American Meteorological Society
University Corporation for Atmospheric Research

TAPE RECORDED INTERVIEW PROJECT

Interview with: Heinz Lettau

March 10, 2002

Interviewer: Sharon Nicholson

(Start Oral History 1 Track 1)

Nicholson: The date is March 10, 2002. We are interviewing in a very beautiful location, Mt. Pleasant, South Carolina, just outside Charleston. I am Sharon Nicholson, Professor of Meteorology at Florida State University and a former student of Professor Lettau's. I think the first thing I would like to ask you is what's the first thing you remember as a child and how old were you with your first memory?

Lettau: My grandparents had been living in a little town about twenty miles of Königsberg, where I was born and I must have been either three or four years old so this takes us back to 1912, and I remember being led by my mother at the hand to a little house where there was an old fashioned doorbell outside and this picture with the doorbell is still in my mind. It must have been 1912 or 1913.

Nicholson: Let's go back again: when and where were you born?

Lettau: Born in Königsberg in the easternmost province of the old German empire.

Nicholson: What's Königsberg called today?

Lettau: Well, the name the Russians gave it after they annexed it is Kaliningrad. And, do you mind if I'm taking off once in a while on a tangent? We met when we were on an assignment in Cairo United National assignment there was a group of Russians and one was a very friendly one from Leningrad, and I mentioned to him if I would have been born at the same place, but fifty years later then I would be a Russian. Now he gave me then a paper when we said goodbye and had written down, "to my fellow Russian" as a dedication. I replied (in a dedication to him on one of my papers,) "to my fellow Egyptian."

Nicholson: Very good, and what year were you born?

Lettau: 1909.

Nicholson: 1909.

Lettau: The first decade of the 20th Century and so I came back calling myself a man of the 20th Century.

Nicholson: And now the 21st Century. You made it to the 21st Century.

Lettau: I never expected to live that long even though my Father died at an old age of eight-five, my brother died at eighty-five, but I never had been expected to live beyond ninety-one, which makes a century.

Nicholson: Well you're ninety-two, and Käte will be ninety-two in a few months.

Lettau: This is the year 2002; that is ninety-two, yes, and I will be ninety-three at the end.

Nicholson: You are both in incredibly good health.

Lettau: Thank you very much. My good doctor saw me at the beginning of this week and found a few flaws but nothing worse than about five years ago and so he said, "Well, what can we do?"

Nicholson: Any idea, why you have had this wonderful long longevity?

Lettau: I think it is partly the company of Käte, my wife. She keeps me going. Secondly, my ancestry, living for two hundred years after having emigrated. My name is of French origin, and the oldest ancestor, well we haven't really found him exactly, but he was from a family of forest managers. The name of Lettau is very often (found) when you look at the list of inhabitants… Of Toronto take, no this is not a good example, but other Canadian cities, you find Lettaus there; French cities because it is a common name in France. On my mother's side the origin was again a group of people who had been thrown out of the country because of their (being) Protestants; these were Austrians. And so after all, only sound people survived the long trip to the cold country, and so this may be one of the explanations why my health is reasonably good.

Nicholson: Do you expect to make it to one hundred?

Lettau: I have no idea to make a forecast and I wouldn't really like it because it depends on the conditions.

Nicholson: Well, I note that Käte is lamenting the fact she can't find anybody to play (table) tennis with, so she certainly is in very good health.

Lettau: I gave up any sport… My school sport activity when I was a student at high school, it was rowing.

Nicholson: Rowing.

Lettau: And this of course made me also strong. In fact it made, since I was always rowing with the right hand, being number three and four. My right shoulder is still stronger than my left.

Nicholson: How about telling me about your family, your mother and your father and did you have brothers and sisters?

Lettau: Well I had only one brother, and the same is true for Käte, she had only one brother. My brother survived the war, and her brother unfortunately not; he died in a prisoner-of-war camp. But now going down, in the family tree, of course, I have three sons and for Germans it was always a little bit amusing to hear that one son was born in Saxony and one in Prussia and one in Bavaria.

Nicholson: None of them were born in the U.S.

Lettau: All three are in the U.S. now and Bernie came here at the age of twelve (ten) and was very quickly Americanized. and let's say my dialect will always be noticeable, it is not original English. In fact it is getting now worse, because Käte and I usually talk in German. At the time when I had to teach classes, I think you will remember that I still had a dialect, but in such a way that I could also say it kept the students awake.

Nicholson: Yes. Your accent is noticeable. Do you remember me imitating your accent in one of the department parties.

Lettau: Say it again.

Nicholson: Do you remember me imitating your accent at one of the department parties? Käte remembers.

Lettau: I forget about it.

Nicholson: We remember your accent in class and it did keep us awake. What did your mother and father do?

Lettau: Let's see, there were three brothers as sons of my grandfather. My grandfather was the last of a series of forest rangers, you call it, but in the service of one of the Counts in eastern and wooded country of East Prussia. All the three boys wanted to become forest rangers, but my grandfather apparently was wise enough, and said, you are getting now a good education. This was in the middle of the last century, the second to last century, the 1800's I'm talking about, and you can read and you can write and so be something else. And so my father decided to go to Königsberg, and get acquainted with… To learn a trade. Finally got a reasonably good income as East Prussia is a dairy country, like Wisconsin is today, and he managed a group of dairy farmers to collect their outputs, which came daily by train into the city and distributed and so on, and so on… He had a small outlet and managed this company of dairy delivery to the town.

Nicholson: So he was basically a dairy distributor.

Lettau: Dairy, ja.

Nicholson: So he was not a scientist?

Lettau: Oh no, by no means. But he, when I showed my interest… First of all, again, what he could tell me about (was) how to deal with nature, and as a son of a forest ranger he knew all the (spoors) What the tracks animals made, and told me how to distinguish between rabbits and hares, and fox and even mice and so on and so on. He said, he took us my brother and me, usually, regularly, to the woods when there was the first snow lying, which in east Prussia was by the end of October to see the tracks of the animals living in the forest row. And he always used to tell about things that in his (youth.) When he was very young, his father was a forest ranger of Count Lindorff. Once in an exciting trip with his master, because wolves had been seen in eastern Prussia, and they had to drive back by sled, from one to the other, owners of the hunting region, in order to get permission. If they find the wolf, to shoot him, but they didn't find him. More about ancestors?

