not know how to drive a dog team. The other thing is: they were late in the season and while this has some attractions in that you can often see the lids of crevasses late in the season. At the same time, a lot of the lids are stronger early in the season. Late in the season there is a slight curvature where the lid sinks slightly and you can see the lines whereas early in the season there is no sink in the lid and it is stronger too you see.

Bellchambers: And so the third problem I had is that this equipment which they had supposedly for detecting crevasses. Now this was not a big crevasse. I have got a picture somewhere of it. It was a work of art to get a tractor down it. If the tractor had stayed where it was, it could not have gone down, but because it stuck its nose down, down it went. Of course it squeezed everything. But I come back to the point I made earlier. When you get onto a crevasse, there is only one way out and if you don't take it, you are a gonna, and I think what they did: they detected the crevasse, put the brakes on – nosedived. That is my view.

[Part 2 0:29:27] Lee: What difference did the fact that they had not worked with dogs make, because the dogs were not actually in the front, were they?

Bellchambers: No.

[Part 2 0:29:32] Lee: Should they have been?

Bellchambers: No, that's alright, but you see Ian Ross who was sitting on the back sledge with the dogs had never driven dogs, so when they went down, he was saved. The sledges bored up on the crevasse, so he then tried to harness the dogs and get back to the depot where there was a radio, because everything had gone down the crevasse. He went around for two days apparently – that is my understanding – trying to get the dogs to behave to get back to the depot there.

[Part 2 0:30:25] Lee: But that would not have saved anybody, would it? My reading of the situation is that they were all dead more or less straight away. One lived a bit longer, Bailey.

Bellchambers: One lived a bit longer, that is true, and Ian said that he could hear the screams. He could not go down and he stayed until it was all quiet.

[Part 2 0:30:51] Lee: One of the theories I heard, and it might have been Gordon Bowra, was that they should always have had the dogs in the front, before the tractor.

Bellchambers: Well that is a good way of proceeding.

[Part 2 0:31:04] Lee: Because the dogs would detect the crevasse?

Bellchambers: Yes because dogs have a sense about these things, a good dog leader does anyway, but then you have got to drive the dogs. Yes I hadn't thought of it. No there are ways round it, but you would have to have had the dog team separate from the tractors. I am not sure though, when you think about this, if the dog team had been up front, whether this would have been any different, because the dog team would have probably just run straight over it. No problems.

[Part 2 0:32:03] Lee: Two questions then really. One is what was it like back at base? It is a bit of a crass question but I would be interested to know what your answer is, and I will come to the second one in a moment.

Bellchambers: Well of course we were all a bit depressed. I was particularly upset because I was very fond of Dai Wild. He used to come over to the ionospheric hut where I was on night watch and sit there and we used to chat. But the other thing of course was that Ian Ross would have been in the tractor if he had not swapped with the doctor. Now the doctor could not stand the cold. That was the reason. In my view he should never have been allowed to go there because he could not stand the cold and there we get Ian Ross let him have a place in the cab because he was so cold. Unfortunately Ian was saved and he is dead.

[Part 2 0:33:32] Lee: Did anything change, the practices or procedures change as a result of the accident? Did they rethink the way they went about that kind of travel, that kind of expedition?

Bellchambers: Not to my knowledge, not to my knowledge.

[Part 2 0:33:57] Lee: You were there South, on that occasion, for just two more years, for the winters of '64 and ... ?

Bellchambers: '64 and '65, yes.

[Part 2 0:34:07] Lee: And then you came out?

Bellchambers: Yes.

[Part 2 0:34:09] Lee: Did you know that was going to be the last time you would ever go to the Antarctic, or was it the last time?

Bellchambers: It was the last time. No I did not think I would go again.

[Part 2 0:34:25] Lee: Did you not work for them again though at some point?

Bellchambers: Oh yes, I used to lecture sometimes at Cambridge, and when I was back in the Ministry I had a lot of contact with Fuchs.

[Part 2 0:34:50] Lee: Why? What sort of contact was that?

Bellchambers: Well we were trying to get BAS to register their frequencies that they were using, and Fuchs did not want to do that.

[Part 2 0:35:16] Lee: Why not?

Bellchambers: I think he wanted to remain more flexible, and also the fact that they never had registered any frequencies so why do it now? But the thing was that if they were registered, they could get some protection, whereas the situation that existed was that they had no protection anyway.

