KB: This is Karen Brewster and it's May 5th, 2001. I'm here at the Rasmuson Library at the University of Alaska Fairbanks Campus and I'm talking with Max Brewer. This is a recording for the Byrd Research Center's Oral History Project on Polar Scientists. Max, thank you very much for finding time to come and join me.

MB: I'm happy to be here, Karen.

KB: Hopefully, we won't repeat too much from everything you've already said to Brian, but we can do a little rehash and then keep going.

MB: OK. I was born in Blackfalds, Alberta, on 7 May, 1924.

KB: Well, it's just about your birthday.

MB: Yes, but I'm not anxious to celebrate so much anymore. I was born in Canada of American parents who had gone up to work on a farm that my paternal grandmother had
purchased as part of her inheritance money from her father. Being born in Canada, of course, provided Canadian citizenship. The US said that I was a citizen born abroad, so I have dual citizenship. Now, if someone is born under similar circumstances, they have to declare one way or the other on reaching the age of 21. However, if you were born between 1919 and 1944, you have dual citizenship for life unless, for some reason, you voluntarily give up one of the citizenships or do something that would be contrary to the interests of one of the countries.

For instance, having served in World War II, I have essentially Veteran's rights in both countries. I served in the US Army Air Corps. Canada says that I served in the military of a friendly country. I moved to the States in 1934. Went to high school in Spokane, Washington. Started college at Washington State as a chemical engineering student. At the same time, I applied for the meteorological program in the Army with the proviso that if accepted, it would be a call to active duty since I was already in the reserves, having been given a "four year deferment," in the enlisted reserves. I was accepted and on the 12th day of February, got a notice along with several others that we were due at Fort Lewis, Washington, at 8 o'clock that morning.

KB:  *What year was that?*

MB:  That was 1943. February, '43. The Dean of Students made peace with the Army and we arrived a day late. This was acceptable, except that my father, who was back living in Canada, received a notice from my draft board that I was a draft evader and that dire things would occur to him if he didn't bring me under Army control forthwith. I gave the letter to my commanding officer who assured me that my father didn't have anything to worry about. That he'd take care of the problem.
KB: *Speaking of your father, what was he like?*

MB: My father was quite different from me in a lot of respects. He was a man who could get up and he would charge off and I'm more of a methodical type. Prior to the summer of '42, I worked at Farragut Naval Base in Idaho, during part of the construction to earn money for going to college. There were 12 units, each one to house 5,000 sailors and, of course, there at Pend Oreille Lake, one would wonder why they were training sailors inland, but when you consider that the other inland training base for sailors was there in the Great Lakes, it's perhaps not too surprising. We worked in the woods - a crew of 20 - and my father and I often worked together. Some of the crew thought we were brothers and one day at lunch, they started guessing our ages. And the guesses came in that my father was the older by a maximum of 8 years, to, in one case, that I was the older by 2 years. He was 43 and I was 18.

But, on the trapline, where I trapped after the war in southern British Columbia in the mountains, normally a young fellow starts out early in the morning, very active and moving and sort of tires in the afternoon while the older person tends to lag in the morning, sort of catches up in the afternoon with greater stamina. So that in a case like that, usually a young fella breaks trail in the morning and the older fellow in the afternoon. And my father, in my case, was just the reverse. He was gung ho and off and running in the morning. I was methodical. By 2 in the afternoon, he was pretty well played out and I was marching right along, still at the same speed. So, you ask, what was he like? Well, that was like that pretty much across the board. He was very young in actions and activity until the day he died. And he was a great athlete - a sprinter. And that resulted in enlargement of the heart which is one of the things that contributed to his death later on.
KB: *What about your mother?*

MB: My mother was of Irish descent. In fact, her name was Harrah. In Reno, today, they call it Harrah's Club, but she was not related. She was one of a family of 12, born and raised on farms. And she had been there on the farm, raised the kids. My parents split up and she went to work for the Post Office, retiring at age 65. In her family, there were 4 boys and 8 girls. The youngest girl died at age 16, at childbirth. Of the other 7 girls, my mother died at the youngest age. She was 91-1/2.

KB: *Wow.*

MB: Her oldest sister lived to 104 and 4 months. I have one aunt still living, but the girls in the family were the strong ones.

KB: *Do you have any brothers or sisters?*

MB: I have two younger brothers and a younger sister. The one is a retired policeman in San Francisco, having also been a policeman in Chicago. The other is a retired electrical engineer for McDonald-Douglass. My sister is a retired school teacher.

KB: *What was your childhood like?*

MB: It was during the Depression, and with my folks having split up, it was one which I had an opportunity to work a bit - the normal business of paper routes. I went to work in the creamery at age 15 and worked during my last three years of high school, worked 32
hours a week. Not only did I serve the public, but I ended up the creamery's ice cream maker. And at the time that I left to go ahead and make the bigger money, I was in a pretty good relationship with the owners of the creamery, so that after the War, they offered me 40% interest that I would work to pay out in the creamery if I would go ahead and take it over.

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They were what I considered elderly at the time, but my view has changed since then. It was after the war. I was with my father in southern British Columbia, live-trapping martin - the American sable - in the mountains of British Columbia. We were using steel traps, no. 0 trap, and then we would weaken the spring, set the trap so that it would catch the martin on the claws, finger area, because if you caught them back up in the wrist area or above, the bones are not as big as a matchstick and if one had a broken leg, you'd have to amputate the leg. The martin did surprisingly well with an amputated leg. But, this was not desirable for breeding stock. Martin are very difficult to raise because of the difficulty of getting them to breed. They have delayed implantation which means that they mate in July and August and then there is essentially no development of the fetus for about the first 7 months. They are a very sensitive animal.

I was pretty lucky in catching martin because I was quite methodical about it. I would run my traps three times a day so that if a martin would be caught, he would not freeze his toes. And we set the trap so that as the martin, a naturally curious animal, went to investigate, that he would be caught on the left paw because if you had to amputate the paw in the martin trade in those days, a martin with a left foot missing would sell for 75% of the undamaged price to someone that wanted to try to raise them. Whereas if it were missing the right paw, it would only bring 2/3rds. So, here there is a prejudice in the martin breeders for right handed or right-pawed martins.
KB: *How come?*

MB: It's just another one of man's quirks because the martin didn't know that they were supposed to be right pawed. But, we were trapping in the mountains between 7,000 and 11,000 feet elevation during the winter time. And I was trapping alone most of the time. I may have actually caught more live martin than anyone else in North America over a two year period. I got 60 live ones.

KB: *Now why were you live-trapping them?*

MB: For breeding stock. And of the last 28 martins I caught, only 4 lost a paw. Now, of course, the environmental action groups are very much anti the steel traps and if one wanted to do that type of trapping again, they'd probably have to use Hav-a-hart traps or something of that nature, which, during the legal trapping season, would cause quite a problem. I then returned to school in the fall of ’46.

KB: *We skipped over the meteorological . . .*

MB: That was a meteorological training course.

KB: *But, that was before . . .*

MB: During the war, which I then completed.
KB: *So, during the war, you were in the meteorological program.*

MB: Yes.

KB: *What was that and where was it?*

MB: That was the weather predictions for aircraft operation. It was, shall we say, the early met days.

KB: *What do you mean?*

MB: Well, some of the meteorological things were going through a lot of development during that period. It's like the fact that the air invasion of Europe, you know the D-Day, in which there was a prediction of a day between the bad weather and the return of bad weather so that the German high command thought that there was no chance for an invasion during that period of good tides, and so on. So, Rommel had gone home for his wife's birthday and the actual invasion date ended up catching them by surprise.

And when I was thinking, after the war, of electrical engineering and visiting an old Army buddy in St. Louis, Missouri, who was also thinking of electrical engineering, the two of us visited a couple of universities. We went to Washington University in St Louis, went in and wanted to enroll and they said, when we went up to enroll in electrical engineering, they said that they were full up and that they had 650 on the waiting list. And I happened to overhear a white-haired gentleman, youngish appearing, ask one of the girls at the desk about geological engineers and she said that they only had 3 registered for that. So, we went around the corner and real quick had a conversation. The
two of us came back and we decided to register as geological engineers and he was still standing there and I think had noticed this. And he said, "You know, you register as a geological engineer, there's no switching out." And we said we understood. Hadn't even crossed our minds, so we went ahead and registered. We got in with the GI Bill and 30 days later, we wondered why we ever wanted to enroll as electrical engineers when we could be geological engineers. By that time, we found out what geology was all about. Before, neither of us had known.

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And it was as a result of that that the two of us came to Fairbanks in June of ’48 on a summer program - electrical resistivity of permafrost. In other words, the resistance to electrical current through permafrost. And in unfrozen ground, you have lower relative resistance to the passage of electrical current. In permafrost, considerably higher. And then, in pure ice, very, very high. We worked in the area - the golf course area - which had some unusual traps where ice wedges had thawed and all of a sudden you had a sinkhole 8 or 10 feet deep - maybe 15 or 20 feet across. Then across the road from the golf course, behind the radio station was a pretty good permafrost area. Also worked behind Cramer's area and there there was a lot of tussocks and you could get your feet wet back there.

In those days, it was called a swamp and now in our enlightened days, it's called a productive wetland. But, then I did some work out across from the university and out in the general area that would now cross the airport runway at 26 mile which is now called Eielson. And the idea was to try, using electrical methods, to map the permafrost. Because permafrost in the Fairbanks area, is spotty in occurrence. And that's one of the methods being tried. It's not, as far as surface mapping of permafrost is concerned, it's not very helpful because, it's too much involved for too little information unless it's a high
value program. However, in the oil field business, whether you're using electrical resistivity down the hole or the well, then of course, its very extensively used and very important.

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We completed the geological survey. That, by the way, was a Geological Survey project. And in '49, during the summer, I also worked for the Geological Survey doing electrical resistivity again in the Colorado Plateau at Eureka, Utah, just south of Reno. We had one case working on the uranium prospects on the mesas there south of Grand Junction; Eureka, Utah, on lead mining areas, and south of Reno, Nevada, the Sanibar or mercury deposits associated with the hot springs there. And that's only about 12 or 15 miles outside of Reno.

The Geological Survey had this program on the temperature study of permafrost at the Arctic Research Laboratory. The Laboratory had been established in 1947 and it was established essentially as an add-on to the petroleum exploration program that was also being conducted by the Navy, so that the Office of Naval Research prevailed on the Office of Naval Petroleum Reserves to provide them logistics for it at Barrow.

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The Navy was interested in physiological projects, per se. The Geological Survey was interested in the permafrost and had studies ongoing in Fairbanks and other areas of Alaska, and the Office of Petroleum Reserves was interested in any information that the Geological Survey could provide them because they were having troubles with permafrost in connection with the stability of some of their buildings and other facilities. And earlier, when they began the exploration program in 1944, using the Seabees, they
had had problems in drilling through permafrost. So that from the standpoint of exploration in the Arctic, this was a pioneering effort and any information that you could have would advance the program.

Getting back to the fact that the Navy had started exploration there in '44, this was occasioned by the reported oil seeps at Cape Simpson and a young lieutenant in the Navy pointing out that these seeps were there and along with others suggesting that the petroleum reserve - known as Petroleum Reserve No. 4 - should be explored. The program was advanced in February of '44, accepted by President Roosevelt in April and the ships departed for Barrow in late July, arriving in August. So that the ones - this was, of course, still wartime - the ones doing the exploration were Seabees - the Navy's sea-going construction battalion.