Nicholson: Yes, how about your mother tell, me a little bit about your mother.

Lettau: Oh ja, this is my mother there. My father is a little bit… You cannot see it but of course you can tell me. She and my grandfather on her side is this

next picture there. They could look like anybody, let's see this was taken at this age of about sixty or seventy. He's an Austrian… He looks like an Austrian but of course he had already assimilated completely. He was also let's say, an official at the post office, in the little town where they discovered the little house with the hand drawn outside bell.

Nicholson: Oh with the bell yes you were telling me.

Lettau: It rings a bell, ja.

Nicholson: Very good.

Lettau: The place was Tapiau and but anyway you asked for my first memories and I can say that none in my ancestry was a scientist. In fact the youngest brother of my father became a schoolteacher, a very successful one incidentally.

Nicholson: How much education did your mother and father have?

Lettau: Usually education for all children, beginning with six or seven and running through at least until fifteen. Then the major thing was of course reading, writing and arithmetic. This was done in a very efficient manner and I can always say that my mother had nine (in her family), three brothers and four sisters and all of them wrote perfectly fine, and I never learned anymore.

Nicholson: I thought I heard Käte mention that your mother had been a businesswoman.

Lettau: She did.

Käte: She had.

Nicholson: You can talk Käte.

Käte: Ja, she was a businesswoman and she helped with his father's business very much. She had sense for it, economics and...

Nicholson: You might need to speak a little bit because the microphone is probably...

Lettau: Ja, ja, you may explain who is the one… The person in the background.

Nicholson: The person in the background is Dr. Katherine Lettau, who has been Professor Lettau's wife for I'd guess about six decades.

Käte: Sixty-five, this year.

Nicholson: Sixty-five this year so I've asked her to join us because she has been not only by your side but she has also been a practicing meteorologist and she has participated in many of the field programs we will be talking about and I think if I remember correctly that they were students together is that correct?

Käte: No, not quite. I was a student when I came to Leipzig and studied, decided to study meteorology and one day some of the other students told me oh we are going to have new assistant coming and he comes from Königsberg his name is Heinz Lettau. My first feeling was, oh what a nice name. Actually I fell in love with his name before ever seeing him.

Nicholson: We will get back to that a little bit later we are going to go in chronological order but I do want to hear more about that. Let me think about the next question. Okay so we talked a bit about your mother and your father. Your mother had a good sense for business and helped out with your father's business. Did they encourage you in your education?

Lettau: Oh yes, he said, when he saw that I was on the right track he said, go ahead. I will, as far as my means are permitting me, I will supply you with all the necessary things. I never had a stipend for study or work in the university. He generously supplied all the means for that and in fact he… When I asked him once, when I had as Käte mentioned come back to Leipzig, as an assistant professor, to especially help students on their doctor's assignment at the observatory. I told my father what I really need presently, I have got a reasonably decent salary, but I personally couldn't afford to buy a car but can you help me. Oh yes, sure and he gave me the assurance this car was for me exorbitantly dear. It costs twelve hundred mark.

Nicholson: Twelve hundred marks?

Lettau: So I got the down payment, but he had generously supplied me with nine hundred-mark payments.

Nicholson: That's probably about three hundred dollars. Okay what was the most memorable thing that happened to you as a child? Not your first memory, but the most memorable thing, until you were about fourteen years old.

Lettau: Oh yes, all the uproar and Königsberg when the war broke out. The Russian armies invaded East Prussia and two armies, one in the southern part, essentially troops from the eastern part of Russian, Cossacks and they left a very, very bad memory there. My uncle, the teacher down there had to flee on a horse drawn vehicle and on this flight his oldest daughter was born, so

the destiny wanted it that her daughter, also had to flee Russians again in 1944, thirty years later. But at this time the little girl was already born. So mother and daughter were born during flight in front of the Russian armies. The northern army under General Rennenkampf was mostly soldiers, from the Baltic countries and they lived really comfortably, but the first part of this army had come about twenty miles up to Königsberg and farmers... At that time in 1914, armies lived on the country. So they slaughtered beef, cattle and chickens and so on and so on. The street on which we were living in Königsberg, (this) was in 1914, August, was always full of cattle because the farmers had brought them in the town, in order to save them from being fed to the Russians. You had also people coming after a while, as the German supreme command decided, since this was a very bad experience for these parts. At the beginning of the war the so-called Schlieffen Plan was followed. That means the major force of the German army should go into France, around Paris and then return to fight the Russians. Then it was decided to send in more than Ludendorff and several divisions, and see, a few of these divisions were freshly drafted people from Berlin, and a group of about twelve of these were, they had their quarters in our apartment and I still remember that they had to fit their uniforms and afterwards there were snippets of field-gray uniform lying around. This is one of the early memories. After the winter of 19… Oh incidentally there is a very well written documentation – the American writer "The Guns of August," Kutner.

Käte: Oh I'm not sure.

Lettau: "The Guns of August," this is the story of the Russian invasion of East Prussia and the rebuttal first by Hindenburg. In the winter the Russians tried to get back, in January in bitter times, but they also were rebuffed. And from them on East Prussia was free, in its boundaries, which had been established in the fourteenth century. In 1944 the Russians were more successful and okay well this is another story.

Nicholson: Okay let's see. I wanted to find out, well two questions when did you have your first interest in science and how old were you when you went to the university?

Lettau: Say it again.

Nicholson: When did you first develop an interest in science?

Lettau: Oh, this developed quite definitely, I could tell about it, but let's see definitely at one time when I was in, oh, eighth or ninth grade, seventh grade

our science teacher, at school was approached by a very… This was the year 1921, after Versailles Treaty forbad Germans to fly. The only thing which people who were interested flyers, and liked to do so, made glider flights. This big dune here, about forty miles from Königsberg. A dune chain which separates the Baltic Sea from a very big lagoon. The crest of this dune chain is about a hundred fifty feet on the average, and the slip face is clear to the east, and the windward face is to the Baltic Sea. There was a private club of very enthusiastic pilots who wanted to build glider planes they call it of course not yet glider planes, but simply hang gliders. And in 1922 one succeeded to stay, at this slipface, in the air for about eight hours. Unfortunately no official timekeeper was there and this was not counted as a good record even though there were enough witness around, but no official timekeeper.

