

**Dr. Arlo Landolt**  
**10 April 2001**

**Brian Shoemaker**  
**Interviewer**

(Begin Tape 1 - Side A)

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*BS: This is an oral interview with Dr. Arlo Landolt taken as part of the Polar Oral History Project, conducted by the American Polar Society and the Byrd Archival Program of the Ohio State University on a grant provided by the National Science Foundation. The interview was conducted in Dr. Landolt's home in Baton Rouge, Louisiana, by Brian Shoemaker on the 10th of April 2001.*

*Dr. Landolt, it's a pleasure to be here in Louisiana at your home. This is your interview. This is for you to express and run the tone of things in the manner that makes you feel comfortable. As you go along, I'll ask you questions, but I'll try not to interrupt you. However, you want to do it from when you got interested or what developed your background in getting you selected, forward. Who's your mentor, is a good question to start with. So, it's up to you.*

AL: Well, I'll start with just a brief comment about the background. I was born and raised on a farm in Illinois about 40 miles east of St. Louis, and went to Miami University in Oxford, Ohio, for my undergraduate work. At the time I went to school, I thought I wanted to become a physicist and/or do mathematics work. By the time I ended up my undergraduate career at Miami in 1955, I had developed some interest in astronomy. I looked around for graduate schools and there was a graduate school that ended up

interested in me. I ended up going to Indiana University in Bloomington. The department chair's name at Indiana was Frank Edmondson, in those days. He's still living. And he was an interesting character with twinkly eyes. The kind of person who was bubbly with information and enthusiasm. He had the task for the graduate students and I was the one to do it, to look after certain library work and efforts. And Edmondson had this task of incoming library publications from around the world for astronomy. Other information got thrown in this big box which I had to go through periodically and file and there was something in there on something called the IGY. I didn't know what it was about at the time, but I read about it and in particular, there was a job of interest to me as an astronomer at Climax, Colorado, at the High Altitude Observatory which had been started there by Harvard people or some people related to Harvard anyway. And the person running that operation was Walter Orr Roberts. I applied for a position with the IGY for work that would have been done at Climax, to study the sun. I didn't get the job. I vaguely remember it went to some French person, but I don't really remember. Someplace along in there, I met or was introduced to a Mr. Oliver, and I don't remember if he was with part of the IGY or whether he was associated with the Air Force Geophysics Laboratory in Boston, but at any rate, I learned more about the IGY possibilities and Antarctic possibilities through talks with him and some other people. It's been so long ago I don't remember without going back to old notes to try to find out.

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I went to Indiana as a graduate student in astronomy. I start there in the fall of 1955, and it was in that first year that I came across this job of looking after library stuff and learned about the IGY. I applied for the job in Colorado, which I didn't get, but applied for other IGY jobs with the Antarctic. At that time, I don't know that I really had a mentor. Edmondson was the department chair. The department was small as were most science departments in those days in the '50s. It was prior to any large increase in funding for science in the United States that came about the time of the Korean War and thereafter. But, after a year in graduate school was when we started training for the IGY. I met Carl Barkline from Cornell who did auroral

work. I met Joe Chamberlain at Yerkes Observatory at the University of Chicago who did auroral work. Last I knew, Chamberlain was over in the Houston area. I really don't know if he's still alive.

It was around that time . . . well, it was in the summer of '56, I guess, when the applications were made for IGY positions in the Antarctic and when the choices were made as to where we would go - and again I don't remember these dates because I haven't reviewed my notes for a long, long time - but, it was sometime in the late spring or summer of '56 when I first met Paul Siple. I went to Washington, and a couple of us met him.

BS: *So, you were chosen by then?*

AL: I was chosen by then, yeah. I was chosen before I met Paul Siple. And a few of us were invited to his home, as I vaguely remember. I met Ruth then. I still have contact with Ruth on occasion, at Christmas time.

BS: *My daughter almost bought Ruth's house. Ruth's moved out of her house and moved into her granddaughter's house in a grandmother's apartment.*

AL: In Virginia?

BS: *Um-hum.*

AL: So, we had training before we actually embarked for the Antarctic. We trained at Yerkes Observatory in Wisconsin, and this was a group of aurora and airglow people who were sent to various bases in the Antarctic and we trained at the Air Force Research Center in Boston, and this was in South Boston on Sumner Street or something like that. We effectively trained for the autumn, September-October-November-December of 1956. Then each of us had a few weeks at home and I went back to the family farm in Illinois. I left from the St. Louis Airport right around New Year's Day in 1957, flew to San Diego. Spent New Year's Eve in San Diego, I guess, then we flew to the Antarctic from there.

BS: *You left a pregnant question hanging. I think most people understand or think they understand what auroras are, but can you give me just a brief explanation on an air glow?*

AL: An air glow is more like a faint luminescence of the nighttime sky. It's a photochemical reaction or something to do with photochemical reaction, whereas the aurora is the result of a recombination of atoms and molecules and thereby releasing energy. But, the airglow is some sort of a photochemical reaction and to get an exact definition, I'd have to go and get my memory.

BS: *Do you see airglow in the mid-latitudes here in the United States?*

AL: I believe you can measure airglow anyplace, but it's got to be dark. It's got to be a pure dark sky.

BS: *So, a 24-hour night in the Antarctic gives you better . . .*

(100)

AL: You can get the airglow and you can get the spectrum of the airglow. You can get a spectrum of the aurora, of course, and you can get a spectrum of an airglow, too. So, that's as much as I know about airglow without going into some book and reminding myself just what it is.

We were going to be going down by ship, but we left San Diego by plane because whoever was in charge, I'm not sure which Seabee Admiral or whoever was in charge, said that there were problems with the ice and we needed to get in fast if we wanted to get in to the Pole. And indeed, when I finally got to the Antarctic, the seals were coming through the ice runways. So, we flew from San Diego in a DC-6 or DC-7, whichever planes were at that time, and flew a military flight to Hawaii. Spent a night in Hawaii, spent a night in Tahiti. We went through Campa Island. I don't remember if Campa Island comes before Tahiti or after, but I remember it's a very tiny island. And flew into Christchurch eventually. We spent a week in

Christchurch before we were able to go into the Antarctic and we finally went in by sea plane tender. The ship was the *USS Curtiss*. I remember my room was right at the water level. I could hear the ice crunching as we went through the ice pack. And the *USS Glacier* led us through the ice pack on the way in. That was very nice.