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And they were aiming for Cape Simpson, 70 miles to the east and a bit south of Barrow. They arrived at Barrow, and I think it was the commodore in charge of the expedition who went over and consulted with Charles D. Brower, the explorer who was then in his, I guess, 83rd year. And he advised against going to Cape Simpson, suggesting that Barrow would be a better place. But, the commodore had his orders and so away they went to Cape Simpson. Four days later, they were back, to see Brower. Where did he suggest that they set up business, because he had pointed out that Cape Simpson was a mud hole. That there was really no opportunity for development of an air strip which they would need and the permafrost conditions there were not too good. That they should set up at Barrow, where there was a possibility of a landing area, there was fresh water immediately adjacent and there were people there who knew how to live in the Arctic. The commodore said, "Well, where should I set up?" Old Charlie said, "My boy, Tommy, will show you." So, Tommy Brower went out to the area of the camp, he put a
stake in the ground, and there's where the camp's flagpole was established. The Imiqpaq Lake was immediately adjacent and the whole North Slope. That's the closest fresh water to the beach that there is and this had been known since 1849, by the early whalers.

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KB: Right.

MB: So, that was the reason for the establishment there. Well, getting back. . .

KB: Now, how did you get from doing the permafrost studies in Fairbanks, to what came after that?

MB: Well, I went back to school and the Geological Survey had established this program of temperatures in permafrost, using what the Navy called recessed wells - they were actually abandoned dry wells - to drop temperature cables in and then to take the temperature readings. This was a program of interest to the Navy. They had set the program up in February of ’49, and they had asked me if I would be interested in the program with the idea of going to Barrow for 8 months. I told them, "No," that I wanted to finish my schooling first. I worked for the Survey in the summer of 1950, and again, out in the Colorado Plateau area. And they asked me again, would I go to Barrow. By this time, I said, "Yes," and so in September, I left Grand Junction, Colorado, where it was 100 degrees in the shade. A week later, I was in Barrow, where it was snowing with 8 inches of snow on the ground.

KB: So, that was September of 1950?
MB: Yes. The 16th of September, I got there. There were opportunities to get some engineering data associated with permafrost and my predecessor, a professor from the University of North Carolina, and his wife left Barrow the week before I arrived. But, he had established some temperature measurements in shallow holes that had some engineering implications. These I continued and we developed in that regard. I had my first opportunity to see the sea ice in the spring of 1952, on a program to try to get oceanographic stations off shore. The Navy had developed a project called Ski Jump and that was to use DC-3 aircraft equipped with skis, land on the ice, and make oceanographic stations. And then come on back with - in other words, a one shot deal. A station in one spot of the ocean. But, I had the opportunity to fly out north and landed about 76 degrees north and a chance to see some of the ice and to get a feel for it.

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MB: I had worked temperature measurements in fresh water ice there in the drinking water, salt water ice off in the near shore ocean, you know out essentially inside the pressure ridge area where the water is normally 15 to 18 feet deep in brackish ice, and so I was familiar with that aspect of the program as well as the engineering associated with the heat from the buildings going into the ground causing differential settlement, things of that nature.
The Eisenhower administration coming in in January of 1953 had determined that this program that had gone on for 8 years, had not discovered a lot of oil or natural gas, and should be discontinued. And so, in March, came the directive for the Navy exploration to close up shop, effective 30 September of ’53. By that time, I had 5 people working for me and it was the biggest year round program at the Laboratory. The logistic support was provided by the exploration program, and there at Barrow, they had a population of perhaps 300 in the winter time and then additional people in the summertime, as well as support of the camp at Umiat. The Laboratory had maybe 30 or 40 during the summer and a half dozen during the winter. So, with the logistics support base disappearing, the ONR had decided that they would have to close down the Laboratory. The Navy had a lot of surplus equipment there and a government agency could request it and it could be transferred at no cost. So, I went ahead and requested some vehicles - a D-8 Cat, two small drilling rigs and a bunch of other stuff and requested food supplies and fuel, to be effective on close-out. So, I had all of this stuff and all the paperwork on it, so I was figuring we'd just go ahead. I had one couple working for me, and she was my secretary.

KB: And who was that?

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MB: Art Lachenbruch. Arthur and Edith. And we just decided to go ahead and set up our own mini-outpost. Well, the ONR heard about this and they had requests and well, other people knew that I was doing this. And the magnetic observer wanted to stay and two or three others. So, then the Laboratory decided that they would go it alone on a reduced basis. And so that's the reason that the Laboratory never closed with the end of the exploration program.
KB: *So, what were you doing on this permafrost temperature project in Barrow? How did that work? What did you do?*

MB: I'd take the temperatures in the permafrost as the temperature changed over the period of a year. In other words, on a lot of the installations where we'd have a temperature cable, it would go 100 feet deep. And we'd take weekly measurements on resistance measurements which convert to temperature on a weekly basis, and some of those measurements continued for a period of 12 years.

KB: *So you'd drop the cable down in one of the old wells and take the measurements?*

MB: Yes. And in some of the wells that had mud in them, in the shallow holes, most of them, they'd drill the hole and it would have mud in and real quick you'd drop the cable in with the lead weight on the bottom to sink it in and it would be frozen in place. And others, they experimented with air drilling, in the spring of 1953. They used it to drill shot holes for seismic studies out at the camp at various sites and I was out in March of '53, at the seismic camp and the Shavirovik River area. That is just east of the Sagavanirktok River. You're familiar with that geography?

KB: *Yeah.*

MB: So, I was out there and when they'd drill the shot hole, I'd drop the cable down. They were using air drilling, so I would drop the cable down and get the temperatures of the permafrost and then sometimes, after they'd go ahead and set off the explosives for the seismic wave, I'd drop the temperature cable down in the hole and get some idea of the heat generated by the explosion. So, I was doing that when the word came that they
were going to close out the camp. So, I then went back to Barrow - that was in March of '53 - because the Navy had offered to drill some holes for me, providing the money since they had money for research. So here, in the spring, as people are saying they're going to close out, here I'm out busily drilling holes to install cables. Well, this continued on and so the Lab was there on a partial basis during the winter time and then during the summertime, there was a pretty active program.

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KB: So, when you got there in 1950, you spent the winter.

MB: The first time that I got there, it was the 16th of September. Then in February, I came to town for 3 days. Then went back, I think, and stayed 9 months.

KB: So, what was it like to winter over?

MB: Well, at the Laboratory, there were not so many people. In fact, the first winter in the dormitory, I think there were 5 of us and then that one couple that lived down in the family quarters and then 4 Native people from the village during the day and that was the staff. In the camp, there were over 300, so that you did not have too much in the way of social activity. You kind of made your own enjoyment. This was improved by the fact that there was a ration of beer that you could get every Saturday - 5 cans. And you'd also get 5 bottles of Coke. But, we did play a fair amount of bridge, a bit of poker and so we had some activity. But, generally speaking, and this is a secret of back in the oil field camps, if you worked a person 7 days a week and enough hours so that they got to eat, they might want to write a letter or two, but really, it's eat, sleep, and work. And that is the secret. I could stay because I had more things to do and that I was interested in doing
than I could accomplish in one day, so my attitude has always been, give a person 110% of the amount that you'd normally expect them to accomplish. You keep them busy, less time for mischief and less time to worry about whatever predicament they're in.

KB: *How did people get along in that close quarters?*

MB: Surprisingly well, because it's a dismal existence if you don't.

KB: *What about other times when you were wintering over?*

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MB: Essentially, the first four years, I was there all the time. In the summer of '52, I did spend some time in Baltimore writing a report, but basically, I was there full time. And they had a school, of course, and a hospital in the village and when the Laboratory took over, you could get transportation to the village. And so, we played pinochle with the principal and the assistant principal at the school and occasionally we'd play bridge. And it was at the hospital that I met my wife who was a nurse that came in while I was out on vacation.

Oh, I should mention also that I would time my annual vacation to depart right after Thanksgiving, and come back right after the first of the year. So, except for the first two winters, I always timed it that way until I got married. But, then I'd go to the San Francisco area and I'd be running around there in shirt sleeves. People would think I was crazy. For me, I was having a second summer.

KB: *I interrupted you. You were talking about right when the Lab was closing.*
MB: So, one of the projects that then came up during that winter was Project Lincoln. And I think it was MIT, and that involved aircraft coming in. And also, the setting up of camp down at Skull Cliff, about 35 miles southwest of Barrow, where they had built a LORAN tower reaching a height of 620 feet in the late '40s and that had never worked, but the tower still stood there without guy wires. And so they wanted to set up some equipment there to operate and I helped them a bit. Project Lincoln was a feasibility study for the DEW line. And so that winter, the Air Force went to the Navy and requested some equipment. They had earlier gone to the Naval Petroleum Reserve and requested equipment. I take it back on the year of Project Lincoln. It was 1953 that they were there.

Because that fall, they had requested a certain amount of supplies from the Navy Surplus and had set up a prototype installation over just east of what is now Prudhoe Bay and they had another location there at Demarcation Point in which they then did some experimenting. And the fall of 1954, I married one of the nurses at Barrow and we departed on the second of October with the idea that since I'd been there more than 4 years, the Geological Survey let me pick the location that I'd like to go to, so I picked San Francisco. But by the time I got there, they had actually moved to Menlo Park. That's down near the bay. So, I transferred there with the idea that I would go back to Barrow a couple times a year for a month. In other words, winter and summer. And so I'd been in Menlo for just about a year when the Office of Naval Research, Max Britton, wrote me a letter essentially suggesting that maybe I should take the directorship at the Laboratory, beginning in the fall of '56.

The construction of the DEW line would be about completed by then and, of course, it had been in December that the Air Force had asked the Navy for the use of Barrow and the facilities. And the ONR had issued them a permit - permit dated 10
December 1954. At one time during the construction of the DEW line, they had as many as 700 people in the Barrow camp including people living in tents on the beach during the summer. Having been exposed to the engineering aspects, the people in charge of construction for the DEW line were the same ones that had been heading the exploration program, the logistics aspects for the Navy.

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In other words, shortly after I went to Barrow, Jim Dalton had become the Arctic Contractor's manager and Chuck Lawson was, well, call him the superintendent - was the assistant superintendent for essentially the last three years of exploration. And when I say superintendent, essentially I'm talking logistics. When the construction began for the DEW line, Western Electric had the technical contract - the equipment - and Puget Sound and Drake in the western third of the DEW line was responsible for construction. The Puget Sound and Drake superintendent was Jim Dalton who had been superintendent for ARC - Arctic Contractors. The superintendent for Western Electric was Chuck Lawson. In other words, Western Electric was prime contractor, Puget Sound and Drake, sub-contractor. So, the same old gang was back together on a new project. And I was in Menlo and so people would write to me for various information that I'd gathered over the years including the depth of pilings in the DEW sites. The construction of air strips, even the small DEW line sites had a 1500 ft. air strip, so I provided the technical stipulations for the construction of the roads, air strips and foundations in the Western third of the DEW line from Tuk-Tuk to Cape Beaufort.

KB: OK.