[Part 2 0:35:52] Lee: Was that symptomatic of FIDS at that time, that it was really a one man band, it was a kind of monarch: and what he wanted when?

Bellchambers: To a large extent. I mean it was quite a small organisation at that time and Bill Sloman, he used to rule the roost, but it was a peculiar system in some ways because the Governor in the Falkland Islands had a lot of say in things. I suppose he had overall responsibility for what went on in British Antarctic ... There was another chap ... They had some sort of headquarters in Port Stanley as well.

[Part 2 0:37:26] Lee: Are you thinking of Johnnie Green?

Bellchambers: I do remember Johnnie Green, yes.

[Part 2 0:37:31] Lee: There was a gap of nearly five years between your first Halley trip and your second Halley trip. Was there a noticeable change in the conditions after five years leave of absence? Was it much better than it had been in the IGY year as a base?

Bellchambers: I don't think so.

[Part 2 0:37:55] Lee: It hadn't moved on? It hadn't improved?

Bellchambers: Not really. Some things were worse, some things were better I think but of course we now had another hut, built on top of the other one, and leaks were always a problem. The heat of the hut used to melt the snow and then it used to find a gap.

[Part 2 0:38:28] Lee: So the second hut was already underground by the time you got back down there, was it?

Bellchambers: Oh yes, it was underground before I left the first time. I don't know when they took this other hut down but it was already partly buried then. There was a big shaft up from the second hut, as I recall. It was already buried when I went down.

[Part 2 0:39:15] Lee: Had the beasties been upgraded between the '50s and the '60s?

Bellchambers: Well the only change that was made really was that instead of using 70 mm photographic paper, we used 35 mm film. That made a big difference because it was easier to process the film, than that 70 mm paper.

[Part 2 0:39:50] Lee: And what about communications with the rest of the planet, surface communications? Was it easier to get through to Stanley and London?

Bellchambers: I think most of the time there was an improvement, yes. I remember we arranged with the Ministry for their transmitter to be used for communication between Birdlip and base. Now it worked for a while, but I think the real trouble was that they did not have an aerial at Birdlip in a polar direction. Most of their rhombics were facing the North Atlantic. The only other one was Singapore. They were not prepared to put up an aerial specially for us.

[Part 2 0:41:27] Lee: Can I pick on a couple of other things in your working life, which are not directly connected with the Antarctic although I guess there must be some cause and effect? I was interested to read that in the early '60s, working for the Ministry of Civil Aviation, that you worked on the effect of cosmic rays on the Concorde.

Bellchambers: Well that was because I knew something about cosmic rays.

[Part 2 0:41:55] Lee: In what way was Concorde affected by cosmic rays? I appreciate it was flying high.

Bellchambers: Well it was the radiation effect on the people in Concorde that would have been the problem because cosmic rays will go through almost anything.

[Part 2 0:42:17] Lee: So the passengers were all being dosed up, were they?

Bellchambers: Well that was a possibility. Not under normal circumstances but when you had a particularly heavy burst there was that possibility.

[Part 2 0:42:36] Lee: Did that come to pass at all?

Bellchambers: No, not to my knowledge.

[Part 2 0:42:42] Lee: I don't remember Concorde being grounded during sunspot activity. So you were trying to work out whether or not it would have an effect.

Bellchambers: Yes.

[Part 2 0:42:51] Lee: And there was no conclusion?

Bellchambers: The conclusion was that unless it was exceptional, it would be OK.

[Part 2 0:43:06] Lee: And you were involved in the Automatic Landing System at Heathrow Airport. What was that, Bill?

Bellchambers: Well the idea was that you could measure the flight path of aircraft landing. You could measure the force which it hit the runway with. There were various things about this which at that time would have been useful to airlines. So I was appointed manager there and I was getting the system up and running, but unfortunately workers used to quite often cut the cables. Oh dear. Yes there was not much coordination between the workers and the tower. So that was always a setback when the cables were cut. But in the end of course the reliability of the Automatic Landing System, not the measuring system, the landing system itself, was becoming so reliable that because most of the landings (you probably know) are automatic. The pilot does not control them these days.

[Part 2 0:45:03] Lee: I wish you hadn't told me that.