Nicholson: Eight hours?

Lettau: Say it again.

Nicholson: Eight hours?

Lettau: Eight hours yes. And the situation was such that you could talk to this man, when he was flying upwind close to the dune. Of course he was not prepared to stay that long. He simply stayed in the air because he loved to fly. And he got hungry, but (we made) attempts to throw him some bread, and he couldn't get it. It's just like trying to bombard, but the other way around. But anyway...

Nicholson: So his flight ended because he was hungry.

Lettau: There was this so-called "Fliegerschule" (flyer's school) of enthusiastic people, of course I met them, they asked for help by students to make parts, the profile, out of plywood, and as a reward three of us students in the seventh grade had signed up. Seventh grade, which is fifteen or fourteen years, had signed up, and we had the so-called Pentecostal break about eight days one week around Pentecost.

Nicholson: Is that Pfingsten?

Lettau: Pfingsten, ja. We biked to this place its about again I would say forty miles from Königsberg and it three hours to bike there, and nothing much came out of it. One of our three crash-landed the only hang glider. And Ferdinand Schultze, the fellow who had done this eight hour flight, was not there anymore. But anyway I learned to understand what the wind does to the

ground, and what the ground can do to the wind. The wind is moving this sand dune and creating this slip face as the slip face then turned that's when the wind goes up and carries the hang glider for hours at a time if you are going back and forth. The entire length of this high chain is about ten kilometers. You see the fishing boat on this (vane), incidentally, I let you see one of these in the first package I sent you has a picture of that.

Nicholson: I saw that. So I've understood that your first interest in meteorology was sparked by the…

Lettau: Oh ja, I should add that this was of course, only the experience when I was thirteen. But one or two years later, there was, in the meantime, the so-called 'rohr' of Rositten, a place here in East Prussia and glider flying had been established. And the very important man who was a professor of meteorology at Darmstadt technical college, by the name of (Walter) Georgii. His name is very well known, and it was really a competition and again around Pentacost two years later. Well I knew that this professor was there, and I collected all of my good intention, and went to the barracks, where he was sitting with two other professors and asked him, could I speak to you for a little while and hear about meteorology. He came out and we walked for a while up and down, and he told me, oh, what grade are you in now, and I said '*Sekunda*'. Well then wait until you get your 'Abitur' and then write to me, and we will (take it up again.) But in the meantime, with more science offered at our school, I had come into contact with the geophysics institution in Königsberg.

Nicholson: While you were in high school or were you in the gymnasium?

Lettau: Yes at '*Unter*-' and '*Oberprima*'…

Nicholson: Ah ha.

Lettau: That's the eleventh and twelfth grade. Here again, I was impressed by the fact that the big seismograph was recording an unrest with little waves about six second phase, when there was a storm at the Scandinavia shores. And otherwise they had a house which was big without any iron nails so called non-magnetic house. I learned there, that a southern part of East Prussia there were enormous magnetic disturbances, which were not identified at the surface, but this was of course, the underground which was igneous rocks. In fact, mentioning rocks, it took about another year before I ever stood on ground rock. We were a diluvial country and of course, you only had sands and alluvial material, except for the big boulders, which were on the coast, at the north east corner of East Prussia which when you learned they came from

Finland, and there were brought by glaciers from Finland in the ice ages. Students in their class really revolted, why didn't they come from the closer Scandinavia Mountains. No, no, he said they are coming from Finland because ice was thickest there, and these (were the) most important glaciers (moving) southward. So I learned a little bit about ice ages. Furthermore when I took up school sports, rowing, the river which runs through Königsberg, and finally permits Königsberg to be a harbor country, a harbor city, was apart from town, separated in two arms, really look as if they were on both sides of little hills. And this is what we learned in school, later an'Ursprungtal' again, one formed by glacier, not by glaciers, but by the deluges which were once in a while coming down in the form of melt water. So I got more and more geophysics, during the last years in high school, and did discover… Finally, I should say that when we were visiting this geophysical installation, about ten miles north Königsberg, in the woods there, I got so impressed as I said to one of my student colleagues, my student friends, this is really a job which I would like to fill. A job to my liking, let's put it this way, and I really didn't dream that ten years later, I was in his place the Director of his institution in 1938. So these were student dreams, which came true, but I do not know if this answers your question.

Nicholson: Well it certainly answers part of the question, and it certainly has been interesting material, and I will note for the record that I know you have been interested in the ice ages for a long time.

Lettau: Okay.

Nicholson: Right now you are still doing some work on the ice ages?

Lettau: Ja ja.

Nicholson: Aren't you?

Lettau: Oh yes.

Nicholson: We will get back to this. Oh, go ahead.

Lettau: Yes, another thing I should mention. So I decided to study at Königsberg, after I had gotten my Abitur, which wasn't too brilliant, but it was good enough to free me from the oral examination. But I found out that my geophysics professor, who had introduced me to (this), he didn't know much about the wind, and this was now my main desire to understand more about the wind, and so I decided, first of all to get really in contact with the profession of meteorology. And during the semester breaks, I asked

permission to sit in at the weather preparation at the airport in Königsberg, which incidentally, at this time, was one of the major stopping places between Berlin and Russian cities, like Moscow.

Nicholson: What year are we talking now this is a very early airport.

Lettau: We are talking about the year 1928 and 1929. This winter of 1928 and 1929 was one of the most severe at this time in February. Most severe because the cold started on the first of February and lasted until the 28th of February.

Nicholson: What were the planes like that they were bringing into those airports. Was it military planes or….

Lettau: The planes were usually, for four or six passengers. It was not the… Well it doesn't matter much, how the planes looked like, but there were only four to six passengers, as I said before. But of course Königsberg was also a point where the German Weather Service maintained an aerological station with daily ascents to 500 millibar. I also said, could I replace the observer of this flight. No, but I would be asked, what is really the difference between the professional meteorologist and his activities at this time, seventy years back, and today. I said, there was enormous drudgery in this profession. I learned this by really putting hands on, the weather reports came in, as handwritten material, or typewritten material, from the radio station. And then you had to sit down and (work with) only the code. You have to decode it, look for the code numbers on the map, and enter them, and then draw lines, isobars, isotherms, but this was really it. Always the pressure, it is only ten-minutes, then it has to go out. This drudgery really turned me off, but lasted for my lifetime. The interesting feature for me was, of course, when I asked once, can I substitute for the observer in the daily ascent. Okay he said, but you have to sign here on the form, that you will not sue us. I signed it, but I was so eager to do this, that I simply kept quiet about the fact, that you have to be twenty-one for this signature to be valid. I was nineteen. So when I came down, the meteorologist, whom I replaced looked at me, and said, boy, you are only nineteen. You are fortunate that nothing happened, but on the other hand one more difference at that time. The assignment was to go up to 500 millibar, but this was an Arado airplane.