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MB: And this was a fortuitous development. I'd been interested in those things and had obtained the temperature data and so I could go ahead and plot the temperature for the cycles for the year and then if you put a heated building on it, what sort of a cycle could you expect then? How much settlement might you expect if you put it out on the beach? The floors needed hangers at the DEW line sites. There were 6 main sites and then in between main sites, like between Barrow and Barter Island, there were 3 what they called auxiliary sites. And in between a main and an auxiliary or one auxiliary and another auxiliary, you had another site. Those were called intermediate sites, because it was a line of sight distance. So, I provided the specifications for the eye sites, the aux sites and the main sites. The main sites were just Barter and Barrow that I provided the specifications for the construction.

I was doing that at Menlo, and of course, this letter came in and Britton had said the DEW line construction would be phasing out in the fall of '56. They'd like to have me as Director of the Laboratory. Britton's rationale was that I kept the Laboratory open once before during close-out. Maybe I could do it again. And so, after a bit of negotiations, the University of Alaska had become the prime contractor for the Laboratory in February of '54, and so the question of the actual hiring of the Director was a prerogative of the president of the university with the concurrent approval of the Navy.

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So, both Britton and I had met Dr. Patty when Britton was at Barrow in August of '52. And in those negotiations, the ONR had asked the USGS to give me a three-year leave of absence. The USGS, of course, was on the Board of Advisers for the Laboratory, and John Reid who was Assistant Director and was also a reserve Navy commander was the one that was sort of the foot in both camps as far as the exploration was concerned.
And the USGS said, "One year." The Navy wanted three years and they wanted me to make a commitment of three years and I told them, "Well, let's say I'll take it for a year and if you don't like me, you get rid of me and if I don't like the job, I'll go home." And so, that was acceptable. Dr. Patty had forgotten both Britton and me, and he had made the suggestion that they had some university graduate that he could recommend. But, it took a little time for an agreement to be reached by the Navy. And so I came back in August of '56, as the incumbent Director. Britton was also aware that the IGY was coming up, and that my graduate work had been in geophysics and so I could be a bit understanding of the geophysical programs that might be associated during the IGY.

KB: *Now when you mention graduate work, where did that fall into the... you were at Washington University for your undergraduate. And then you did that USGS work.*

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MB: And I did some graduate work there, too.

KB: *Oh, OK.*

MB: And also some graduate work at Berkeley when I was there in Menlo Park.

KB: *Did you ever complete your graduate work?*

MB: No. I have an honorary degree here at the University from '65.

KB: *From the University of Alaska?*
MB: Um-hum.

KB: *Honorary Ph.D.?*

MB: Doctor of Science.

KB: *OK. So, now you're the new Director at NARL, or ARL - the Lab - getting into the IGY, which is kind of where you and Brian left off.*

MB: Prior to IGY, the emphasis had essentially been in the biological sciences. And, of course, the Navy provided the announcements of availability and they also included some funding, but modest type funding. And generally, the physical sciences require more money to go ahead because a lot of equipment is expensive. The other thing is that the funds available for research grants were not all that great. And of course, the Director's interests also had some influence on what projects might be supported. The previous Directors had been biologists.

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Dr. Larry Irving was, in many respects, the first. Technically, he was the second. George MacGinitie, a marine biologist, who had been a sailor. Ira Wiggins, who is a botanist and headed the museum there at Stanford. Ted Matthews is the exception. Ted Matthews was the first Director after the University of Alaska took over the contract in February of '54. So, Ted had the directorship for a year. Then, he was followed by G. Dallas Hanna. Dallas, essentially, was a paleontologist from the California Academy of Science. He was one of the assistant curators. And then, in '55, G. Dallas and Ira Wiggins thought maybe they could alternate years in the directorship for a while. But, essentially the directorship
was a summertime job in the field at Barrow, and you did certain administrative chores in the winter, plus maybe traveled and tried to recruit some projects for Barrow. The actual operation of the facility was left to your assistant. And that had been the case from '47 through '56.

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For instance, Wiggins, who succeeded MacGinitie in '50, and was Director until February of '53, would come up in late April and leave the first part of September for the school year. And one of the things that Britton wanted to do after Tom was finally successful in recruiting him to leave Northwestern where he was a professor and go to ONR, was that Britton wanted to get the lab on a full-time directorship condition. And also, he was concerned that the DEW line would be phasing out and he needed somebody to keep the doors open and it would be desirable to have someone that was acquainted with geophysics. And that is why he, in effect, was trying to recruit me for the job. And it was the reason that he was trying to prevail upon Dr. Patty.

(End of Tape 1 - Side B)

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(Begin Tape 2 - Side A)

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KB: This is Karen Brewster again, May 4th 2001, with Max Brewer and this is Tape 2. Why don't we talk about the ice stations. You started to talk about that with Brian, but I
MB: The original reason, of course, that the Geological Survey had asked me to go north was that they knew about my trapping experience in southern British Columbia and in those days, there was not too much known about the Arctic operations or anything like that and the Geological Survey felt that if I had trapped in the mountains of British Columbia, that I probably could take care of myself at Barrow. This was one of the things that, of course, followed through my tour in the north and essentially there is a need to use common sense. I had another aspect that was helpful in that I had been an investigator at the Laboratory for 4 years, plus the two months a year, so I had another 3 trips there before I became the Director. During that period, I'd gotten to know some of the Natives rather well and they had been very kind to talk about their experiences and their old stories. So, I had picked up a lot of Native ways of survival during the years. For someone just to come in new as Director, the Natives would be less outgoing in trying to, perhaps, educate a southerner in the ways of operating in the north.

During the IGY, there was the need, of course, to search for a place to establish a station that could operate the year round. T-3 had been discovered by radar back in, I think it was 1947. It was, at that time, not initially known that it was an ice island. So, that was considered to be one of the choices. They wanted to establish a station on an ice floe and the Air Force had as their Arctic consultant, Father Tom Cunningham, who had been a Catholic priest on the Little Diomede earlier and then had come to Barrow and was the resident Catholic priest there, so he'd had considerable Arctic experience and he was the one advising them. They had also talked a great deal to me. Their construction adviser was a man named Fritz Awe. And we'd talk a lot to Fritz. They had put out a station that they named Station Alpha on an ice floe at about 76 or so north and they wanted a second station. So Ice Island, when it was originally discovered, was called
Target-3 and later was renamed Fletcher's Ice Island after Colonel Joe Fletcher, who later was the commanding officer for the Air Force polar flights.

KB: Who set up these ice stations?


KB: OK.

MB: The Air Force under IGY. The Navy contributed money for the effort and what they did was to go out and paradrop much of the equipment. The Ice Station Alpha was breaking up and when I say breaking up, in that case, the Air Force figured that they needed an air strip about 5000 feet long on these stations for re-supply and also for safety reasons. In early January of 1959, the Alpha air strip had a crack across it, so it had been shortened and the Air Force decided to evacuate it. The Navy put up the money to reestablish the station as a continuation of IGY and the Air Force was going out to go ahead and establish it and operate it. They requested that the Navy furnish ice observers and there was an oceanographer at Barrow who had been taking gravity stations out over the ice. This oceanographer had begun the program in 1957, and was using charter aircraft. They actually used Aronca aircraft.

The Navy had a group visit the Laboratory that fall and during the visit, it was decided that the Laboratory should have its own aircraft rather than chartering whenever it wanted to send somebody into the field. So, in the spring/summer of 1958, the Lab purchased two Cessna 180s, and hired it's own chief pilot who had also flown for an oceanographer out of the Naval Electronics Laboratory at San Diego. The thought was
that if you could use light aircraft to go out and hunt polar bears, which was a common practice in those days, that you could also use them to do useful work, so that we could make oceanographic stations as well as support our on-land programs. So, that was the beginning of the Laboratory's venture into the aircraft business.

KB: What was that oceanographer's name?

MB: Allan Beal. And so, the Air Force requested that the Navy furnish the ice observers, and they're flying two P2Vs. Well, the flights just to get to Barrow were almost two hours and then 10 hours out over the ice, meant that it was a 14 hour day, so that meant that the pilots could not fly every day. Allan and I went on the first trip and then he had to leave, so I had the duty of flying daily with a different crew. And we found that generally the ice north of about 76 was usually a good area for ice floes. Northeast of Barrow was a good place to establish a station because the Beaufort Sea gyro is clockwise and it tends to bring heavy polar ice down to the south. And that polar ice, then, swings around and goes up to somewhere near the Pole, depending on what part of the gyre you're on.

I flew 140 hours in 10 days and generally, I found an area with good floes about 76 north. The idea, then, was to go out with the Laboratory Cessnas and an Air Force DC-3. The speed of the Cessna and the DC-3 is quite compatible - about 135-140 miles an hour, so that they can fly together. We got out, did not fly into the floe that I had originally picked. We searched around and found a separate floe that we could land on. We landed, checked the thickness of the ice, and determined that it would be a satisfactory place to set up a station. The ice was about 7-8 feet thick on that floe so that it was multi-year ice. And additionally, by being multi-year ice, that meant that you could take the top part of the ice and use it for drinking water.
So, the Air Force landed in the area that we chose. Captain Smith, who had been the last Air Force commanding officer on Station Alpha, was now the new commanding officer of Station Charlie. The Air Force dropped equipment and set up a station. This was in the spring of 1959. That station continued through the summer. It was occupied through the fall and early winter of 1959 and in early January, about the 4th or 5th, a crack ran across the runway, reducing the useful length of the air strip to about 3500 feet, which was considered to be too short by the Air Force. I happened to be in Palo Alto, California, at the time. We were expecting the third daughter to arrive, and I had taken Mary Lou to the hospital when the phone calls started from Washington, wanting me to head back to Barrow to go out to the ice. And Max Britton was coming from Washington and the idea was to convince the Air Force that 3500 feet of air strip was fine. No need to evacuate the station.

I demurred about going immediately because Mary Lou was in the hospital. She'd gone into labor and then she and the daughter decided they'd get a good night's sleep before any further activity. So, during the night, there were more calls for Dr. Brewer in the hospital and I think that the nurses must have felt that I was working on an emergency case or something or other because I was mentioned more frequently than any of the medical doctors on their PA system. Paula arrived on the morning of the 7th, so that evening, I took off to Barrow and met with Britton and the Air Force flew us to T-3. The two of us felt that the station was in fine shape and should continue on, but the Air Force people overruled and determined that it would have to be evacuated.

This convinced the Navy that they didn't have a great deal of control with a third party operation, so they asked if the Laboratory could put out a station using ice breakers. I said, yes, we could, but if you put out an ice station using an ice breaker, this meant that you were putting out an ice station that had no air strip. So, if you put the station out and
didn't have an air strip, there was never any reason to evacuate it if you lost your air strip. That was the initiation of the Laboratory getting into the business.