BS: *How thick was the ice pack? Do you remember?*

AL: I don't know how thick it was. We didn't have any trouble following the icebreaker through. I remember vaguely the ice was said to be 10 or 15 feet thick - the ice floes. I've got some old slides which show the different colorations of the ice when we went through it.

BS: *So you could hear the growlers.*

AL: I could hear the crunching going down the ship, which was interesting being a complete landlubber, or whatever and having never really been on a ship before. We had no problem getting in, but it was an interesting experience. And then I remember the ship coming in near the Antarctic and seeing the ice edge around the continent. After we left the ice pack, we went through a clear space of water. I guess the wind had blown that out. And we had calm seas going into the shore itself and tied up along side the shore. Saw a couple of penguins there and saw a couple of seals. In those days, there was nothing prohibiting us from going over and touching the seals and touching the penguins, which we did. Penguins didn't like it much, but we touched them anyway and the seals didn't care. We went over to the facility there at McMurdo. We climbed the hill there up above McMurdo which was named Williams Peak or something like that after somebody who'd died?

BS: *Was there a cross at the top?*

AL: Yeah.

BS: *That's Scott's Observation Hill.*

AL: Yeah, but there's some. Oh, it's Williams Field after a guy who fell through the ice.

BS: *He fell through the ice.*

AL: Yeah, we crawled Scott's Hill. And we spent a few weeks there, as I remember, because by that time, the ice runway had developed potholes and the ski planes couldn't go to the Pole. So, that was my first work in the Antarctic actually or something that I did which I knew nothing about, but I worked with a Dr. Assur or something like that, and he was from the Snow Ice Permafrost Research Institute. And I helped him dig out some of the holes in the ice and run Young's Modulus tests on the ice for ice strength and we made something he called "ice concrete." He mixed up water and ice, slush I guess, poured it in the holes that were dug out of the runways, and sort of paved the potholes that way. The potholes got started in the first place by grease and oil dropping from the aircraft, Weasels and Caterpillar tractors. And the black oil drops soaked up sunlight and caused the puddles.

(150)

BS: *Still do.*

AL: Anyway, we made ice concrete to fill the potholes and the Caterpillar tractors smoothed them off and we eventually got into the Pole.

BS: *What year was this?*

AL: This was January of '57. And the exact date we flew into the Pole, I don't remember. I'd have to look back in my diary, but it was sometime in January or early February.

BS: *It's not important. What kind of plane did you go in?*

AL: We went in on an old DC-3. What do they call those?

BS: *R4D Dakota. Probably had a D6 Dakota.*

AL: And the plane's cargo was an extra fuel tank they had inside the passenger compartment and they had 3 or 4 of us and our gear. That was the payload on skis and I almost can remember the guy's name, the pilot, but I can't. I've probably got it written down.

BS: *There are some of them here. Elliott \_\_\_\_\_ was flying during that time. Gus Shinn?*

AL: Gus Shinn. I think it might have been Shinn.

BS: *First man to ever land at the Pole. He'll be here.*

AL: He'll be over there?

BS: *He lives at Pensacola.*

AL: I'll be darn. I think it might have been Shinn.

BS: *He was one of the great flying explorers. Probably about 2-300,000 miles. He was the first man to land at South Pole, and in the '40s, you know, with Byrd he flew off the carrier Philippines. So, he got \_\_\_\_\_.*

AL: Well, I may have come across his name on some of the other memories.

BS: *Eddie Frankowicz was there, too.*

AL: Yeah, so we got into the Pole. And the first work we did at the Pole was to help secure the base for winter. We had gotten in later than we thought. Virtually all supplies came by air drop. Only the staff, scientists for sure and the staff and other winter over people came in by plane. Some of the more delicate equipment came in by ski plane, like my spectrograph camera. But, everything else was air dropped. And the interesting efforts in the air dropping . . . we'd have to go out and be in the drop zone when the parachutes came down because the wind would reinflate the parachutes and off they'd go across the landscape. We went out there with our hunting knives - in pictures we have belts with hunting knives scabbarded there and we'd go out and cut the parachute lines so that the supplies wouldn't go scooting off the landscape. There's still some of our mail out there someplace. The parachute came in with mail and it took off and they never were able to find it. Some did come in, of course. Much of it did, but some of it didn't.

BS: *Was Paul Siple already there?*

AL: Paul was already there when I got there. I was one of the last ones to go in, I believe. A lot of the Seabees were already there. And my notes would say when we came in and who was with me, but I just don't really remember.

BS: *Was Dick Bowers still there? The guy who was in charge of construction?*

AL: If he was, it was a very brief encounter. I know the name, but I don't remember really . . .

BS: *He was in charge of construction.*

AL: Construction, yeah.

BS: *He's over there already.*

AL: Gosh, I need to come over.

BS: *So, here you are. You've gone to work doing slave labor. Was Jack Tuck there?*

AL: Jack would have been there, I think, when I got there.

BS: *So, by the time you arrived, that pretty much completed the winter over crew?*

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AL: I was among the last of the winter over crew to come in. The camp had pretty well been built. We tore down a couple of temporary Jamesways and put up a couple more buildings - prefab buildings. Put them together after I got there. And we built and secured the supply area where all of the oil barrels and food supplies were stored under improvised . . . we'd stack up NGR barrels on the ends and put packing crates along in there and that formed an infrastructure over which we put parachutes and other things like that to serve as buffers against the snow and then all of our supplies were underneath that. We had paths connecting all of that stuff. That we did pretty much after I got there.

BS: *Admiral Byrd style.*

AL: Admiral Byrd style, yeah, I guess. We even dismantled the packing crates and saved the nails. I know we did a lot of that. I guess it was Paul Siple who had gone through that with Byrd. We saved virtually everything like that. Knocked down the packing crates and kept the nails and all that sort of thing.