Nicholson: In a what?

Lettau: The name was 'Arado'. The biplane was "leinwand" (canvas) covered. An open cockpit of course, and we had of course, not only to mount the heavy clothes, but gloves on, and I sat, (with) in front of me all of the equipment. The meteograph was of course, attached to the struts of the side, but when we

were at about six hundred millibars, I noticed in the mirror, the altimeter, which mirrored my nose, two big clumps of ice here. What is it, he said, chill off, that was ice. But then the altimeter showed six hundred and eighty, and the pilot, a very nice man, had to level off, put on gas and get a little bit higher, five mb higher or ten mb higher so to six hundred forty. Then another ten mb higher, at six hundred thirty. At six hundred twenty, I said I couldn't talk to him because he was way behind me, and the noise of the propeller was pretty strong. I waved him off, and this again bought me a slight rebuke from the meteorologist. You should have put him up to 500 mb. But it couldn't we extrapolate from six hundred forty, thirty, twenty. Oh yes, you can, but it is not what the government demands from us, and so again, drudgery. So at this time there were no radiosondes in 1920 in the early 1920's. I have to say a little bit about radiosondes later.

Nicholson: Were their pibals then?

Lettau: Yes, but the pibals weren't giving me the temperatures.

Nicholson: Of course.

Lettau: The pibals of course was easy. But when I came down I got two rebukes, first of all not going up to five hundred, and secondly being nineteen and having signed illegal. So I said, well I will get a signature of my father, give me a form. Again my father was good enough. He grumbled a little bit about it, he said, is it really safe? I said, well I feel absolutely safe. In fact, I enjoy the scenery from nearly five thousand meters or fifteen hundred feet high. So I wanted to fly once more. So this is where it really got at the early stage, fed up with drudgery, and the science, in the profession, not the science. The interest in science remained because in fact, it stimulated my first scientific paper and publication because I noticed from above, it was an October day, in the fall, that the city was still very closely built up. It was a cool October morning, most people, I say, needed to start heating. Most people used, of course, coal for heating. Then the harbor, with quite a number of ships, and putting smoke into the air. The smoke of these little individual smoke plumes seemed to connect, and drift downwind and then dissolve. This gave me the idea for my first paper.

Nicholson: Was this the one on the filters, your bicycle trip?

Lettau: Right, right.

Nicholson: Looking at the sky and different colors.

Lettau: I think I had in Madison...

Nicholson: Let me stop you for just a minute here. Did that take place during your college days or before college? Your bicycle rides where you looked at the air pollution. Was that prior to university?

Lettau: It was absolutely private.

Nicholson: Prior to your university days.

Lettau: Early university.

Nicholson: Let's go back to that.

Lettau: Let's see September it was either after the first or after the third semester.

Nicholson: Okay.

Lettau: I think the third.

Nicholson: Okay, let's come back to that. I wanted to ask a couple more questions about pre-university time and I would like both of you to answer this. I guess the … Two questions. One is what were the schools like then? I'm thinking in terms of discipline and how long and how you learned and also were the school co-ed? I am thinking of primary and secondary schools.

Käte: That's an interesting question especially for me. I went to a girl's school until ninth grade. Then I decided, at that time I want to go to university, and since this school does not go onto the twelfth grade, I changed and went to the so-called 'realgymnasium' which was a boys school and I enrolled at the tenth grade for three years in this boy's schools. There were two girls in the class.

Nicholson: And how many boys?

Käte: Twelve to fifteen, it was a relatively small class. In the entire school I think we had six hundred boys and twenty girls all together.

Nicholson: Did the boys resist the girls being there?

Käte: Not a bit. I have to emphasis this, in all my life, and in all my studies, I was among boys in school, in university….

Lettau: The family.

Käte: The family.

Nicholson: A family…

Käte: But I never had, for one moment, the feeling that they didn't take me as a whole person. I never had that.

Nicholson: Excellent.

Käte: In meteorology, when I studied in Munich, meteorology with two girls in the studies, so that was my school experience. I had the best experience, the best teacher's ...

Nicholson: How about you were your schools co-ed and how did they discipline the students? How did they make you learn?

Lettau: Well being a student meant to be free to choose what you want to. Being matriculated at a university, at this time meant you could attend any class.

Nicholson: No but before, in primary and secondary?

Lettau: Oh, primary, we had of course our, schedule and if you didn't make it then you had to repeat it. I never had to do that, but I managed always well to slip through more or less, being on the little plus side, so it was enough to be free from the oral examination, for the final examination but not more.

Käte: This was an all boys' school.

Lettau: All boys, yes.

Nicholson: For primary and secondary?

Lettau: Yes, yes I didn't get it.

Käte: Schools were no problem. I will not compare to what it is today, because there is too big a difference, even at your age, you would know the difference between your school days, and school days, in our days. But still there are the basics, we learned the basics, and didn't just know this, and we did it.

END OF TAPE 1, SIDE 1

Interview with Heinz Lettau

TAPE 1, SIDE 2

Käte: One thing that was good at that time was that you had a regular weekly schedule. Twice during the week, mathematics, twice physics, twice chemistry hours and so on. And this goes, from I think probably eighth grade to ninth grade, and we did not just take the course for two years, also forgetting afterward. I think the whole set-up was different.

Nicholson: In your classes was there a lot of discussion, professors asking your opinion?

Lettau: Oh sure.

Nicholson: Were you sitting there taking notes from the board or…

Lettau: Definitely, you see the major thing in the cases of my school years, was the class had their room, and the group stayed in that room, and one after the other teacher came to the room. Here, you know that the teacher has the room and so the students have to walk during intermission. This was different and I think it was a better system.