Bellchambers: Well it is very reliable. He monitors in case anything should go wrong. But basically they are monitors now, to a large extent, pilots.

[Part 2 0:45:19] Lee: So you were in on the ground floor of that technology, were you, the early stages of developing the automatic landing?

Bellchambers: Yes.

[Part 2 0:45:29] Lee: Was your role purely management or were you actually at the cutting edge of that development?

Bellchambers: Well I was developing the technology.

[Part 2 0:45:41] Lee: So automatic landing at airports is down to you, to a certain extent, is it?

Bellchambers: Oh I would not go that far.

[Part 2 0:45:50] Lee: No, but you were in the team?

Bellchambers: Yes.

[Part 2 0:45:53] Lee: OK. I might have got this wrong but were you also involved in the early development of mobile phones?

Bellchambers: Yes, in many ways. From a frequency point of view, use of frequencies, yes.

[Part 2 0:46:10] Lee: Tell me a bit more about that, Bill.

Bellchambers: Because everything was analogue years ago, and the fact that the MoD had a lot of spectrum allocated to them, there was not much spectrum available for mobile telephones. One of the jobs I was doing was trying to seek sharing possibilities, but also because I was responsible for engineering across the spectrum, that is from low frequency to very high frequencies, extra high frequencies, the only way we could find spectrum for mobile phones in those days was to get some of the spectrum back from MoD. But it wasn't just mobile phones. I mean they controlled the spectrum for certain radars which we wanted to introduce and they would not give up the spectrum, and yet they were not really using it. They put spectrum aside for a rainy day.

[Part 2 0:48:09] Lee: How did you break that conundrum?

Bellchambers: Well it is interesting because we arranged trials up on Salisbury Plain with equipment that they had, and from our point of view the trials were quite satisfactory. So the MoD allowed us to use the spectrum, but of course another aspect of it was that internationally it was not supposed to be used for military purposes, that part of the spectrum.

[Part 2 0:49:10] Lee: In this wonderfully varied career that you had, how does the Antarctic rate?

Bellchambers: Well today, I don't think about it much but years ago it meant a lot to me because I think it helped my career.

[Part 2 0:49:42] Lee: So having done four years in the Antarctic, it wasn't a handicap? It was a good line in your CV, was it?

Bellchambers: Well it did me no harm, but I like to think that they thought I was a bit of a 'get up and go' chap.

[Part 2 0:50:05] Lee: Most Fids are. Why has it faded in status in recent years? You say you don't think about it much now. Is it simply because it is such a long time ago?

Bellchambers: I think it is because it is a different world today. To us who went down in the 50's and '60s, it was a pretty hard life. Not that that worried us but when you look back, it was a hard life, whereas today, you do not actually get cold at all. Even the people who go down for the summer, it is like a summer holiday for them. They have never wintered. There are people who have wintered of course, but look at the conditions they have got: running water at Halley Bay now, flush toilets.

[Part 2 0:51:40] Lee: Central heating?

Bellchambers: Yes. I don't begrudge them that, but it is a different world. When people talk about the Antarctic, they are looking at today's situation. Perhaps this is why, as I said earlier, we were not far different from Scott.

[Part 2 0:52:13] Lee: It is exactly a hundred years since Scott reached the Pole, next month, and it is only in the last 30 years things have changed, it seems to me, after you stopped going.

Bellchambers: Well perhaps that is the reason. [laughs]

[Part 2 0:52:36] Lee: No you can't take the blame for that, Bill. It has been a real pleasure to talk to you. Thank you very much for your time.

[Part 2 0:52:54] [End of Part Two]

ENDS

Possible extracts:

- Why *Magga Dan* got stuck in the ice. [Part 1 0:22:45]
- Toilet arrangements at Halley Bay. [Part 1 0:29:12]
- Sledging with a homemade sledge. [Part 1 0:46:30]
- Close encounter with a leopard seal. [Part 2 0:00:21]
- Medical assistance flight from Shackleton lands short. [Part 2 0:05:36]
- Bellchambers' opinion of Fuchs as a leader. [Part 2 0:10:11]
- Penguin mating puzzle solved. [Part 2 0:11:23]
- A remote ionospheric observatory. [Part 2 0:18:13]
- Comments on the 1965 crevasse accident. [Part 2 0:26:12]
- Things are easier now. [Part 2 0:50:05]