BS: *So when did Paul come?*

AL: Siple was there when I arrived also.

BS: *So, when did you begin your scientific work?*

AL: I started once it got dark. And, of course, the sun sets on March the 21st, I guess. And then we had some twilight after that, so it wasn't really dark enough to start doing auroral studies for a few weeks after that - probably two or three weeks. So, it was probably early April.

BS: *When did they isolate you? When did they leave you - what date?*

AL: I don't know the precise date. It's probably in Paul Siple's book, "90 Degrees South," and in my diary. But, it would have been sometime in late January or early February when they stopped the last flights in. We were isolated very roughly in mid-February to late October. I think the first air drop came in very late October.

BS: *By Globemaster?*

AL: By Globemaster. Both the air drops and the supplies came in by Globemaster.

BS: *So, tell me, when that last plane left . . . here you are. You've been left, not to see anyone for over 6 months. What were your feelings?*

AL: It's interesting and I really don't know how to answer such questions, never ever have been . . . the only thing is that I must have been so oblivious to all this stuff that it didn't leave any feeling of dread or anything like that. Just curious of something happening and they were gong, and they were going to be gone for who knows how long? And the thing was that it never really struck me as . . . well, I knew we were isolated, but somehow it never really struck me that we were really, *really* isolated. I don't know why because there was nothing brave about it. I think it was just ignorance of what might have been.

BS: *No feelings of, "Gee, what if I break my leg?"*

AL: Well, we had a doctor there. And the doctor had an operating room, actually. We built the operating room. It was a like a big closet. Had an operating table in there and I believe one of the mechanics or somebody had had some training to help the doctor if he needed it. What would have really happened if the doctor had something serious, I don't really know. The most he ever had was splinters and he took blood for us and testing and that sort of thing. But, fortunately, nobody was really seriously incapacitated.

BS: *So, the only medical experience you had was an guinea pigs.*

(250)

AL: Guinea pigs, that's right, yeah.

BS: *OK, you've been isolated. The sun is getting low on the horizon and eventually goes down. Tell me, what was the horizon like? Was it red like it is here? Was it a different kind of sunset? I know it was longer because it lasted for days, didn't it?*

AL: The sunset did last for days. You could see the sun just sort of rolling around the horizon before it disappeared beneath the horizon.

BS: *So, that's a unique experience that you can only experience at the Pole.*

AL: And the refraction lifted the sun up a bit, so, of course, the light was longer than actual. The sun actually had dropped below the horizon, and the Earth's atmosphere refracted the sunlight and would be above the horizon for a while longer. And you could sort of see effects of the mountains, although they were a long, long way away from the Pole because you could see a spike of sunlight at times which wouldn't always be there and that would be the sunlight coming between some mountain valley or something like that. And even after the sun had been beneath the horizon, you'd see a spike of white now and then.

BS: *Did you see green flash?*

AL: Didn't see any green flash. Green flash, I think, has to occur when the sun sets relatively quickly below the horizon and it never really does that at the Pole. It just sort of rolls around it. But, you did see that the twilight terminator was very, very intense. The twilight terminator is the band showing where the sun does not illuminate the atmosphere any more, but where there still is sunlight and that steadily advances across the sky as the sun gets farther and farther below the horizon. It has a deep purplish color and I've got some slides showing the twilight terminator very, very well - a very dark purplish-pinkish behind you and the opposite side of the sky, of course, there is still . . . sun was below the horizon. You can see this not so easily here in the United States, at least in Louisiana or the southern United States, but you can see it in the mountains in the observatories with telescopes. When the sun sets, the sky is really clear and you can see on the opposite side of the sky from which the sun sets, where darkness is coming. You can see that band across the sky.

BS: *The purple coming up behind you.*

AL: Up behind you as you look toward the sun. And it was really intense in the Antarctic, both at sunset and at sunrise.

BS: *Did you see that same thing in McMurdo?*

AL: I wasn't there for that, so I wouldn't see it.

BS: *So, was this part of your observations responsibility?*

AL: No, it's just notes that I took and I don't know that the Weather Bureau people took any great notice of it either. It was just a phenomenon that happened. My work didn't really start until it got dark enough so I could start recording images of the aurora. And I had two instruments - a camera which was called an All-Sky Camera and it's essentially a hemispheric mirror which pointed upward in the sky and it gave you not quite 180 degree view. It didn't go quite horizon to horizon. And in the center of this hemispheric mirror, there was an opening and so light would fall from the sky or most of the sky on the hemispheric mirror and be reflected up to an optical flat mirror above it and then that would reflect the light dimming down through a hole in the center to a K-100 Kodak movie camera inside.

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And we could take motion pictures of the sky, which I don't think I did because it would take a lot of film, but actually we had fashioned an actuator which would allow you to take an exposure every so often. You could adjust how often you took an exposure of the night sky and we could take pictures of the aurora, then, as they formed and as they existed every so often. I don't remember how long the film would last. We'd take the film out. I built the darkroom farther from my work. We had chemicals shipped into it as part of our supplies. We developed the film there.

So, we took two kinds of data, images of the sky, the film was black and white film. I don't remember what kind of Kodak film it was.

BS: *So, you had the All-Sky camera and . . .*

AL: And we had a spectrograph.

BS: *And a spectrograph.*

AL: The spectrograph had a fish-eye lens and the optics were made such that we could accept an image of the sky almost from horizon to horizon, but only an arc, a band across the sky a few degrees wide. I don't know, 5 degrees or 10 degrees wide, so we could get a spectrum of the sky, of the aurora or the airglow along that flight across the sky.

BS: *Would it show up in a different color? You did it from one side of the horizon to the other?*

AL: The spectrograph had a grating inside it which would disperse light as it came into this fish-eye lens and it would give you a spectrum of the sky. And it's been so long since I looked at one of those specters - it's been over 40 years - I really don't know what it looks like anymore.