(200)

We proceeded to construct the huts to use on the station. The Air Force, on Station Charlie, had used helicop huts that were about 6 ft.x 6 ft. x about 12 ft - very expensive. They cost about $14,000 a piece. So, we designed huts that were 12 x 16 ft. in size and they were constructed in our own shops. The idea there was that the engineering would say that you would put a vapor barrier on the exterior of the hut, but on the other hand, you need a wall to hang your pictures on and also your instruments and a few other things on the inside, so that in order to cut down on the weight of these huts, they were designed differently than you would design if you were using engineering. For instance, in the walls, we used 2 x 3s instead of 2 x 4s. Also, in the roof, 2 x 3s. Now, in the floor, the floors were solidly constructed. These huts were built in 8 ft. panels and strapped together as a panel. The interior wall was 1/4 inch plywood and then you had 4 inches of insulation with the aluminum foil on the outside and then you had your vapor barrier - visquine, 6 mm - on the exterior. These were set up so that two men could go ahead and take the packages and construct the whole hut within half a day. And with the lapping, everything was built according so that you had the laps that would fit over the 2 x 4s to give you a good floor and windproof sides, and then the vapor barrier was nailed to the 2 x 3s except at the bottom and the idea was that any moisture from the interior of the hut would go out and would collect on the vapor barrier and then what you do is just run around the edge and tap the vapor barrier and the ice would fall down and continue on since you didn't tack it at the bottom. So, you didn't have to worry about the building sweating.
The camp was laid out in U-shape form with the base of the U being the mess hall and kitchen. Those are activities that people are always going to. And the next would be the washroom. And then you had the sleeping quarters and the scientific quarters on each of the arms of the U. The very ends of the U, you had a generator on each side, so that here the activities all getting together were here at the base of the U, then you spread out with the quiet areas closest to the mess hall, and then the noisy areas out at the end to be helpful for sleeping and what not.

KB: So, the sleeping quarters were next to the mess hall or were they closer to the generator end?

MB: They were closer to the mess hall. Besides, if you want a cup of coffee, you don't want to have to put on a parka to go get a cup of coffee. And the equipment in the camp, initially, was one Weasel. That was the only operating equipment and with that, the re-supply was light airplanes - Cessna 180s. So, since we didn't have a big air strip, we didn't have a lot of running equipment. The biggest were the two generators - AKW Witte generators. And those are very slow, long lasting, generators. They go thud, thud, thud, thud, thud. But, they don't wear out so easily. They weigh about 3,000 lbs. a piece and the Weasel enabled people to get around and also to drag an area to keep the snow drifts down for ease of landing.

Now, when you come right down to it, it is common sense to build a camp like that. But, I can't claim all together that it was my common sense. Because in the very
early exploration camps on the Petroleum Reserve, they had used the same configuration. And it was with the same general attitudes in mind as to considering what people would be doing, then trying to make it so that they can do what they want to do naturally that will cause you the least bit of headache or other problems.

KB: *What kind of science was done at ice stations?*

MB: Generally, geophysics. In other words, seismic, magnetic, gravity. Oceanography, both physical and biological. Now, from the standpoint of doing seismic, you could get the depths of water. And then with your biological, and with seismic, you know, you get very close spacing. If you did it oceanography-wise, like Nansen did in the 1890s - '93-'96 - that means that you're lowering equipment and out there in the central Arctic basin, you're down to depths of 10,000 ft. So, that's a lot of work to drop a weight down there to see how deep it is when you can get it with just a little seismic charge. But, on the other hand, oceanographers, they want the biology and the upper portion of the water which is more interesting to them, but they want it all the way - particularly temperature and salinities. And then occasionally, they want a bottom core. And there are your climatological parameters. And then snow and ice studies. To get these various parameters on the ice stations, there was usually about a dozen scientists. Some were professors and part-time people. Basically, the majority of the workers were graduate students past the Master's level.

KB: *Do you remember what some of the important findings of the ice stations were?*
MB: Of course, to monitor the depth is one of the big things that they get. And then the biological aspects there was to get some idea of what was there because, basically, in some respects you know more about the surface of the moon than you do about the bottom of the Arctic Ocean. It's just like even in the more tropic or temperate areas, the idea of, for instance these smokers at depths where you have tube worms living right next to the emission of very high sulphur compounds and this is without any aspects of what normally had been considered the necessities of life. Another aspect, of course, was the temperatures. Ocean water temperatures and bottom cores with the idea of determining the rate of sedimentation in the bottom and just how long some of the remains of the various animals that had died and whose hard parts had settled into the mud. And there were also some upper atmosphere observations such as the aurora - the all sky cameras and things of that nature. Because the aurora is not symmetrical around the Pole, and it's on the US side.

Now, when you're choosing an ice station, you have to consider that in the Beaufort Sea, you have a clockwise gyro. In the Chukchi Sea, you have a counter-clockwise gyro and so you have to keep these things in mind as you chose a station. Also as you try to reach a station. For instance, you fly to the northeast of Barrow - say you go out 75, 76 degrees north. There, you can usually count on heavy polar floes. You go the same distance to the northwest and you run into broken up ice. Then, you head north out of Point Lay which we have done using ice breakers and between the confluence of these two gyres, you can take an ice breaker and patiently, even the old Windclass breakers - the 6,000 toners that the US was using in those days - you can work your way north by staying in this juncture of the two gyres, moving when the ice is relaxed and sitting there and playing pinochle when the ice is tight.
Because there is no sense banging your head against a brick wall just to see how good it feels when you quit. And when we put out the ARLIS-I, this was using the Burton Island ice breaker - the Burton Island and the Staten Island were the two ice breakers the US loaned to the Soviets during the War and finally got them back in about '47. But, we used the Burton Island and the ice - I had made one flight out. Of course, you know when you put out a station like that, you do it in the fall. And so I had made one flight of P2Vs out to 75 north and then I requested the pilot to head straight east as far as the fuel would allow him, and then head back to Barrow. And in that flight going out, I had noticed that as we went eastward, that the ice was more relaxed and we did not get as far as McClure Strait that's between Prince Patrick and Banks Island. I thought that there might be possibilities of floe beyond, so in the fall of 1960, the ice was very close in to shore and very thick. And so, we loaded the ice breaker and then instead of trying to head out in the direction that we wanted, we went along the coast from Barrow to Barter Island, on over to about Demarcation Point, and then headed north, paralleling the coast of Banks Island.

(450)

When we got off McClure Strait, then we turned westward - we're at about 75 north - we turned westward and penetrated in 210 miles into the pack. I was occupying the visiting captain's quarters and that's a nice place to be. It has all the advantages and none of the working disadvantages. And I ate with the captain and the captain tended to be a very gung-ho type - Griffith Evans. He was full commander. And this was his third command in a row - very unusual in the Navy and particularly with a reservist because he was a reservist. So, he said, well, it was his last hurrah and as we're going into the ice, it was slow working, but we were working. We got in and one day there was a P2V overhead - a Kodiak - and so, they did ice reconnaissance and the ice looked very tight and the plane got back in and so the admiral in the Kodiak radioed the captain giving him
all of the good ice information which was not worth a hoot, and then asked, "What are your intentions?" Well, in Navalese, that says, "The ice is tighter than all get out. What in hell are you doing in there?" And "What are your intentions?" after bad news is "What in hell are you doing there?" So, he radios back, "Establishing ARLIS-I." And that was all that went back. Well, we came to an area that looked like a reasonable floe.

(500)

Well, before we got there, the captain had said, "Max, we're running a little short on water, so maybe short showers." "Oh," I said, "You got a problem? No, no problem. There's water all over the place here. It's early September." So he said, "What do you mean?" I said, "See out there along that floe? There's water there. Nice fresh water and there's more over there." He said, "Yeah, but I've got to tie up someplace." "No, no problem." And I said, "You pull over and we'll put in a couple of Eskimo deadmen."

KB: What's that?

MB: The Eskimos don't call them that, but I do. What you do is you cut a hole about 18 inches or so square. Cut it down about 2 feet and cut another hole over here about 16-18 inches apart, then you take a pick and you chisel between the two. Then you run your rope, your line, through there and you tie up there. Now, when you're tieing up at a wharf here, you go ahead and you take the line from the boat and you tie it around something on the dock and it holds you in position. So, here you just use the ice. And you tie up there and that's the finest. And so, here a deadman is something to tie up to. It's a phraseology. And so I got off the ship and climbed down the rope ladder and went over and the executive officer goes with me and I said I needed a hatchet and he had a hatchet and of course, a couple of sailors went over there and here I started chopping in the ice and
there's water. I reached down and got a handful and said it tasted OK to me. How about to you?

(550)

The Exec Officer said, "Oh, that's better than we can make on board." And so my work was done. He hollered up to the chief up there on the rail, he told the old chief what he wanted and bingo, down came the sailors and the hose and everything just moved along and we were a happy crew and I said, "You know, any time you want water, just let me know and we'll find another spot." Because, see when ice or snow melts, there are depressions and this is old ice, not new ice. Old ice, there are depressions and so if you just spot those, you go and cut a little hole and start hauling up the water. No strain, no pain. That, by the way, is now in the Coast Guard manuals. And they use the word "Eskimo deadmen."

(End of Tape 2 - Side A)

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(Begin Tape 2 - Side B)

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MB: You want to find some hummocky ice because that tells you that it's old ice - two or more years old. In other words, it's been through at least one thaw season. You want to find, hopefully, a reasonably flat area in this old floe so that you can establish an air strip without too much difficulty. You want to find the surrounding ice in not big floes, smaller floes, maybe that's broken up a bit. If you can establish your camp and other
things being equal, you establish the camp so that it's not so far from the edge so that you can put out on the edge there of the floe, an oceanographic wanigan. Now, if you put an oceanographic wanigan out there, you're either going to have to have a small light plant or you're going to have to use batteries for operation, so that there are pros and cons of that type of location.

If you establish your station in the middle of the floe, then for some things that you might want to do, you have difficulty because you may have to dig down through 8, hopefully, maybe 10 feet of ice. Now, to cut a hole in 10 feet of ice that you can put equipment down, that's a lot of ice chipping, particularly for people who are not used to that sort of thing. It's not like when they were exploring for gold here in the Fairbanks area where some of the people of European stock who were used to hard work would go ahead and dig a shaft through the overlying silt and through the gravel to near the base of the gravel to get at the gold. When they were doing that, 8 x 8 x 8 was a shift's work for two men. One fellow with a pick and shovel, the other sharpening the picks and pulling up the material. And so, we don't have people with that background anymore.

You want a nice big floe, but not too big, because some floes are 25 miles across even, but about 4 miles is good. And you want it to be surrounded by smaller floes. This means that if there is a pressure due to shift in winds and what not, this previously broken up ice around the edge is very weak so that when it comes up against this old floe, it will just break up some more and it won't break your floe.

KB: OK. Interesting. So, after Station Charlie, you had ARLIS-I?

MB: ARLIS-I.

KB: Which was what years?
MB: ARLIS-I was put out in September of 1960, about the 21st or so of September. Then, as I mentioned before, the admiral asked, "What the hell are you doing there?" but, politely. We go ahead and try to backtrack. The next day, here are people from the station. They come out and they are 200-300 yards away. They're waving to us and we're not moving very fast on the return.

Well, during the construction of the station, as I recall, we put up 10 huts, including the mess hall. And what it was was that here we had a Weasel that was off-loaded with a crane, and it would pull the generators into place and it was being active, but the construction . . . here would be a little bit of hut materials going up and here would be the executive officer - he'd be lead dog and sailors pulling. In other words, it was hand constructed. But, we put up 10 huts in just about 2 days time. So, it was 2 days time to build an active, on-going station. Now, the Air Force station had taken them a week or 10 days, because, among other things, they had lots more equipment parachuted in and everything was dependent on the runway. Well, as we left, they had no runway. So, we could never say they were worse off from the day that they started. So, that was the intent.