Käte: Yes, because you feel you belonged together. This is my class and wherever you are, when you are in my class, I will stay for you and be with you, whether you are smart or whether you are dumb, but you are a member of the class, and this makes a lot of difference. I ask my children, (about class members) and they say, he may be in my English class, or he may have been in my math class. That was a big difference.

Nicholson: Was there a rigid dress code?

Lettau: No dress code you simply were neatly dressed. I have a picture of our twelfth grade class. Everybody has a necktie (and a) coat.

Käte: Really.

Lettau: Yes. I can show it later it is in here. This is a picture I sent back to one of the people who maintain memories of the old times and they thought it was pretty good.

Nicholson: How did women dress for school then?

Lettau: No pants.

Nicholson: No pants.

Käte: No pants, skirt and blouse.

Nicholson: I think we are probably at the university time now. Let me start by asking Heinz where he went to school. I know you went to several universities but I want to ask you Käte.

Lettau: Oh ja you see after three years at Königsberg.

Nicholson: What year did you enter – here let me also step back there is something that I wanted to clarify that I forgot to in your earlier discussion. You mentioned somebody named Georgie.

Lettau: Oh ja.

Nicholson: Was that H.W. Georgie that was at Frankfurt or was that his father.

Lettau: No, this is the father.

Nicholson: This is the father, okay.

Lettau: Yes.

Nicholson: I just wanted to be sure.

Lettau: The father of sail flight (or gliders) in Germany. In fact he had quite a reputation. Once he organized an expedition of his best sail flight pilots to Brazil, because he wanted to…. And I think this must have been in the early 1920's or so, 1924, 1925. He said he would like to see the Arubas, the vultures, where they are circling, there you will find wind. One of the remarkable discoveries of this expedition was that the Arubas watched the sailing flights of people, and they began to circle in the Arubas came and joined them.

Nicholson: That's amazing.

Lettau: The name Arubas is Brazilian for a vulture, about the size of a turkey vulture. You see them always sitting around in the morning and watching the sky and if somebody circles, they are going there.

Nicholson: That's very amazing. Okay so which year did you enter the university and which university did you begin at?

Lettau: Okay, the interview with Professor Georgie was when I was at unterprima. I think it was before, the tenth grade. Then afterwards I learned about the geophysics in Königsberg, and that Professor Eralatu was the seismologist and Terresta Mangafessen, a specialist, also gave a lecture on introduction to weather and weather forecasting. After I had taken this course I wanted to learn more and looked over the literature and found that at that time in 1929 or 30...

Käte: 1930.

Lettau: The best (faculty) was either at Berlin or Frankfurt. But I decided to go to Frankfurt. This turned out to be pleasant for me and for her, because there were five… Of course Professor Linke was the chairman, but the organization of his institute was so that there were four additional people lecturing there or teaching there, and one of these was Stuver, the man who got a name about this diagram.

Nicholson: Stuver diagram.

Lettau: Mugge was more of a cloud physicist. Then Bauer, the statistician and for long range forecasting, and Moller, a young, about my age, a very young assistant professor. So it was really ideal. I did not forget Gutenberg, as the seismologist. Beno Gutenberg.

Nicholson: The Moller that you mentioned is that the same Moller who was responsible for one of the forecasts that we will be talking about later.

Lettau: No, no absolutely not. Its "M" "o," Moller, Fritz Moller. He was later, after the war, professor in Munich, and made his name as a radiation man.

Nicholson: It sounds like you had a real…

Lettau: After two semesters at (Frankfort) and because Gutenberg had been a visiting professor, the year before in Pasadena, in California, and he was full of praise for this, and he said I have decided to wind up here in Frankfurt and Darmstadt in one year, and then go for good, a very wise man. It was 1930 and there was some rumbling already about the Nazi effect on high schools and so on. They made it clear what they wanted so he decided to go there. Linke wanted to keep me there. I said but first of all I was born a thousand kilometers from here. Every time I want to go home for vacation it is a

twenty hour railroad trip. I would like to make it only half as long a trip every time, and so it's either Berlin or Leipzig. He looked at me said well, I would suggest you go to Leipzig for the rest of your (studies), I was… I had five semesters of geophysics behind me, much more than any of the students who came to his institute after they had discovered, oh, there is such a subject as geophysics and meteorology.

Nicholson: So being close to your family was one of the big reasons you.

Lettau: Right. And of course the cost.

Nicholson: What was your brother doing in these days?

Lettau: Say again.

Nicholson: What was your brother doing about this time was he also at the university.

Käte: Your brother Herbert, he had gone to Hamburg.

Lettau: My brother had gone… actually my father said he had no really special drive, and my father said you will definitely be the man who is taking over when I am not having my business anymore and what he was studying was national economy as a college. He never got a degree. He was of a different type as I was so but anyway so he later on took over the business of my father and helped him. Then after 1944 the Russians had destroyed practically the province and my parents just managed to get away by the skin of their… but with only two luggage pieces. One of the last steamers that succeeded in going to Copenhagen to Denmark. It was in January 1945 already.

Nicholson: So what year did you start in Lieipzig?.

Lettau: Okay fine, this was in 1930 when I came to Leipzig and found – I should mention one thing. Weickmann, Linke had said don't go to Berlin there are too many stuffed shirts.

Nicholson: That's good.

Lettau: Go to Leipzig.

Nicholson: Who were the stuffed shirts in Berlin.

Lettau: Oh well.

Käte: How did Linke know about that?

Lettau: The people at Lindbenberg were the ones favored by the emperor…so okay there was no one at the time. But anyway, in Leipzig I was told, I do not know if you will learn much of Weickmann but there is Horawitz there, who is really somebody who had a future. Unfortunately Horawitz also had to flee.

Nicholson: Horawitz?.

Lettau: He was Jewish. But after all, I came to Leipzig and when I introduced myself to Weickmann and said Linke has recommended me to come here. He was very pleased. I couldn't tell him that Linke had said go there because Horawitz is there

Nicholson: So is Leipzig where you met Käte.

Lettau: Leipzig yes. When I arrived there and wanted to attend the first classes I found out, which I didn't know, that the 31st of October was Reformation day and a holiday in Saxony, but not in other parts of the country. Anyway…

Käte: You got a degree in 1931.

Nicholson: What was your thesis about and how did you come to choose your these topic.