BS: *So, you basically had about what, 5 months of work?*

AL: Something like that. I had from very roughly the first week in April to roughly the end of the first week in September is when I actually took aurora and airglow data. Of course, that was a 24-hour operation. And in addition to recording of images, the movie film on the K-100 Kodak movie camera and by the spectrograph, I was supposed to make visual observation periodically. And I did, except when I was sleeping. And during special intervals that the IGY had proclaimed, we . . . I don't remember if they called

it special avertence or whatever it is . . . there were times - 24 hours or something like that - when intense observations were made of a variety of objects or phenomenon around the world and we were all supposed to be getting densely observations every 15 minutes, every 30 minutes. Something like that. And those times, I didn't get to sleep very much.

BS: *Constant observations.*

AL: Yeah.

BS: *Did you get any help from Seabees or others? Did you train anybody to help you?*

(350)

AL: I did most of it myself. And I really don't remember any more how much help I might have gotten. I had help in infrastructure, although we all had our jobs to do and most of us did it ourselves. Interesting because many of us weren't really trained for that sort of thing. I had never built a darkroom before and I'm sure there must have been some help at some level, perhaps from the carpenter. But, much of that we had to do ourselves. And anymore, I just don't remember how it was done.

BS: *Yeah. Things have changed because we assign people to scientists now. This guy does science and you do all his gopher work.*

AL: We did all the gopher work.

BS: *I know. It's the same story throughout the IGY.*

AL: One of the points . . . while we built this sort of equipment, I built the darkroom and we built other infrastructure, it was really pretty good and this was something that resulted, from my memory, in what Paul Siple knew and learned. He wanted to keep people busy and while as an aurora and airglow person, it meant I could only work when it was dark, so what was I going to do the weeks and months when it was daylight? And not get in trouble. And that's where we all helped each other out at some level. And there were certain kinds of camp chores that we all had to help with that I really had no time to do when it was dark, but when the sun was up, I could do work then which other people didn't do. And a lot of people worked together and got to know each other and interact with each other which was important. And one of the things that we all did - we all took turns which you probably would call KP duty - we called "house mouse" for lack of a better term or something fun like. But, we'd take turns mopping the floor or helping wash dishes and keeping the latrine clean and we all did it. And the scientists did, too. And Doc Siple realized from past experience and maybe just common sense, realized that everybody needed to do that kind of work. Not just the Seabees or the support staff. It certainly didn't hurt any of us and it's good for morale. Today, I think it would be a good thing to do.

BS: *Let me back up a little bit. I want to get into interpersonal relations with you and you've led up to them. But, I want to jump back to your aurora and airglow data. You took this data and you coordinated it with other stations around the world, not just the Antarctic, I take it. They were probably doing it in the Arctic at the same time, weren't they?*

AL: I think they were.

BS: *It was daylight.*

AL: But, they did have experiments running because at that time it wasn't clear whether the aurora or aurora light phenomena occurred simultaneously in both hemispheres. We now know it does, but we weren't sure then.

(400)

*BS: Because Leinbach had the radiometers going on in the Arctic all the time. He invented the radiometer for that. Anyway, the data afterwards, who took all this data? There were a lot of people studying aurora and airglow. They were doing it at the Ellsworth Station. They were doing it at McMurdo. They were doing it at Wilkes. They were doing it at Little America, I assume. I'm not sure, but they must have been doing it there. So, there's somebody that took all of this. What happened?*

AL: We were all called scientists and on some level we were, but on another level, we were all more technicians. We all collected the data, kept notes, kept logs, pulled all this together, wrote reports. But, when we got back, the data were dispersed. The visual data, I believe, went to Carl Gartline at Cornell. I'm not 100% sure. I'm pretty sure Gartline got the visual data. I'm not clear where the spectroscopic and the imaging data went. Some of them might have gone to Joe Chamberlain. Beyond that, I don't know. When we got back, we went back to the Air Force Cambridge Research Center in Boston where we did our final report writing and our material had come there. And then they were sent off and I don't know what happened to them after that because after that, I went back to graduate school.

*BS: At Indiana.*

AL: At Indiana University. That's where I eventually got my Ph.D. degree in astronomy. And to my knowledge, that's what most if not all of us did. We brought back our data, wrote up what we'd done and gave these reports and the data to some central facility and just what happened to them, I honestly don't know.

*BS: So, you were data collectors and all scientists, essentially, are data collectors.*

AL: But, we didn't analyze it like you and I did for our theses and that sort of thing. We didn't go on and analyze the data. We did a job and that was it.

BS: *So, the data went back somewhere, and you're not sure where.*

AL: That's right.

BS: *You're not unique. They're still looking for some of it. What other kinds of research were going on there? The Weather Bureau, I know, was there. What were they doing?*

AL: The Weather Bureau sent up radiosohns, mostly, once a day, I think. They had anemometers and so forth, mounted outside to measure wind speed. They kept track of the high and low temperatures. We had a board in the dininghall area which was also the rec area and part of the kitchen. We had a board on the wall which gave the daily temperatures, the high and the low, the wind chill factor and the direction of the wind.

(450)

We had a big map of the Antarctic on which you could put the highs and lows of the day and that sort of thing. So, they tabulated those data and sent them out and I believe it was part of the radio operators job to send it out at least every day or sometimes more often, I'm not sure.

BS: *To International Weather Central at Little America.*

AL: I think it went there.

BS: *Well, it's why they were there. They were doing the Russians, they were doing the British, they were doing everything.*

AL: And there was another couple of people there - Willy Huff and Bob Benson - were doing ionospheric studies. And I really don't remember much about it. I think they had an ionospheric sounder or something like that and I guess they sent signals up to the atmosphere and monitored the elevation of the ionosphere or something like that. I know that at times, the ionosphere completely disappeared and we had no radio contact with the outside world. One time in September, I remember we had something like 4-5 weeks, memory says 6 weeks, but I'm not sure - a time when we had no contact because there just was no atmosphere. So, they did that kind of work. We had a couple of other people - Ed Remington, I think - did glaciological studies and Remington dug down in the ice, I forget how far but I think he went down 100-200 feet or so and he studied the different layers in the ice as he went down.