Well, the second day, we got moving a little faster in the ice breaker and made it out the same way that we went in to the ice. Now, this was done in September, 1960. If you look at Life magazine, I think the October issue, or one of the October issues, 1961, the big spread - the Soviets had put out an ice station by ice breaker, using the Lenin. Life magazine gave them a rousing spread and it went on to show that we were not very well PR oriented in those days because we beat them by 13 months, but they got all the credit. And they had an ice breaker with umph because, whereas we had a 6000 ton ship that put
out about 12,000 KW power, they had the Lenin which was about 19,000 tons and it was atomic powered. So, that was different.

That station operated on through the winter, re-supplied entirely by Cessna 180s, because those were the only aircraft we had. So, then, in March of ’61, by that time, the station was northwest of Barrow, still about 75 degrees north, and the Navy was interested in putting out a station a little further north and back again to the northeast. So, we were, in the winter of ’61. . . well actually, it was after the first of the year, we had constructed the units for ARLIS-II. And we were ready to go when we had a shop fire at Barrow and all the units were stored in the shop - the wanigans. This meant that there was a real quick re-building operation. We got it done and we'd gotten the DC-3, the first DC-3 that we had in the spring of ’61.

(100)

So, that when we evacuated the station in March, we were able to take off all the equipment except the Weasel. We got the generators back and the evacuation of the station was under the tutelage of Kenny Toovak, our Native shop foreman, because he was well acquainted with how to do things. He salvaged the material, including the doors and windows of the wanigans except for the mess hall kitchen. His argument is that you never deprive someone that might come on of shelter, so there was shelter in case someone needed it. This came back to Barrow. Now we had the DC-3, and so we had now moved into the big time. We can do something with our own aircraft.

So, we go ahead and rebuild the units for the station. People said that it was too late in the year to put a station out, but we went out about the 20th of May and we loaded up the DC-3 and the two 180s - those three aircraft flying together. I was flying in the plane with Bobby Fischer and reading the Wall Street Journal and glancing at the ice and in the three planes we had 8 people. This meant that, say that we had an accident with the
DC-3 on landing, that we could all come back in the two 180s. That was our safety. And I said, "Bobby, are we off course?" "No, no, no." In other words, that was something you didn't ask Bobby Fischer because he knew the ice well and he'd been flying. "No," he said, "we're on course." I said, "Dammit, Bobby, there's an ice island over there - T-3." "No, no." I said, "Well, let's swing over and take a look at it." It wasn't T-3. It was a new ice island that had come into the area and this was 72-10 north. In other words, about 110 nautical miles out of Barrow, and not very deep into the pack. So, we flew around it and I could see that it was an ice island about 2 x 3 miles area, broken in the center and it had broken earlier and there was a refrozen lead that penetrated a bit into the center.

(150)

I said, "Bobby, let's set down here." Bob Mean was flying the other 180. And so he came in and I ran around the area there and told the others, I said, check the thickness of ice in the lead and they came back and I've forgotten - I think it was about 3 feet. Anyway, I'd been out and checked the area and I said, "OK, what do you think about bringing the DC-3 into that re-frozen lead?" Bobby said, "Fine." So, they landed and picked out an area for the station. We man-hauled the stuff over to that area which included radio, generator, and one hut. And there were two native carpenters to put up the hut.

KB:  *Was that Joe Ahgeak and Harry Brower?*

MB:  Not Harry. Amos . . . no, at that time . . . Amos came later. Joe Ahgeak and Baxter Adams. Baxter was the son of John Quincy Adams, and Baxter was the father of Jacob Adams.

KB:  *So, this is ARLIS-II, right?*
MB: Yes. And the whole idea there is, we had a unit, quarters, radio, and power. And two Cessnas sitting there, because the two Cessnas had to sit there overnight while the hut was going up. And that was our safety aspect. We had the two pilots, the two carpenters, the radio operator. We did not have a mechanic.

(200)

So, then the pilot, co-pilot and I went back to Barrow after they got established. But, the two Cessna 180s had to stay there until the hut was up and they had established radio contact with Barrow. And that was the deal.

Well, then we started flying in the equipment and we moved from the lead onto where they had smoothed out an area on the ice and it was in that area, nice flat area, that we were hauling because you see, it was getting close to the spring melt season and we had a lot of this stuff out there. And on the landing area, we had gone from ski wheels, because if you're on ski wheels, that's 1300 pounds of weight and that cuts down on your freight capacity. And we were flying heavy to get the stuff out there. And so, coming in to land, they had not noticed, but earlier there had been a crack in the ice and it went across the runway this way, and there had been a warm day and the plane went this way, nosed up, and curled the props and it nosed up, then came down and broke off the tail wheel, the yoke. And that particular flight happened to be carrying explosives, but they were C-14 type which is a benign explosive until you go ahead and really try to explode it. So, the pilots came back in and asked how do we get the plane out? And I actually had to charter a plane and I went out and inspected it and saw what had happened and said, "Ok, forget the airplane. We’ll just use two 180s," and by then we had some 195s, so I said we'll just take a 195 and go ahead and get the station in shape for the summer because we were going to have 16 people there. So, this was fine. We flew around the
clock getting supplies out there and as we finished up, it was about the 13th of June, and then I told the pilots, "OK, now we'll take a look at the plane," because we were safe for the summer. And so, they called the pilots in and the aircraft mechanic was a big, tall black man by the name of Frank Quates. He must have been 6'-4". He'd take a basketball and scrunch it down with his hands.

(250)

KB: How do you spell his last name?

MB: Q-u-a-t-e-s. I hired him from Seattle. Very affable man, and he was also a fine pilot in his own right. In fact, you know, I was sort of a cheapskate in those days, because the three pilots that I hired - Ed Donnelly, Frank Quates and Cliff Aldifer had all been pilots and they'd sort of, as their piloting years phased out, they had become aircraft mechanics. So, I said, "OK, let's go get the DC-3." They said, "Yeah, but, both props and the tail wheel are damaged." "Well," I said, "You know I traded the Air Force on T-3," - they had left a DC-3 out there and you may have seen the picture of the airplane sitting on the pinnacle? Well, that's the old Air Force DC-3. And so, the people in the station, I had traded them the tail wheel and yoke for a case of whiskey and they put the stuff on our planes and brought it back. Government procedure was sort of bent a little bit and I said, "OK, we got the wheel and the yoke." Well, they said, "No problem." But, they needed the props. I said that's a real problem. And the airplane was in the ditch with the front wheels down in the ditches almost 6 feet deep and how were we to get it out? And I said, "Kenny, you know that airplane doesn't weigh as much as a whale." "I'll go get my whaling gear!" and he was off to get his whaling gear - block and tackle - so, I said, "Well, now we need props." My understanding on the props is that you can break them down and you can mark the cone and the prop and you could put a scratch mark across
there and then disassemble them. I said, they fit in a Cessna 180 and a 195. Frank said, "No problem except getting them up there." I said, "Well, we've got some 2 x 4s at the station. You can make an A-frame." That seemed like it would work out. "OK, no problem."

(300)

So, I said, "OK, Kenny, we can't spare you for the summer. You go out there with the two Cessnas and the other pilot and the mechanic. You can go out there and with the whaling gear, you can get the airplane back up on the runway. You can come back with the pilot. The third pilot and the mechanic, if you fellas want to come back this spring, fine. If you want to wait until fall, fine." So, away they go. Kenny had the airplane up on the runway with the new yoke and wheel on it in about an hour. They had the new props hung on the plane by evening. They called in and I said, "Well, you'd better wait until morning. The weather's bad here." So, the next morning, they went ahead and pinned the wheels so that the wheels could not be retracted. They were in the down position. And they flew the airplane back to Barrow the next morning.

Well, when do we get it fixed?” We needed to take it to Los Angeles for overhaul. And I said, "This fall. We've got to run the summer program. And this fall we'll take it down." So, that fall, we took it down and it was with the wheels in the down position the whole trip to Los Angeles to Air Research. Meanwhile, we conducted the summer business. The ice station continues on and it went across the dateline that fall - this is ARLIS-II. They scientists on the station said, "We're in the Russian sector now. What should we do?" And I radioed them back, "You take care of science. You leave politics to me." And it was that fall, on the way back from the station, that we had the forced landing.
KB: *What year was this?*

MB: Forced landing was on November 15, 1961. We returned to land on 17 November.

KB: *So, ARLIS-II was set up in March of 1961.*

MB: No, ARLIS-I was evacuated in March of 1961. ARLIS-II was established in late May of '61.

KB: *OK. I see. And so this is November. And how long was ARLIS-II in operation?*

MB: ARLIS-II continued in operation, went to within about 90 miles of the Pole. It was across the dateline almost 18 months, something on that order. It fiddled around up in that general area for a while and then in the winter of '64 or '65, it sort of floated out of the Beaufort gyro and started down the east coast of Greenland and the last flight to ARLIS-II was early April of 1965 - the last flight from Barrow - 18 hours flying time in a DC-3 and 4 hours out of Keflavik, Iceland. So, it was coming down between Iceland and Greenland.

So, John Schindler was on the last flight to ARLIS-II. Bob Murphy was the pilot and Dick Dickerson, co-pilot. Dick, later became a chief pilot. And John reported that they'd been flying for what seemed like hours on end and Bob Murphy came back and he was not a big man and he said, "John, ain't we ever going to get there?" And John said, "You know, that's not all that reassuring to have the pilot tell you that." But, it was a long trip. John went on into Iceland with the DC-3 after landing and John set up the system for the eventual evacuation and the ONR Navy had made all the arrangements, but still you
have to set things in motion. So, John had the liaison duty there with the admiral who was actually the NATO commander for Iceland.

(400)

And then, Dr. Wood and I went over in May. No, we went over earlier and Dr. Wood came back and I stayed over there. So, I guess we went over about 15 April.

KB: So, was that the last ice station or did you guys put another one up?

MB: No, we put out ARLIS-III, IV, V, and VI, then, in succeeding years. We actually had, for instance, we put out ARLIS-III in, I think, about '63. But, those were just temporary stations. However, the Air Force had evacuated T-3 because T-3 was ice 130-140 feet thick from Ellesmere, and it had become grounded northwest of Barrow. So, the Air Force had evacuated it.

KB: And when was that?

MB: I think that they evacuated it in the fall of '61, when it was out northwest of Barrow. And then, in February of '62, I was down south and I got a call that the pilots had spotted T-3 at 73 north and so I told John, "Go ahead and put a skeleton crew on," because when the Air Force had evacuated it, they left all the equipment and everything on board. So, John put a skeleton crew on and we asked the Navy what should we do next? The Navy said, "Stay with it." So, in effect, we were then operating two ice stations and the operation of T-3 continued, the lab operation continued through John's tenure to about 1975.
KB: *T-3 did?*

MB: Yeah.

KB: *Wow.*

MB: And T-3 went in more towards the center of the gyro so that it went around faster. As we determined from the movement of ARLIS-II, when you're in the gyro on the outer edge of the gyro, it's about two years from north of Barrow until it reaches the general vicinity of the Pole and about 8 years back. So, if you're on the outer limb of the gyro, it's about a 10 year round trip, but if you're on the inner part of the gyro, it's about a 4-5 year round trip. And in the Chukchi, the ice is minimal for the establishment of ice stations, so that's why when the Russians established a station, essentially they were over in our sector. And of course, this is one of the reasons they might have been so quiet when we were in their sector, although the US doesn't recognize sectors. Canada and Russia do.