Lettau: I really wanted to do something about winter and ice and snow accumulation, and ice ages. Weickmann said, well I can suggest that you start looking at this and that. And I came after two weeks with a little outline. He looked at it. You seem to be good enough in trying to combine several things, but really why don't you analyze one of these waves in the atmospheric circulation. He had one student, a very promising one, who analyzed a wave which was in the winter of 1923 and 1924, a very pronounced twenty-four hour swing in the pressure and name of the student was Werner Schwerdtfaeger and he said he is doing very well. And I think there is another really good thing in another wave of thirty-six days and then I looked at this and found that from the displacement of the lines of phase, that this was a twenty-four hour one, that it was clearly an outflow from the polar regions. The thirty-six wave was one where the lines run from east Siberia to the Atlantic Ocean, eastward movement. And then he had trusted me, and I really found it on my own, a paper by Margulus, the famous Austrian, who died after World War I because he had no position anymore and hungered simply. Margulus said it is really all in the compendium of meteorology, but

he had discovered that there is really a break, of thirty, that such long waves move eastward, and shorter waves can either move westward or as Schwerdtfaeger found it come down, from higher latitudes to lower latitudes. I should say that Weickmann shook his head, and said "oh boy I am impressed." Pardon me when I say that but he didn't use these words but he was. So in an unbelievably short time I got the dissertation together which is entitled the Thirty-Six Hourly – The Physical.

Nicholson: You can say it in German we will translate.

Lettau: I could say it in German, but I will show it to you because this of course is a very valuable document. Read it.

Nicholson: Okay, oh boy. *Die Philosophische Facultät die Universität Leipzig, ernennt durch diese Uhrkunde den Herrn Heinz Lettau aus Königsberg dies hier aus drukershienenden, sehr guten Dissertation Theoretische Ableitung und Physicalische Nachweis den Sechs und Dreisiches Tagishen Luftdrukwelle, und mit den sehr guten erfolge bestanden werd Doktor den Philosophie.* (Approximate transcription.)
In other words, the University of Leipzig has bestowed upon Herr Heinz Lettau from Königsberg by reason of his very….

Lettau: Good, I mean it is grade C …forget about it grade A.

Nicholson: Grade A essentially yes it is a grade A dissertation and this was received in the 3rd of December 1931 and signed by the Dean.

Lettau: Thank you Sharon your German is better than mine okay.
Nicholson: Let me point out I was asked to read that. So you became an instructor at Leipzig after you finished your dissertation.

Lettau: Yes, but let me say the document says only oral examination. The oral examination was to the major professor. First of all the major professor was Weickmann, then the second to the major was Debye, the Nobel Prize winning chemophysicist Debye, Peter Debye.

Nicholson: Right. I thought I read somewhere that Heisenberg was the second reader.

Lettau: No not in that.

Käte: That's mine.

Nicholson: That's yours.

Käte: That's my proud point.

Nicholson: Oh.

Käte: Having an oral examination with Heisenberg, a half an hour he gave a half an hour of his precious time to examine me in physics.

Nicholson: Oh, in physics.

Käte: In physics, not nuclear physics, not atomic physics but plain experimental physics.

Nicholson: Okay, because some of the literature that you gave me to read had it wrong. They said that Heisenberg was a reader.

Lettau: No, no, no Heisenberg, you see… I do have the second degree, as habil doctor.

Nicholson: Oh, okay …

Lettau: Here Heisenberg was the reader of my thesis.

Nicholson: Okay let's come back to this. Let me talk a little bit to Käte about her time at Leipzig to and I also am anxious to find out how you two met, how you courted, how you came to Leipzig.

Käte: You know I grew up in Plauen, in Saxony and most of the people, who after the abitur, went to Leipzig, because it was the closest university we had. But when I was in the twelfth grade, I got a stipend from the school, to go to Munich to visit the Deutsche Museum during summer vacation and then make a report on it. That's how I got to know Munich during the summer time. Then I decided you know I don't want to go to Leipzig, I want to go to Munich. In that time it was very easy. I had my diploma from high school, I took the train to Munich, I didn't know a soul there.

Nicholson: You were very brave.

Käte: To university and find out what kind of lectures they are giving, what professors are there and so I enrolled in the university. Everyone who came and had this diploma, this abitur, could enroll. So I went to Munich and studied mathematics and physics, and after two semesters I had a feeling that,

no, I cannot go on with it because it is getting too difficult for me. Too difficult, and I could only be a teacher.

Nicholson: Too difficult in what sense.

Käte: Mathematics, and I mean I made it up differential theory, integrals and differentials, but then…

Nicholson: Eventually….

Käte: But then I thought, that's enough of mathematics. So I went to the meteorology department and I enrolled in meteorology with Professor Schmaltz, and this was fascinated. So I stayed there, for two, no I was there for four semesters in Munich and in 1932 as in America, in Europe there was the great depression and my father lost his job and he said I cannot pay your university costs anymore. Either you have to do something else, or come home to Leipzig at least. So I decided. I went home during the summer vacation, and got a job during the summer vacation. And then I decided, I'm going back to Munich no matter what. My father was nice enough he handed in his life insurance policy, and got his life insurance paid out, to pay my tuition in Munich. And so I went back to Munich for another two semesters.

Nicholson: Still in physics, or in meteorology.

Käte: In meteorology, and another minor. You would say mathematics and physics as a minor, but as a major, meteorology.

Nicholson: So the thesis that you mentioned, that was in meteorology.

Käte: Meteorology.

Nicholson: And Heisenberg was one of the readers on that.

Käte: After the two years I decided I will go after all, to Leipzig, as it was closer and not so far away. So I came to Leipzig as a student, and I enrolled with Professor Weickmann. I asked him whether he could give me a theme for a Doctor's thesis. He said yes, I can, but you would have to live out in the observatory. That's about forty miles out of Leipzig in Osterburg. And I said of course I will do it, because for me, it was like a solution to all of my troubles. It gave me a place to stay and I didn't have to pay room, so I said of course I can stay and that's where I met him.

Nicholson: That's where you met him.

Käte: That's where I met him. He was there as a supervisor and there was eight students.

Lettau: No, six students, it changed, of course, but when you were there, it was with four male students and one female. The observatory was partly dormitory and had one big room for six student's male students and for two females.

Käte: Two rooms for him and the other assistant, and so I had to throw him out of his room, in order for there to be a private room.

Lettau: Yes.

Käte: He didn't like it I know.