BS: *So he had the hole. Everybody had a hole.*

AL: He had the hole, but we helped him and we used that for two purposes: one, Ed studied the surface layers and took cores as he went down. And we dug that snow and we used that snow for water. Melted it in the exhaust pipes from the generators that went through a sort of back lash arrangement and we threw the ice in there and that was melted and that was our drinking water. I don't know, we might have used some surface snow, too. But, after a while we'd get to walking around on it, so we used that from the ice mine for the drinking water.

BS: *Interesting. So, you had the guys that were studying the glaciological work, the snow and the formation down through the firm. Did they dig down to the hard ice?*

AL: I don't remember how far down they went.

(500)

BS: *So, down through the firm and into harder and harder ice, more and more compressed. You had your studies on aurora and airglow. You had the weather studies going on. What scientific work did Paul Siple do?*

AL: Paul tried some hydroponic gardening. He also had a theodolite which he used - a Weil T-3 which I remember for some reason - a Swiss-made theodolite, which he used to try to locate the base. And he did use that to measure the altitude of the stars around and around the sky. And the fact that the stars' altitude changed slightly from some directions in the sky compared to others meant we weren't at the Pole. Because if we had been right at the Pole, the elevation of the star would have been the same all the time.

BS: *How far did he determine you were off?*

AL: He thought we were about 1000 feet off.

BS: *You mean as far as the building went.*

AL: Our building where our base was was about 1000 feet from the Pole. He determined where he thought the Pole was, went out there and put a flagpole up and we got a ring of oil barrels around it with a radius of 100 feet or so. That was his error of determination. And there's a picture of that in his book, "90 Degrees South," and you can see the South Pole Base in the distance. The next year's crew came in, made some observations, picked up the pole and moved it, so I'm told.

BS: *It's moved every year. You know why?*

AL: Well, in part, the polar cap moves.

BS: *Thirty-two feet a year, and I have a photo. They put a pipe in and they put a flag in and they can measure it very precisely at the beginning of the season. And they leave the pipes in.*

AL: Oh, really.

BS: *And I have a picture of a flag in one and several of the other sites, 32 feet apart going off over the horizon. I'm going to get into personal relations here. How did you fit in under Paul Siple? He was your scientific leader, by title.*

AL: Well, Paul was the leader of the science group. They had a split command. Paul was the leader of the science group and Jack Tuck was the leader of the Seabees and I'm not sure just how well that kind of a split command worked at all of the bases. That sort of split command in a small, confined location could have some poor consequences, I guess.

(550)

But, Jack had a lot of respect for Siple and there were no severe problems ever that I know of. There were discussions now and then, I suppose. Maybe even a more animated discussion on occasion, but we were really fortunate. We had no real big problems there. And as a scientist - I was a scientist under Paul. I had my job to do and he would give me . . . in some sense, he was a mentor. Bob Benson and I were the youngest people there. I don't know how old Paul was at that time. Let's see, he went down with Byrd in '28 and he was a teenager.

BS: *He was 18 in '28. Born in 1910.*

AL: So, he was 47, in his late 40s, and I was just 21. So, he was a mentor in that sense. And looking back through notes and memories, he gave me a lot of common sense advice.

BS: *So, you looked up to Paul.*

AL: Certainly I looked up to Paul. And he was an easy going guy, at least around . . .

BS: *How about Jack Tuck?*

AL: I don't have strong memories of Jack one way or another. He was an OK guy. I liked him. Since you and I started talking about doing this oral interview, I spent about two hours looking through a diary and here a couple of nights ago, I read I had an argument with Jack at one point and Doc smoothed it over and it wasn't anything serious, but we did have some discussion about something infrastructure-wise. But, I got along well with Jack and I got along with everybody. No enemies and a lot of friends and some contacts, I've kept over the years.

(End of Tape 1 - Side A)

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(Begin Tape 1 - Side B)

(000)

BS: *When we turned the tape, we were talking about the personnel relations and I've got a few questions on that aspect. We had some other bases where they did have some personal problems - particularly Ellsworth Station. And you didn't have any cliques? No Navy group, no science group, you'd interact with the Navy guys? I mean, here's men who finished high school basically, some of them, not even that. Did any of them take an interest in your science?*

AL: Well, this is . . . I don't remember any serious problems. And one of the things that Siple did and Jack Tuck, I suppose. I don't know how they interacted and how these things came about, but we had a series of talks and I can't tell you whether Doc Siple was involved or Doc Taylor, the medical doctor, was involved and/or Jack Tuck, but however they got started, we had talks. And everybody gave a talk about their work. I talked about the aurora. I don't remember what Paul talked about, but the point is, the Seabees talked about their work. And again, I don't remember what they talked about. What their topics were. But, they talked about their work and we took turns once a week or whatever. We had a talk. The most popular talks, of course, was the medical doctor's talks about human relations.

BS: *And the name of that doctor was . . . ?*

AL: Taylor. Howard Taylor. Howard C. Taylor, III.

BS: *So, he talked about human relations.*

AL: He talked about medical characteristics, medical items.

BS: *Did he talk about season affected dementia - SAD?*

AL: I don't remember. I'd have to go back and see whether or not I made notes.

BS: *People withdraw and they've got a good test now to figure out whose susceptible to it.*

AL: Well, before we went to the Antarctic, in part of the testing stage we all were given medical tests and we all were interviewed by psychologists and psychiatrists - I always forget the difference in the two.

BS: *One's got a Ph.D. and one's a medical doctor.*

AL: We each were interviewed by three different people. I remember taking a Rorschach test and things like that. Evidently in what they were looking for, we all did OK, I guess. We all went down there anyway. One of the things we had were happy hours every week, maybe twice a week. Wednesday and Saturdays and the point I'm making is that there was a limit as to how much alcohol any one person could have in his possession. We could get it from the ship's store and we each had a personal account. I don't remember how they worked, but we could buy beer and we could buy a whiskey that I think was called "Old Methuselah." I remember the name just because it sounded so funny. It was bottled the year before or something. I'm not sure about the quality, but anyway, we had that. But, the people were restricted to how much they could have. And you could buy a case of beer, but you could only have a case or two in your possession at any one time, the point being nobody could go on a week's long drunk. You didn't have that much at your disposal, but you had some. And every once in a while one of the guys would get a little bit much, but there was really no problem with it because I ascribe that to the combination of Siple and Tuck being able to work together very well and I think that Siple, having been down with Byrd and having so much experience . . . awe is too strong a word, but people had great respect for Doc. And his personality and his easy-goingness really kept things going well.