(500)

KB: *Now, another ice project that I've heard about was AIDJEX?*

MB: Yes. AIDJEX is a spring operation and it occurred after John's tenure as director. And it was put out about 75 north. And it was a big project, but essentially a short-term project.

KB: *Who put it out and what was the purpose?*
MB: The Laboratory put it out with the . . . I think there was some contract aircraft involved, but this is a subject better discussed with John or with well, actually, Warren Denner was Director during that period. But, John or John Kelly who came after Denner would be more knowledgeable.

KB: *I've heard of it and I didn't know what time period it took place in. So, it was in the '70s?*

MB: It was in the 1975 period.

KB: *And what does AIDJEX stand for? Do you remember?*

MB: The J is for joint.

KB: *Arctic Ice Dynamics Joint Expedition. I think there's a D in there.*

MB: Yeah.

KB: OK.

(End of Tape 2 - Side B)

(000)
This is Karen Brewster with Max Brewer, May 4th, 2001, Tape 3. We finished ice stations, so I wanted to ask you about the rest of your career. I know you were the Director of the Naval Arctic Research Laboratory until 1972?

MB: July, 1971. And then, in that spring, or actually early February, Governor Egan had called me in the primary there in '70. Egan had been running against Carr in the primary and Carr had said that - this was after the NEPA had been signed by President Nixon - and Carr said he was proposing that they set up a Department of Environment for Alaska. So, in February, I got a call from the governor and he said that he had put in the bill and was I interested in becoming the first Commissioner? And I told him, yes, I was interested. Then, in early May, I happened to be in Spokane visiting my mother and I was out in the garden on a Sunday and she came out and said, "The governor of Alaska is on the telephone and wants to talk to you." So, we went in and he said that the legislature had passed the bill. Was I still interested in becoming Commissioner? I said, "Yes." He said, "Why don't you drop by on your trip back to Alaska?" Then he said, "I haven't mentioned anything to anybody. You can just stop by Juneau and talk to the Attorney General."

And so, I went by and it was actually one of the assistant attorneys general, so we were talking about housing and such and he said I should talk to the governor. And he said, "Well, I'll sign the bill later in the month. Maybe you could be down here for the signing." So, I said, "OK. Now, I've got a speaking engagement in Fairbanks." It was some transportation meeting, and he said that was fine. I could catch the afternoon plane and come on in to Juneau. "Good." So, I went to Anchorage. The family had been in Anchorage that year because my oldest boy had run out of school at Barrow and instead of shipping him out, I didn't want to split the family, so the whole family moved down to Anchorage. On the way to Juneau, I was overnighted there and, of course Mary Lou had known, and John knew about the original call. So, I told the oldest boy, went on to
Juneau, and it was a little before 10 AM. I went over and the governor had assembled various people including the Commissioner of Health and Social Services, Fred McGuinness, who had been president of APU. The governor had called Fred and told him they were going to swear in a new Commissioner for the Environment and would Fred like to be at the ceremony?

Fred said, "Well, yes, but you know, it's always been that when I attended a christening or a funeral, I've always asked who the guest of honor was." He said, "Would that be too much this time?" The governor said, "No, I guess not," so he told him. But, here, from February to late May, that offer had been in the fire and yet there had been no rumors or anything and that afternoon I went on back to Anchorage with the family and took the two boys for a haircut, I came back and my oldest daughter came out and she says, "Hey, some guy named Brewer is going to be the new Commissioner! It's a headline." I said, "Did you read any more?" "No, why?" I said, "Maybe you should read the thing." And so it came out, but it was one of the well kept secrets in the rumor-mill in Juneau.

KB: So, it was the Commissioner of Environmental Conservation?

MB: Um-hum. I was the first Commissioner. Served until December of '74.

KB: So, July, 1971 to December, 1974. So, then what did you do after that?

MB: Then, the oil shock of 1973 had caused renewed interest in exploration in the Petroleum Reserve and the Navy was up there. They'd done some seismics and they had drilled one well and then there had been complaints, and so they called for an impact
statement. So, they had contracted to write an impact statement for what they called Zone A which was the northeastern corner of the Petroleum Reserve that abuts the area near Prudhoe and they had sent me a copy of that to critique, which I did, and had also offered me the job of chief engineer and environmental consultant for the exploration program on a contract basis. So, here I reviewed the environmental impact statement and I pointed out quite a few problems with it. So, I sent the review in and I was back in Washington, and they were in the process of hiring the prime contractor to take over for the full exploration program and they had asked me to go back there and write an environmental impact statement for geophysical exploration in the entire reserve, which I did. And so I was finishing that up and that wasn't so long and the question of the contract for the final EIS for the northeastern corner came up and the Director of the Naval Petroleum and Oil Shale Reserves said, "OK, I want no more fiddling around with this environmental impact statement. Max, you write it."

(100)

So, 429 hand-written pages on legal size paper and it had to be signed in late October, the 23rd of October, I think, because President Ford was going to Japan and he had to sign the contract before he left. The only way that they could get the contract signed was for the environmental impact statement to be completed. So, I was writing in the library of the Naval Petroleum and Oil Shale Reserves office, and as I would finish a page, the Executive Officer would take it to the typist and when I got to the last of it, I had written for 49 hours straight. I couldn't leave the library except to visit the facilities. They brought hamburgers or whatever else I wanted to the library. I could eat while I wrote. And that went to the Deputy Secretary of the Navy at 10 o'clock in the morning. It went to the White House and President Ford signed it at noon. Then he took off to Japan, wearing pants that were about 3 inches too short. But, after the Teapot-Dome Scandal in
1923, it was set up so that any contracts having to do with petroleum - at that time, they took the petroleum and oil shale reserves from the Department of Interior and gave them to the Navy and the Secretary of the Navy had to approve it and the President had to sign it. So, that was the convoluted aspect there.

So, I then came for an impact statement for the entire reserve. So, again, the contract and I was to monitor the contract. And I had a fair number of problems with it. So, when it came to the final draft of that, the Navy arranged that Max Britton and I go to San Francisco and they put us up in a hotel and they had Navy people there and all the secretarial support and what not and the two of us came up with that document - 700 and some pages of writing, plus appendices. Two volumes about yeah-thick, total.

(150)

Congress had passed the Petroleum Reserve Act in May of 1976, and it required that the Navy give over what had been called Pet-4 to the Department of Interior for the continued exploration of the petroleum reserve to be effected by 1 June 1977. During that year, the contract had been left in until only while it was drilled by the contractor which happened to be Husky Oil NPRA. And so, here I'm chief engineer and environmental consultant. So, that was fine. Well, of course, the Navy lost the lease to Interior, and so there was a big going-away party on Friday evening. This was fine. I enjoyed the party. And meanwhile, the Survey had been designated as the exploration partner, the BLM is the landowner.

KB: USGS, is that who you mean by survey? Geological Survey?

MB: Yes. And so, the Geological Survey came back and said, "Max, we want you to be Chief of Operations for the exploration. You've been on WE - which is when actually
employed leave - for 21 years. It's time that you came back and go to work." So, I had my going away party on Friday evening. Monday, I'm sitting at the same desk, Chief of Operations for the USGS.

KB: So, your other position as engineer and environmental consultant had been with the Navy?

MB: Yes. So, in other words, I got my party and just put on a new hat.

KB: You got to have your cake and eat it too.

MB: Yeah. Then I was in that position for the . . . we were actually very active in that operation into the drilling through '81, and then the clean-up aspects until about '85. And then there was some question about the reserve pits into about '91. And during that, I was also appointed to be the USGS Director's Representative in Alaska. So, I was wearing a couple of hats again.

KB: So, when did you start the Chief of Operations job?


KB: OK.

MB: That's as close as I can get it.

KB: Very precise.
So, then the Laboratory was closing out. The reason it was closing out is a long story which I can get into a bit later, but this close out of the Laboratory occurred in the end of September, the end of the fiscal year, 1980. Part of the duties of the USGS was the operation of the gas well for the Barrow community and associated government installations. So, in order to operate the gas well, you need a headquarters. So, in effect the Laboratory went from a scientific organization to a logistic support organization and with the Navy's prime contractor providing the support - that was Husky Oil NPRA. As the Chief of Operations, I was then responsible for the operation of the gas fields at Barrow, and responsible for the facility. So here, I was, in effect, back directing the operations of the Laboratory, but this time, from headquarters in Anchorage. And that continued on until the gas fields were turned over to the Bureau in September 30, again, 1984.

So, I had another 4 year stint associated with the Laboratory, during which period there was not a scientific program at the Laboratory. However, science could be approved for support at the Laboratory and I was the approval authority for such scientific programs, not only at the Laboratory but also at the exploration camps during the period when there was active exploration. So that during the period while I was really still with the Navy but in effect, more so, after June of 1977, I was very active in the support of scientific programs on the Petroleum Reserve from then through '84.

KB: OK. We're doing the highlights. I'm just trying to get a general overview of everything that you've been involved with, then we can go back to details. So then, after '84 when the gas wells went over to the Bureau, what did you do? Did you still work for the USGS?
MB: Yes. I continued there. One of my other chores was representative of the Director. There was also the disposal of property and equipment - the winding down of the program and there was some question as to whether it was environmentally sound for the reserve pits to remain open and it was my contention when I mandated that they remain open, that it was environmentally superior than trying to cover them.

(250)

Some of the environmental groups disagreed with that and EPA put out some reports on the proper way of wrapping up the exploration site. And I had the opportunity to review those. The EPA had hired 7 consultants. They had gotten information from their consultants that was in some instances, contradictory, and in some instances, off by a very large factor. And so, this forced me to dig back in my memory to my earlier chemistry and so on. The water resources division ran a two-year, 3 million dollar study on the whole aspect and then the final proof on it is using Russian and Chinese data to prove out the chemistry that I was trying to get the EPA . . . because they would just hire somebody that went out and looked at water. They didn't hire somebody to look at the overall system. And, for instance, say that you have water with salts in it. And say that you freeze the ice. The first thing that happens is the salts are extruded because ice crystals try to form purified. So, the only way that you get impurities is between the crystal boundaries. In a normal freeze, 85% of the salts are extruded outwards and you freeze down, you come to the bottom of the pit, you extrude the salts into the muds where they become fixed. You do this for several years, you tend to purify the water to a very great extent.

(300)
If, on the other hand, you try to cover, then the capillarity goes ahead and when you freeze something and especially if you have a bit of turbulence in the air, what it does is the capillarity brings the salts to the surface because the water has tended to freeze out, concentrating the salts on the crystal boundaries so that you bring it to the surface. Well, that's the way you get salt flats in the south 48. And here, I tried to point this out and we had a good example. The first one that the Navy drilled had been covered and here it was reseeded, got a nice green growth of grass, and a couple of years later, the grass is all dead and you have the salts on the surface. And so, this was the thing that I was trying to get across. Well, to go ahead and get backing on it, I used the Russian works by a fellow who determined the mineral, and then a Chinese book that I had summarized or edited the English summary, in which they laid it out the same way. And they called it Halleck soils. Well, Halleck salt, so . . . I was tangled up with that deal. So, here I was sort of delving back into the scientific aspect of it.