Nicholson: What year is this.

Käte: That was the year 1934.

Nicholson: 1934.

Lettau: Here, you can read this very well… It's Käte Dorffels.

Nicholson: No, no, no that's yours, that's not Käte's that's yours.

Käte: Mine is on the next page.

Lettau: No, pardon me. Well yes next page yes.

Nicholson: Next page okay.

Käte: Not this one the next one.

Lettau: Here. This is it.

Nicholson: Okay. *Die Philosophische Facultät der Universität Leipzig, ernenntt durch diese Uhrkunde Fräulein Katharina Dörffel, geboren in Plauen, i. V., auf Grund ihrer sehr guten Dissertation, "Die physiklische Arbeitsweise des Gallenkamp-Verdunstungsmessers und seine Anwendung auf mikroklimatische Fragen" und der mitsehr guten Erfolge bestandenen mündliche Prüfung zum Doktor der Philosophie.* This is the physical workings of the Gallencamp evaporation meter, and its use in micrometeorological and microcronological questions.

Lettau: Applications.

Nicholson: Applications and she received her *Doktor der Philosophie*, in Leipzig on the 6th of August 1935. And I guess in the interests of history, both of you apparently had some contact through your theses with Heisenberg and this is D. Heisenberg of the uncertainty principle?

Käte: That was D. Heisenberg.

Nicholson: I see him shaking his head no.

Käte: It was D. Heisenberg, wasn't it? Yes, because my major was meteorology, the minor of mathematics and physics, and so I had to have the oral examination. After this was finished, they had an oral examination, the first with Weickmann, the second with Heisenberg and the third with Handervaden, a mathematician.

Nicholson: Handerwalt?

Lettau: Handervaden, in applied mathematics.

Käte: Handervaden.

Nicholson: How did they treat you during the exam especially Heisenberg.

Käte: Very nice, in fact when I asked him for a time, he said, oh I am leaving tomorrow, why don't you come this afternoon. So I said yes, and it was more or less a conversation. It was all about thermodynamics.

Nicholson: So you didn't have time to prepare for it.

Käte: No, no.

Nicholson: This came out of the cold.

Käte: No, nothing. I didn't know what he would ask me but it was all about thermodynamics, and it went very well. So Weickmann and Handervaden gave me an A. I think he gave me a B. I am sure I didn't … The question I remember was about interference colors if you heat an iron and the interference result. I was happy that he gave half an hour of his time. He was very nice, I had several conversations, short conversations before that with him.

Nicholson: And what was your experience with him.

Lettau: With Heisenberg?

Käte: Yes.

Lettau: You see this was much later. My doctor…

Nicholson: Dissertation?

Lettau: My Doctoral diploma was dated 1931 but my habil doctor.

Nicholson: What we call habilitation.

Lettau: Which involved the admission as academic teacher and researcher, this was much later and here Heisenberg was the second reader of my thesis. So this was a different thing but the ordinary dissertation there was no second reader. The major professor was the only one responsible for the content of the thesis.

Käte: Yes.

Lettau: That was the second degree, the habil degree. Habilitatus.

Käte: You needed a second reader.

Lettau: The second reader was required and this was Heisenberg. Heisenberg called me after he had seen my manuscript, and said, Lettau I do not understand what you have done here. I said to the professor, that it would probably be better if talk about it when we see the instrument. So he came out, well it was at Lieipzig. I said I can offer you transport in my little one-thousand mark car. Oh,he said, I have the same type, but the better one. One was "reich classe" and the other was "meister klasse." So he in his "meister klasse" followed me in my "reich klasse" and we went thirty miles out to the observatory. Then we went to the seismic house, where on this solid foundation, was my pendulum. Oh, he said, now I understand it. And he then came up to my study and said, give me some paper. On these large yellow sheets, he filled one after the other. If you put it this way, he said, it's fine and I sign it.

Nicholson: So you educated Heisenberg.

Käte: Yes.

Lettau: This was Heisenberg. But after all, I really got questions by… I remember especially one member of the so-called "ingena." There was the big institution for seismic research, and one of them asked me, Lettau, this was a very fine idea you had, but why did you make such a complicated theory about it? I said, this is not my theory, this is Heisenberg's theory.

Nicholson: That's great.

Lettau: You see I had originally, practically taken from one of the handbooks of mechanical engineering, a section on Kopet system.

Käte: Kopet.

Lettau: Kopet system, but since Heisenberg didn't deal with mechanical engineering systems, so he said he had to develop one on his own.

Nicholson: What was the time title of your habilitation.

Lettau: Again it is simply the horizontal double pendulum. The horizontal pendulum is a concept in seismology developed a Russian, Galatsin, who said, when you want to record the movements of the earth, you need one point, which doesn't follow. So you can either make a very long…

Käte: Pendulum.

Lettau: …pendulum. But you have to make it, in order to record subsurface movement it has to have a frequency or a period of at least a meter. You see one meter gives about one second for these, and you have to go to at least a thousand seconds. And so you have to make a thousand meter long pendulum. The double pendulum simply puts the mass on a step, and lets… It is like a door who swings in its angles but …

Nicholson: Hinges?.

Lettau: In its hinges yes. And when you make the vertical slightly inclined against a line through the hinges, then this goes very, very slowly and the more you tilt it, the fixed tilt makes a long period. As I said, well the disadvantage of this is it is very sensitive to the thermal working of the material, so you don't make the period very long. Is it alright that I take off on such a tangent?

Nicholson: Yes, yes…

Lettau: Two more sentences and I am finished. You see the horizontal pendulum can now carry a smaller one, and of course the tilt is enlarged in this one. But the little one feeds back on the big one so it is a complete system, with let's say certain complications, which really intrigued Heisenberg.

Nicholson: But what can it do? What's the use of the double pendulum?

Lettau: Okay, you can record the tilt due to the gravitation acceleration of air tides.

Nicholson: Okay does this get to the salt mine experiments you were doing?