(50)

BS: *So, he was Doc, eh?*

AL: He was Doc. And Jack Tuck, if my memory serves, must have been a pretty level-headed young man, too, to maintain the respect of his men. He was a Lieutenant JG, as I remember. So, we were fortunate. Things worked out pretty well.

BS: *It's a shame that both of those men died quite young.*

AL: Yeah.

BS: *OK. This is revealing. There are different ways . . . alcohol and interrelations between Seabees and the military and the scientists at each station, and what's quite interesting is that the station where they had the biggest problems was where the military guy and the chief scientist were the same person. Bert Crary who wintered over at Little America and the guy who used to be skipper of the Glacier and was the officer in charge that year, were buddies. I mean real buddies, and did you heard about the meeting of that first plane that came back after the winter?*

AL: No, I don't remember that . . .

BS: *Only in their boots, they taxied the plane in together. And they were both standing there . . . Of course, the guys had come from the States, but . . . it was crazy. Anyway, they got together like brothers. And it pretty much happens, it's the story everywhere.*

AL: I vaguely remember that it actually happened, but my memory says it did, but a couple of times when a couple of guys got a little, you know, upset with each other, Doc would say, "Out in the snow, you boys go outside," where the average temperature was 62 below. The guys would only go outside for a little while and they would cool off pretty fast. And I vaguely remember that might have happened a couple of times or so, but I don't have any idea who it would involve anymore and if my memory's right, it was minimal.

BS: *Did anybody have any problems of withdrawal and the darkness?*

AL: I don't remember anybody.

BS: *Everybody did their job throughout the winter.*

AL: My memory says they did. Yeah.

BS: *So, here you spent the winter and the sun's coming up. Did you anticipate it?*

AL: There was euphoria about that.

BS: *You mean in anticipation?*

AL: In anticipation of it coming up, and then you could start seeing this little bit of shaft of light going around the horizon again, and in some places where there were valleys in the mountains in the distance, the light beam of sunlight would be a little bit more intense than otherwise and there was some . . . yeah, it was sort of like spring in the air or something. By the way, don't let me forget, when we get farther along when the replacement crew comes in, I want to comment about the change in attitude.

BS: *OK. Well, we'll work our way up to that. So, you're anticipating sunrise. Do you recall, did you all go out and look? You knew where the first crack on the horizon . . .*

AL: At the Pole, of course, there is no one place for the first crack at the horizon. You could see dawn moving around the sky, in effect, where the sun was, and it just gradually got brighter and brighter. And if I can remember, you could see the guy lines holding some of the antennas, some of those post vertical guy lines waving in the breeze and you'd see the hoar frost caked on them before it breaks off. We didn't really get much snow at the South Pole because it's so very, very dry. Most of the snow rearrangement there was by the wind.

BS: *How about storms? Did you have any windstorms?*

AL: We had some storms. I don't know just what the highest velocity winds were. We did have a few storms. When the base was built and after the Seabees left, one of the last things we did, was to push snow around the edges of the camp to help give insulation so the camp was pretty much surrounded by a wall of snow.

(100)

But, in the spring, one side of the camp had huge long drifts. That whole side of the camp was completely covered with snow because of the wind. And I'm not sure at this point if my memory would be correct about the direction from which the wind came. My memory says it's from the African side. It would have been the downwind side. It would have been the side opposite from Africa, but I'm not sure that's correct anymore.

BS: *How about sastrugi?*

AL: Oh, they were beautiful. Sastrugi are those little wind-sculpted snow drifts.

BS: *How big did they get?*

AL: I don't remember seeing them more than a foot or two.

BS: *They're curved like a wave?*

AL: Many of them were curved like waves. They're like the waves on water and maybe undercut a little bit. Bob Benson was one of my good friends down there. He lives in the Washington, DC area now. And we'd go out looking, we'd pal around. And Bob liked to go ahead of me because I liked sastrugi and I'd take pictures of them and he'd run ahead of me and jump on them, break them. I remember that. He's a good friend.

BS: *What was his job down there?*

AL: Bob worked with Willy Huff and Willy Huff was the guy that ran the ionospheric sounding program. Seismology . . . Bob worked with seismology and Willy worked with the ionosphere. But, somehow my memory says they worked together.

BS: *OK. So, he's in Washington now.*

AL: Bob Benson lives in the suburbs. He lives in Maryland, or did, on the northeast side of Washington. We exchange Christmas cards, but I don't remember who he's working for.

BS: *I'm going to catch him on an oral . . . that's why it's really, really . . . you're good. This is very helpful. Tell me, so the sun comes up and you went out and took a look around the camp. How far did you go from the camp? How far did people take trips?*

AL: We weren't supposed to go farther away from the camp than where you could see the camp and we didn't often go that far out. The problem, of course, is with white-outs. But, if the sun was in the sky, you didn't have any problem with white-outs. But, there was a limit. You weren't supposed to get out of sight of the camp. I remember once during the wintertime, actually, when the meteorologists had to go some little distance from camp where they set up one of their pieces of equipment and they had to go out and tend to it now and then, and I don't remember the distance, but they had a guide rope set up and you'd just keep your hand on the rope because in the wintertime, it was dark. In the wintertime, when the sun would set and there was no moon in the sky, you'd walk out there and keep your hand on the rope till you got out there and do your measurements and check it and you'd walk back in. I remember, I'm pretty sure it was Herb Hanson came back in white and said, "Guess where I've been?" And he'd let go of the rope when he was coming

back and it took a little bit to find us. He did, obviously. I still see Herb once in a while. He used to come through here on a visit. He is a retired Weather Bureau person living in Omaha, Nebraska.

BS: *Oh he is?*

AL: Yeah.

BS: *My son lives in Lincoln and he works in Omaha and I'm going to visit him. Herb Hanson was retired?*

AL: Yeah, he's retired now.