Another things is that a lot of agencies try to do things in the north and they are always calling up either asking where something is or how can they do something. I still get calls that way. Two or three of them a month.

KB: Did you end up retiring from the USGS?

MB: Yes. I had decided that working 55 years, if I hadn't been able to make it in 55 years, that I might as well give up, so that I should plan to retire at age 70. So, they had a buy-out program and the last date that you could buy out was on the 3rd day of May and I wouldn't be 70 until the 7th, but I took the buy-out. So, I missed it by 4 days. I retired. Came to Fairbanks for the Commencement. Max Britton got an honorary degree. I drove Max and his wife back to Anchorage - John and I did.
We got back, I had a toothache and the next morning I got a dentist to go ahead and look at the tooth. He did a root canal. I came back home, went to the airport, got there at 10:30, and 11 o'clock I took off around the world.

KB: So, what year was that that you retired?


KB: And so from back to the gas wells in '84 and reserve pits, you just worked on various USGS things?

MB: Yeah.

KB: So, you're around the world thing, that was the Northern Forum flight?

MB: Yeah.

KB: OK. So, since you retired, what have you been doing?

MB: Well, since retirement, I've had four trips to China, and I've lived in China about 8-1/2 months total. I've been doing occasional comments on things to try to get some of the things done that I had skipped doing over the years. You never want to retire. You never have enough time to do the things that you want to do after you retire, so you get to wonder how did you ever have time to work?

KB: I'm sure. So how is it that you ended up doing work in China?
MB: Well, I'd gone to the permafrost conference. I had become very interested in some of the work that they were doing out there in the Tianshans, and you know we call them the Tianshan mountains, but actually, in Chinese, Shun means mountain, so that you shouldn't call it . . . it's just like the Kuk River in northern Alaska.

KB: River River.

MB: The River River. And, so, I was invited to give a presentation to the Chinese frost effects conference in '96. I went over in '96, and did a certain amount of traveling in central and southern China. Then I offered to do the English editing of their papers in '97, when I wanted to see some more of China. Well, I didn't get to see as much of it. I'd been hoping to get over the highway to Lhasa.

I didn't get to do as much traveling that year because I spent 10 weeks on the editing job and then went back and went to Yellowknife in '98. I'd had the aneurysm surgery earlier. Came back from that and went to China and that's when I went to Tibet. So, I had the aneurysm surgery in February, and I was there in Tibet in September. I went back in '99, and did some more work at the Institute and did some more traveling.

KB: What's the name of that Institute?

MB: The Lan Cho Institute of Glaciology and Geocryology. Geocryology is just the study of frozen ground. But, the institute has been working with glaciers and one of the reasons that they have concentrated so much on glaciers is that the engineering
backgrounds are lacking. And that's what they're attempting to rectify a bit. The other thing is that the Institute, like the US government agencies, is trying to reorganize to get the requirements for increased funding when, in effect, they don't have the funding. So, that means that you sort of reorganize and decide what are the critical items. They recently have combined three institutes and given it a new name including engineering and environment. So, [CARARY] is the nickname for it. I would have to check some of my notes for the actual wording for the title of the new institute, but it's under the Chinese Academy of Sciences.

(450)

KB: OK. In thinking back on your tenure as Director of the Arctic Research Lab, looking back over all those years, what would you say were some of the highlights?

MB: Well, to have an engineer geophysicist come in as Director could be a little disconcerting if you were on the biological or social science program. And this was true at the time that it happened. The actuality of it was that we just built the programs so that the biological programs actually experienced a heyday because here we had our own aircraft. We ended up with our own small ice strengthened boat. We had equipment that we could do things with. And so, during that period, we actually, at one time, were operating 20 field stations. And most of the field stations were associated with biological aspects. Another thing was that they had a small animal house when I became Director. And in the animal house, they had some ground squirrels, lemmings, and a few birds, but essentially, you know, it was a summertime operation and with the squirrels, their primary interest was in hibernation. We built it up to where some people referred to it as a zoo.
MB: The Chief of Naval Operations operating a zoo is not so politically desirable, so we always referred to it as the vivarium and the thing that I was particularly interested in to start with were wolves and wolverines. We got the first wolverine in the spring of '57, live trapped, at Pitt Point, which on the map was shown as POW 1. About 140 miles southeast of Barrow. POW 2 is at Oliktok Point, just the other side of the mouth of the Colville and so on. I was interested in wolves and the behavior of wolves. But, other aspects of it. We got the first four wolf pups from the Brooks Range and we had them together. Two males and two females. We did not raise a litter of pups the first year, although we later determined that a litter had been born. So, we revised the... built a large cage complex with multi-cages there in units of four. So, those were for the wolves. The wolf population at the time I left as Director was 52, the majority of them black because I like black wolves. The maximum bear population was 7. Wolverine population, 14. And so there was a very considerable growth in the biological projects.

As Director, I could have been a better administrator had my original love not been that of technical director. For instance, I was in on the discussions about the wolves. One of the - he was not a grad student - he had his Ph.D., but he came in and one of the aspects of all programs was to meet with me and have a little discussion of what their goals were and their methods of operation. For instance, this particular case with the wolves, I had the idea that I wanted, for behavioral studies, I wanted a sample of four each year and this fellow ended up causing the deaths of 7 wolves. With wolverines, he
was authorized to study in his contract, but I said that until he could show that he could
think like a wolverine, there weren't any wolverines available for him. Here, one had to
understand an animal rather than just going ahead and grabbing him by the back of the
neck and putting him through some tests. You don't know how good your results are until
you understand an animal. A lot of zoos had written to us requesting that we provide
them with wolves for their zoos.

(600)

I never agreed to provide any animals to zoos, although if an animal was captured for a
zoo, then I would . . .

(End of Tape 3 - Side A)

(Begin Tape 3 - Side B)

KB:  OK, the St. Louis Zoo.

MB:  St. Louis Zoo said, well, if we would not furnish them with wolves, would we
provide the secrets of our success in breeding, because one year we raised 24 pups and
the next year 20. And the St. Louis Zoo had been having their problems with
reproduction. So, we got a number of questions in that regard. I had always wanted some
wolverine pups. We were never successful in a breeding program with wolverines, even
though we had wolverines from the North Slope, from the Yukon Territory and from
Sweden. But, I'd always wanted some - actually you call them kits, wolverine kits. And it
was amazing that in one year, 1970, that I finally got the first kit. A native had killed the
mother and dug out the two kits - very, very young. The one, I determined, was 6 days old. The companion had died. But, the 6 day old one came in and it was my determination that she was 6 days old because it was another 15 days to open her eyes. And so, I took her down to the hut and I kept her in the living room. That's where I worked and she got feedings every four hours. I went to bed at 2 o'clock. My wife got up about 6 AM to get the kids ready, so she was supposed to feed her. Then, I had to go to Washington, and I told my wife, every 4 hours.

Well, she was talking to the Eskimos and they said that actually wolverines only fed their young twice a day, so Mary Lou started doing it twice a day. I was gone almost a week and came back and John met me at the airport said he had sad news that we were going to lose the wolverine kit and that they'd had one of the Ph.D. biologists down and he'd been giving it antibiotics and so on. And I walked in the hut and took a look at the wolverine and it was no bigger than when I left. So, I picked her up and I gave her a bottle. That was early afternoon. Evening, I gave her another bottle - 10 and 2, she got another bottle. And I didn't see that she was sick. So, I asked my wife about it and oh, she had gotten expert advice from Charlie Brower's oldest son who said that they only fed them twice a day and also, from this biologist who had a degree in veterinarian medicine and was feeding the antibiotics. Well, shall we say, I threw that tutelage out the window and went back to the original plan and that wolverine lasted. And before John left as Director, because I would never let anybody experiment with her. We shipped her to the Zoo in Anchorage, where she expired at the age of 17 years, 7 months.

(50)

Normally, the maximum life of that type of animal is 14 years, with wolverines beyond the order of 10. The reason is that at 10, their teeth are shot. 14, you know like a dog or a cow or a deer, an old animal is about 13, 14 years. But, in my handling of the
wolverines, I based it on my experience when I was in southern British Columbia, taking care of martens. Because, the marten, you catch them live, you take him out and put him in a sugar sack, drop him in it, tie it and then you drop the sugar sack into another sugar sack, because if you leave the sugar sack so that it's tight in any spot, he'll go ahead and his back teeth are so sharp, he'll just scissor through it. But, if you have it so that he tries to chew, it just keeps rolling on him. And I know that my father took pine boards once like that and just made a pack, three tiers across like this, and then he snowshoed out of the mountains with this, walked right through town with this load of marten on his back and took them out to the farm and put them in their cages.

And I learned another thing with the marten - you catch him and he goes into a kind of hysteria and the thing that happens there is that the fluid drains out of the blood and so what you do is get them in and they're in shock. And so you just take milk on a blunt table knife and you keep hitting them in the mouth with it and they start lapping it. Then, when they're in shock, you know, their eyes are all closed and what not and you just take the knife and bring it right over to the can with milk in it and the marten will just start drinking. And when they start drinking, they're over the shock and you can save them. Now, the other thing is you don't dare give them fresh milk because if you give them fresh milk, they get diarrhea and if you dehydrate a person or an animal, they die.

Well, I go up north, there's no doctor for the early years. So, during those early years of DEW line construction people across the DEW line, they'd call up the Lab and say, "I've just been bitten by a fox. Am I going to get rabies?" I'd get these calls at 4 o'clock in the morning. And I'd say, "Well, is the fox around camp? You been feeding him?" "Yeah." I said, "Did you get him inside the building?" "Yeah." And I said, "Did you try to catch him inside a building?" "Yeah, and he bit me." "Well," I said, "that's pretty serious. Now, where he bit you, you take a razor blade. Make good cuts. Use a match on the razor blade to sterilize it and make good cuts. And then you squeeze them hard."
Then you soak the hand in strong Epsom Salts water, as hot as you can stand it for a half-hour. Take it out and pour iodine over the wound. Not mercurochrome, iodine. You do that three times a day for the next two days and the third day, if there's no redness, you can quit. But, if any redness is there, you call me and we'll see what to do next." And so, I don't know how many times I've given that diagnosis and I've never lost a patient to rabies yet. But, the thing is, if you try to coax a fox and you catch the poor little devil and he bites you in self defense, your chance of infection is good because foxes eat a lot of things and they don't brush their teeth. And so if you go ahead and lance that a little bit, squeeze it, bring out the blood, then you soak it in hot Epsom Salts and then you pour iodine on it and I'd always insist on iodine because that hurts like hell and I wanted to teach them a lesson. Mercurochrome would have done just as well, but that wasn't what I had in mind.

Now, getting back to what I started to tell you about was with the marten and the wolverine, use canned milk, cut it 50-50 with water and then the animals don't get diarrhea. When we had kids, we had Visadol for the vitamins, so I put it in a blender with the diluted milk, that diluted canned milk and I put in 6 or 8 drops of Visadol and then I'd take an egg and just take the yolk, no white, and drop the egg into the mixture and that's what the wolverines had. They did well on that, but that is the thing.