BS: *He was the first weather observer at South Pole then.*

AL: Well, he and Ed Flowers was meteorology, Herb Hanson was meteorology, William Johnson - Floyd, William F. Johnson, we called him Floyd Johnson were meteorology.

BS: *So, it was Hanson, Floyd Johnson . . .*

AL: Hanson, Floyd Johnson. His first name was William, but we called him Floyd, and Ed Flowers, meteorology. Last I knew, Ed lived in the Sun City, Arizona, area. And Floyd lived out there too, although he may have moved. But, Herb Hanson, I know lives in Omaha.

(150)

BS: OK. Hanson, Johnson and Flowers.

AL: Yeah. I might be able to give you some of their addresses.

BS: *If you can give me Herb Hanson's, or give me all of them, I would certainly get Herb Hanson easily and Benson, I'm going to talk to. Diane might have interviewed Benson. This is good. I started with a list of a hundred and I've probably got over a thousand. And it keeps growing. So, here we are, the sun's come up, everybody's done their work. This is September 21st. You're looking to leave, I would imagine, by then, or at least thinking about it. Did it have an affect on anybody? Did you get antsy about it?*

AL: I don't know that it had an effect at that point. My memory says that at least personally, I wasn't antsy to leave until the replacement crew came in. And a reason that sticks in my mind was that when the replacement crew came in, they had all sorts of questions and new ideas and wondered why we did this this way and why we did that that way and the criticism and that sort of thing, and I don't mean criticism in a negative way. There may have been some, but just the new crew came in and our family , everything was changed, broken, everything and that, then, by golly, you knew it was time to go home.

BS: *They were obviously going to do things different.*

AL: They were going to do things different and it was time to go home. And that's what sticks in my mind. The change came when the new crew arrived. Camp was more crowded then, of course, too. There were no extra living facilities and I don't remember what kind of bunking arrangements were made and that sort of thing, but that's when the big change came. Of course, the other thing that happened when the crew came in is that they brought in the flu and colds and we were, most of us, sicker than dogs when they came in. Our immune system wasn't working.

BS: *They brought in dogs?*

AL: No, I meant our immune system had gone to the dogs. We did have a dog there, by the way. We had a husky named Bravo that Jack Tuck looked after while we were there and that dog, by the way, was a good

thing to have. We'd play with the dog and the saying was, if you couldn't stand your colleagues, you could always go play with the dog. So, psychologically, the dog was an important aspect of our lives.

BS: *B-r-a-v-o, right?*

AL: B-r-a-v-o. There's a picture of him in Doc Siple's book, "90 Degrees South." A couple of pictures of him.

BS: *Important for morale.*

AL: Yep.

BS: *OK. So, the new crew brought in the flu and that swept the camp pretty rapidly, I imagine.*

AL: Yes, it did.

BS: *How long did you overlap?*

AL: I really don't know. Probably a week or so. A week or two. My memory says the first air drop came in late October and I flew out on Thanksgiving Day in November of '57, because I ate Thanksgiving dinner, Bob Benson, I think it was . . . Bob Benson and I ate Thanksgiving dinner in the back of the P2V going from the Pole down to McMurdo.

BS: *What'd you have, C-rations?*

AL: Oh, I don't know what it was. The cooks might have had something for us to eat. Boxed lunches or something.

BS: *The whole crew go out together?*

AL: No, we went out piecemeal and just how we went out, my diary might say, but . . .

(200)

BS: *So, Thanksgiving Day, 1957. That made me think of something. I want to back up here. The IGY formally started on July 1st, 1957, and it went to December 1st, 1958. So that noted, did that change your lifestyle or . . . you'd already started taking measurements and you just continued . . .*

AL: I started before IGY officially went into effect and I kept making measurements throughout. As far as I know, everybody else did. The only thing that might have changed is that we had, once IGY started, we had certain days or time intervals which were set for world events or something like that. There was some name given to some of these intervals of time where everybody around the world made intensive observations of the weather or whatever he or she was supposed to measure.

BS: *You mentioned that for the auroras, too, where they were doing them everywhere. Did you communicate with the other guys doing the same thing, like Kim Malville in Ellsworth Station?*

AL: There may have been some radio communication, but there wasn't much. I don't remember talking. We might have had a ham radio contact with them now and then, but nothing regularly that I recall. Have you talked to Kim Malville, by the way?

BS: *Yes, I did an interview on Kim. That's why I knew when you said Yerkes, I asked if you knew Kim and you said you did. So, you didn't know about what was going on at the other stations like Ellsworth Station was really having some personnel problems.*

AL: Memory says we had some indication of it, but I don't remember why and how. It may have been something that Siple or somebody picked up. Or something that the radio people picked up.

BS: *Did you have any traverse equipment? You were different from other stations. You didn't do any traversing.*

AL: We did not do any traversing. We had some . . . I remember we had a couple of man-pulling sleds in the storage area - man-hauling sleds? And we had some rations.

BS: *The reason I ask that is because the traverse affected the aurora guys because they usually went along on the traverses until the sun came up because they didn't have anything to do. In many cases, they were the go person unless they got involved in the geophysics. So, that was never anticipated for you.*

AL: No.

BS: *So these were all the guys who were there. Of course, we know Paul and Jack Tuck have died. You had a total of 1, 2, 3, 4, . . . 9.*

AL: There were 18.

BS: *Right. 18 people, and you maintain contact with most of them.*

AL: No, I maintain contact with Bob Benson, with Ed Remington, Cliff Dickie, one of the Seabees has been here at this house once. He and his wife drove across country. I saw Ed Flowers and Floyd Johnson when I was observing at Kidd Peak a number of years ago. They came to visit me. They knew I was observing.

BS: *Kidd Peak in Mexico?*

AL: Kidd Peak National Observatory south of Tucson. 50 miles south of Tucson. I keep contact with Ruth Siple, although it's been a year or two since I have, I guess, always at Christmas. And Herb Hanson. We've kept in contact with him. Herb came through here once and he was going across country once on some senior citizens' tour and I drove a couple of hours and met him in the city where they were staying one night. We had dinner together. So, that's about the extent of it.

(250)

BS: *So, you all went out piecemeal. You stayed in McMurdo for a while or did you go right on?*

AL: We stayed in McMurdo a short time, but we flew Globemasters into Christchurch and then in Christchurch, we stayed for a little while waiting for a flight back to the States. I'm not sure how much time elapsed. I got back home before Christmas. It took two or three weeks to get back, I guess. And I know that there was no flight out of Christchurch right away. I had time to go to Australia to visit the observatory at Australia National University, the \_\_\_\_\_ Observatory.

BS: *Did you have a de-briefing session anywhere in the States when you were done?*

AL: When we got back, we went back to Boston to the Air Force Cambridge Research Center, and we spent time there writing reports and I was there off and on, I'm not just sure, in the Spring of '58.

BS: *Did you meet Joe Fletcher there?*

AL: I can't think.

BS: *So, the debrief was at Air Force Cambridge . . .*

AL: Research Center. Now, it might have been there and/or out at Hanson Field. I don't remember. One of the two places or maybe both.

BS: *Were you there with guys like Kim Malville and other aurora observers? Were you all there together?*

AL: Probably, but I don't remember that for sure.

BS: *Were you paid as part of the IGY? Did you get a salary?*

AL: Yes, we sure did.

BS: *What were you paid? How were you paid?*

AL: Well, the money went into a bank account in my home in Illinois.

BS: *So, it was all waiting for you when you came back.*

AL: Yeah.

BS: *Have to pay back taxes and all that?*

AL: I'm sure we had to pay taxes. I'm trying to remember what my salary was. I think my salary was six or seven thousand dollars down there, including \_\_\_\_\_ pay. It was something of that order. That's probably written down someplace.

BS: *So, did you ever go back to the polar regions?*

AL: Never went back. I'd love to go, or I'd love to go for a visit.

BS: *Well, you were already thinking of astronomy and had started grad school. You obviously went back to the University of Indiana. And your career, where has it taken you since then travel-wise? Has it taken you around the world to observatories?*

AL: I've spent a lot of time at the observatories in Chile, which the United States owns and operates there.

BS: *Why are they there?*

AL: The Atacama Desert north of Chile is one of the driest spots in the world and so it's a good place to build optical telescopes because the sky is clear for a longer time than it is elsewhere. American southwest is a similar good sight, but the northern deserts in Chile are probably the best in the world. So, I go there frequently. I've been observing there since 1965 and in the last 10-12 years, I go 6 or 7 times a year down there.

BS: *So, it's on a mountain in the desert, right?*

AL: On a mountain. In the Andes.

BS: *How high?*

(300)

AL: 7200 feet. It's a couple of thousand feet less high than the South Pole Station was.

BS: *So, is it as clear as the South Pole?*

AL: Probably clearer. I'm asked on occasion just how clear South Pole is and I don't know how to answer it because there was a lot of cirrus at the South Pole and for some things, it was good.

BS: *What was cirrus?*

AL: Cirrus, clouds.

BS: *Oh yeah.*

AL: And for some things, you can make observations through it. But, the kind of astronomy I do, you can't. I need really clear skies. But you can do spectroscopy through cirrus.

BS: *What kind of astronomy do you do?*

AL: I do photometry measuring intensities and brightnesses of stars, mostly stars photometry.

BS: *Are you familiar with the top hat experiments?*

AL: I heard the name, but I can't tell you . . .

BS: *It's the one where they've got the telescope on the top of the balloon and they put it up and . . .*

AL: Oh yeah.

BS: *It didn't work. This year was the big launching of it to put it up to look at the brightness of stars, I believe, out of Chicago. What's the observatory in Chicago?*

AL: University of Chicago? But, that's the Yerkes Observatory staff, but it might be some of the astronomers on the main campus.

BS: *Well, I followed it. I was going to carry it in the Polar Times, but then they got it up and it stayed up there fine, but something went wrong with the telescope. So, do you specialize in the southern hemisphere?*

AL: No, I set up standard star sequences around the sky - stars of known intensities and colors. The colors you get by comparing the intensities of the starlight at two different wave lengths. And I do that around the sky for calibration purposes, for my own work and for all of astronomy. So, in that sense, it's a service to the astrological community. And I do a lot of work in Chile, because the skies are clearer there. But the northern hemisphere stuff, the far northern hemisphere stuff, I do at Kidd Peak National Observatory in Tucson.

BS: *You teach, too.*

AL: I'm a full-time professor at LSU.

BS: *Full-time professor. You teach as well as do research.*

AL: Right. That's part of our job.

BS: *You have to teach.*

AL: Well, yeah, but we're a research university at Louisiana State University in Baton Rouge, and so, those of us who are active scholars as well, we teach and we do research and there's a service component.

BS: *You obviously enjoy teaching.*

AL: Yeah.

BS: *And you are having a special seminar in the evenings for your students.*

AL: Well, I have study sessions once a week for students in the class who want to come and review the content of the material, or talk about anything they want to, but it's \_\_\_\_\_.

BS: *These are over and above their classwork.*

AL: Right, but it will do them good in their classwork if they come.

BS: *I understand.*

AL: They don't always come.

BS: *So, you offer this as extracurricular for both yourself and them.*

AL: Right.

BS: *Are you close to your students?*

AL: Probably not. I mean, I like students and that sort of thing, and I've got good friends, but I'm not . .

BS: *Have you grown any grad students?*

AL: Not in recent years. I've had some Ph.D. students, actually none of my Ph.D. students have finished and the last three students I've had have been women and they all went off and got their MRS. rather than their Ph.D.

(350)

BS: *You don't hear that too much any more. Well, I think, unless there's something you feel that you've forgotten, I think we're done. Your career was short compared to a lot of guys, but it was at a very critical period of time when we were just developing programs in the Antarctic. And you've enlightened me on how some of this got started. It's quite interesting and the other part that's quite interesting is the interpersonal relations at South Pole Station. I hadn't gotten that from anybody yet. And that's good.*

AL: In my view, the people there got along pretty well.

(End of Tape 1 - Side B)

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**End of Interview**