Now, with other animals, one of the things that you do, say if you have 3 Kodiak bears and you never put them in a cage. You've got triplets with only two full cans of milk, you're going to have a fight and bears get their ears ripped. You always have three cans of milk. They're not pleasant. They used to say in the bars here when I first got the wolverines is that Brewer had wolverines at Barrow that would lick your fingers. Yeah. But, there would be betting in the bars. Now, when I had wolverines that would lick my
fingers, there was 2 inch mesh on the cages because they were very powerful and so, after
the wolverines had a chance to sort of become used to their surroundings, I'd go in and talk to them gently, slowly, and I'd put my fingers up like my knuckles across this way.

(150)

Well, the females would lick the fingers because there's a little bit of salt. And this is fine. And they became quite playful. Well, males never would. They're more aloof. And I told you about the first little wolverine. Six weeks later, I got a wolverine again, a kit about that long. And she lived a year, then she caught pneumonia because when it gets wet and break up, it's hard to keep them dry. But, I had those wolverines down at my hut so that, in effect, they were sort of off limits. But, this is what I mean. If you want people to properly study things, they have to kind of sit back and look at the animal before they start manipulating or introducing stress or something like that. For instance, with the wolves. You put the wolf's paw in a combination of dry ice and alcohol, very cold, and they don't get frostbite because the blood shunts to the extremities. On us, it reserves to the core and wolverines, you know, they're padding along and it's pretty cold if you're out with your bare feet. Wolverines have hair that comes down from the wrist area and goes under it.

KB: *Like a polar bear over the bottoms of their feet?*

MB: Yeah. And they have it between the toes, so it's things like that. Well, as I say, with me as Director, the biologists didn't suffer too much.

*KB: When you look back over your whole career, what do you think were your most important accomplishments?*
MB: Oh, I think maybe we could divide it up into about 3 areas. One is the development of engineering methods that are in concert with the environment. For instance, the new Laboratory building at Barrow. It's 33 years old now, but it's as sound as a dollar. The roof doesn't leak like in other government buildings. The doors still open and close. Water doesn't run to one side of the building. A Swedish architect said that that was one of two buildings constructed in the State of Alaska that were in concert with the environment.

That construction aspect extends to other areas. For instance, I'd provide the specifications for roads, air strips, and foundation pilings for the western third of the DEW line. Provide the specifications for the gravel roads in the Prudhoe area for the air strip at ARCO and for the Chevron air strip. The Arco and Chevron air strip are both two stage construction. The Arco was construction beginning in the spring, Chevron in the fall - two stage construction. Those type of engineering things. One of the things is the protection of the environment, not as protection of the environment is often construed today by saying let's put it in wilderness so we don't have to manage it, but in the ways of doing things. For instance, if it is inevitable that they are going to build a pipeline which was my assumption with Alyeska, how can they do it with the least damage to the environment? So, there is that aspect.

Well, two other things that I've accomplished - one is the operations as a business rather than just because in the Arctic you throw money at it so you don't have to think about how to do things in a reasonable business-like fashion. And the Laboratory was a training ground for nearly all the managers who had been in the North Slope Borough for the last 25 years. There was a willingness to go ahead and take young fellows and put
them with people, not necessarily to give them schooling, but teach them how to do things. When I became Director and the question of hiring for summer jobs came up, I announced the first year that anybody that was planning to go to college that year or was finishing high school, since Barrow only had through the 9th grade, could have a summer job at the Lab. Wien used to land at the camp and their passenger vehicle was the back end of a 4 x 4 truck. Kids on their way home from school would jump off the back of the truck, come into the Lab and apply for a job, then walk home. And the first year that I made that announcement, I had 3. After that, I figured roughly that of the added summer employees, half were local and half were handicapped from down south. In other words, they could not apply or obtain a government job because of what their father did. In other words, if their father was a government employee, the kids couldn't get a normal summer job with the government. So, at the maximum during the summer in the '60s, we might have had a total of something approaching 100 employees, of whom 30 or so would be summer. But, after making that announcement to the Natives, they started going to school a lot more and eventually, the supply was bigger than I could swallow. For instance, Eugene Brower, when he became Mayor, he announced that any painting of government facilities in the village could not use yellow. He had painted so many yellow buildings that he was flat out tired of painting yellow, so he wouldn't allow that.

KB: *Yellow, being NARL's colors.*

MB: Yeah. And the Navy, you know they said the olive was too drab. That you should have something distinctive. So, I agreed with them and the next time they had a Navy visit, our vehicles were painted red with yellow cabs. And our field wanigans were all canary yellow. And Max Britton asked me, "How come you picked red and yellow?" "Oh," I said, "High visibility colors." That wasn't true. Red and yellow were the first colors I ever learned, because red is very poor visibility. Yellow is good, but red a half
mile away looks black. But, the red and yellow at NARL were the first colors I ever learned.

(300)

KB: You just said something before about running the Lab as a business?

MB: Yes.

KB: OK, other accomplishments?

MB: When I left the Lab, the number of permanent employees and administrative support was 12 and 40 in the shops, roughly equal between the mechanical and the carpenter shops. Five years later, the totals were reversed. 40 in administration and 12 in the shops. I prepared the budgets after consultation with Britton - the Navy rep - and we would have our general conversations in the evening, sometimes with a bit of brandy handy, and sometimes until 2 or 3 in the morning. But, we would come to a general plan of attack for the following year. The longest budget I ever submitted was 8 pages. Five years later, John Kelly showed me his budget that he had submitted. It was 323 pages. When I first went to Barrow, in many respects, it was a frontier area. Not so much so now. But, when I first went to Barrow, I had been there for a while and as the years went on, for instance, I was always concerned with safety and I kept direct control of all aircraft operations and all boat operations, because with those vehicles, you can kill people. Also, when we were operating the ice stations, I had the ice stations immediately reporting to me.

(350)
And because I had such tight control, I occasionally was referred to as dictator - a title which I never denied. I only modified by insisting that they include the word benevolent.

KB: Besides accomplishments, what about any disappointments you've had?

MB: Well, one of the things, for instance, I would write a trip ticket for an aircraft flight. I would designate from whence, to whence, to whence. What to do. The pilot would get on and people would say, "Well, now, but he told me that I could go ahead and do this and that we should go there." Your flight plan is out the window, your safety is out the window. We're dealing with scientists and the care of feeding of scientists is a scientific procedure. So, we never questioned their veracity. The pilots were always under the instructions that you call back in and you get a verification of your change in flight plans. And it was amazing. You know in all the years I was director, I never had a pilot call in and say that I had made a mistake in the flight plan.

And that was another thing. Before I became Director, I occasionally touched the controls of an airplane in a bush plane. After I became Director and had the planes under my operation, I never touched the control of an airplane because we had a lot of the scientists coming up who had a pilot license and pilots were under very strict instructions - nobody could touch the controls. And if the Director won't touch them, then nobody else could. So, when I say the comment about dictator, you can see that, yeah, there were certain things, but I always gave people an out.

(400)

You put out small folding boats on the rivers and you're concerned because you can get in trouble on the waters. Including a lot of Natives. So, the thing that of putting
out a field party with the old Seabee Quonset there - opened 40 ft. wide by 20 ft. When anybody was going in the field, we'd tell them, well we haven't had a chance to look the tents over. I don't know what shape they're in. You'd better put one up to see if all the parts are there.

Same on the boat. All boats. And the Eskimos all knew the routine. They would be on the upstairs in the stockroom portion and hear the scientists going into the field down here assembling the tent to see what shape it was in and the Eskimos just watching what's going on. The boat, the same way. And after a while, one of the Eskimos might wander down to see if they needed anything or to give them a hand. Because you ask any 12 year old boy can he put a fold boat together, can he pitch a tent? The outboard motors. . . there was a barrel of water out there. If you didn't know what shape it was in, you'd better check it out. The Eskimos and usually it was two or three younger Eskimos in the 20 bracket - they knew what the routine was. They knew exactly what I was after and they knew what they should do if things didn't look so good. And they would report to me and I was pretty knowledgeable of what was going on.

(450)

Take ARLIS-III, we had a retired lieutenant commander. No, he was a retired full commander, just recently out of the Navy. He was going out on the ice - that was ARLIS-III - with a young fellow who was his assistant and they were going to do this, that and the other. Had to do with acoustics, listening. So, I was asking him about it and suggesting maybe I'd send Pete with him. Oh, that would just cause trouble with the acoustics. He didn't want Pete to go and this was the retired commander speaking. The younger fellow was not nearly vociferous, in fact, he didn't say a word. And so, I sent the plane out - two planes - they went out and got them set up in tents and then Bobby came up and he said, "I didn't like the way they're set up, they didn't take enough of the things
that they needed out there." So, I said, "What do you mean?" So he started telling me what he didn't like about the set up, and I called for Pete and said, "Can you go to the ice tomorrow? Can you stay a couple of weeks?" He said, "Yeah, maybe." I said, "OK, Pete. Maybe you go to the ice, stay a couple of weeks." The next day, he and Bobby are getting ready to take off in the two planes, so I'm talking to Bobby and Pete and I said, "Pete, when you go out there, Bobby says that things don't look so good. When you get off the airplane, if things don't look good, you stay. And Pete, if they say that you should leave, you stay. And if they continue to say you leave, you pick them up, put them on your shoulder, put them in the airplane and bring them back."

(500)

And, of course, Bobby's hearing the whole routine. Away they go. They get out there and the first thing that Pete did is he went in and started boiling water. And there were no comments made about Pete having to return, so he stayed the two weeks. What had happened was that when they tried to boil water, they took nice, clean snow, put it in the pot and boiled it. And when Pete went to boil water, he went over to a hummock and he chopped away some ice, put it in, and melted it and boiled it. It was nice clean snow they picked up from a refrozen lead - salt water. They were drinking water that was saltier than ocean water. And Pete took bottles out because he wanted to bring back some water because it was so much better than any water they could get at Barrow. So, when I say run it like a business, run it in a dictatorial fashion, you can get an idea that in many respects it was dictatorial, but I always tried to do it so that it was in a fashion not offensive. Because if it becomes offensive, then people go the opposite way.

(550)
When I went to China in '93, one of the comments made about me was that I understood people. This was made by a Chinese. What had happened, we went to a field station in northwestern China - 17 of us from 12 nations. So we went up in the Tianshan at the field station and they took us out and sort of the not exactly the leader, but the ranking fellow with our group was a fellow from the Netherlands. And so, we're out and the Chinese were showing us the various features with handouts, a few misspellings, but with handouts and so on. And there was not much discussion. And that evening, there was some grumbling about the Chinese presentation. So, I'd gotten to know [Hzushu] a bit so I told him, "You know the people in Europe and America - they're not as courteous as people in China. You go on a field trip with them and they say, look over there and see this and you see that and you see the other. Look over there. That's not very courteous, but that's they way they do it in the West." So, the next day, we're out in the field and here are the Chinese pointing things out and we see this, and we see that, and so on. And when we came back, the grumbles departed and the next day, somebody told this fellow that they wanted to do something.

(600)

"Oh," he said, "don't tell me, tell Max. They'll do whatever he wants." But, the Chinese said I understood people. Now, I didn't learn that in school. I learned that at Barrow.

KB: I think we're going to stop for today.

(End of Tape 3 - Side B)

End of Interview