Käte: Ja, this war…

Lettau: I learned about the original use of the whole under pendulum to record earth tides at Potsdam, at the geotechnical institute. There was still one of the old ones in use, but I looked at the recordings and somebody shook his head. Not I but he showed it to me said it was only for someone who could interpret this correctly. I said well there must be a system to make a better one and there was one fellow at the technical institute in Dresden, Pormaschek, who had improved the mechanics of the horizontal pendulum and had also gone with his students…(Start Oral History 2 Track 1)…. to the salt mines in Berchtesgarten. He had enough funds to establish here a chamber, which could be closed and where he recorded earth tides. I went there too, after I had found this, and showed that you can record earth tides. I wanted, in addition, at that time… I really don't know if now is the time to talk about that. …to follow-up a theory by Professor Steinhauser in Vienna who said every time in winter ….

Nicholson: Let's come back to that a little bit later.

Lettau: Come back.

Nicholson: Yes, yes, because we started this talking about you meeting Käte.

Lettau: But again, we started out talking about the interest Heisenberg had in that system.

Nicholson: Right.

Lettau: And it's understandable that he was intrigued by it, and I think that after I met him in Bonn 1974.

Nicholson: You met Heisenberg in Bonn in 1974.

Lettau: Oh sure, yes,here's a picture showing that. And she said, hello Professor Heisenberg, I am one of the students who you had. Well, he acknowledged this. And I was standing behind her and said, Professor Heisenberg perhaps you remember the Collm Observatory. Heisenberg took his finger and said, oh yes this was Dr. Lettau had this interesting apparatus and I had to go there and improve the theories. And Dr. Pfeiffer, the secretary of the Humboldt Society said *Das ist doch* Dr. Lettau. Then he really took me to a chair at his right, and talked about the old times in Leipzig for about twenty minutes. Quite a number of the other Humboldt people there were anxiously looking around. Okay. Heisenberg had very good qualities as a human being.

Nicholson: That's interesting it is also interesting that both of you had that connection there. I brought up the salt mines in part because I remembered that the salt mine experiment was related to the pendulum but also because Chuck Stern said make sure you ask them about the salt mines. They were courting in those days and spent a lot of time in the salt mines. So this must have been after you and Käte met.

Lettau: Would you like to hear about it right now.

Nicholson: Sure. I wanted to hear about you two meeting at the university. Käte had mentioned before the tape-recorder went on that she already fell in love with your name when she first heard it.

Käte: Ja.

Nicholson: So you two met at the university at the observatory.

Käte: Yes it happened after Weickmann told me that you have to live at the observatory. I said I should at least have a look at it before I agreed. So I took my bicycle and "bicycled" there one Sunday in November.

Lettau: It was the fourth of November, my Birthday.

Käte: Ja, but I didn't know that. I took my bicycle and went, and when I came to the observatory, there was nobody inside. It was quiet, so I went upstairs and then I found in his office, he was in his office.

Lettau: My study.

Käte: Studying, ja.

Lettau: Yes, I called it my study, yes.

Käte: I found him with another student drinking coffee and eating cake, and he kindly invited me to sit down and joined them. That was the first time I met him and I stayed overnight there. Then I had a look at the instrumentation that I should use. So it would not be new to me. Then afterwards I thanked him and left

Lettau: The instrumentation.

Käte: Some time later when I moved over to the observatory and then I took part in all of the activities. Again there were male students and I was the only girl, but they took me in with everything that they did. Whether it was in the evening in the "beer joint," or if it was on a summer afternoon, swimming together in the lake, not too far away. I've never felt that I was left out, or considered not equal to them.

Nicholson: That's absolutely wonderful.

Käte: That's wonderful really.

Nicholson: So it was fairly unusual in those days for a woman to be a meteorologist.

Käte: Ja, not very many others. I think the only in Leipzig, at that time there was one student girl, but they had an assistant Luisa Lumert.

Lettau: Luisa Lumert. She got her degree at a time, during World War I in Munich when there was really paucity of people who did, not forecasting, but climate. She got a degree by Professor Schmaltz in Munich, who still was teaching was she was there. Later on she, after World War I, she apparently was a member of the German Association of University Women and they had for each year, a stipend, and since apparently Dr. Lumbert was the first meteorologist among these academic ladies, most of them were medical doctors of course, and some were physicists and so on and so on. But meteorology apparently paid off for her, She got a stipend to go for one year to Australia. She really achieved in something which was in the literature always, that at Leipzig, at that time was Bjerknes, the famous Norwegian.

Nicholson: He was in Leipzig.

Käte: Yes.

Lettau: Professor and the first director of the institute in Leipzig in 1920 or 1930. He told me later on, I would have loved to stay there. The atmosphere was perfect for me to have all my assistants, which I need to go on and on, but during the war, for him as a Norwegian, it became impossible.

Nicholson: Oh of course.

Lettau: So he went back to Bergan. But Lumert got her degree and came to Leipzig as an interim professor there and…

Nicholson: So she was actually a professor of meteorology.

Käte: Yes.

Lettau: Yes, but she never got the teaching qualification, but she supervised thesis and so on so on, but she had a full degree. And in Australia, in Melbourne I believe or Sidney, I don't know where. She gave a publication in which the Bergen type of the cyclone, with the cold front and warm front was turned around as valid for the southern hemisphere. So this was Dr. Lumert's and of course, later she had a few more publications. But she was really, probably not the first female meteorologist, but among the first.

Nicholson: Were duel career marriages like you two had common in those days or very unusual. Two career marriages were those very common in those days or very unusual.

Käte: Let me finish one episode.

Nicholson: Sure.

Käte: One day he asked me, *Fraulein Dorffell, wie kennen sie ihre zunkunft vor?*

Nicholson: How do you imagine your future.

Käte: How do you imagine your future. Oh I said, that I know exactly. First I want to finish my studies here and earn a doctorate's degree then I want to work with the German Weather Service for a couple of years and then I will marry, period.

Nicholson: Period?

Lettau: That's it, an open door for me.

Käte: I hadn't mentioned anything to whom I was going to be married, but the structure was just what I thought of, and it turned out to be that way.

Nicholson: Ah ha, that's very good.

Käte: Thank you very much for that. Are you going on?

Nicholson: Oh we're still going on sure.

Käte: Oh okay. I thought you were….

Nicholson: So I'm trying to summarize. He was an instructor there when you came in as a student.

Lettau: I could put it this way, a supervisor of thesis work.

Nicholson: Supervisor of thesis work.

Lettau: Not only her, but all of the students over there, at the dormitory actually. Some of the students were not actually working for a degree at the observatory, but were dealing with what Weickmann said chart meteorology. They had to spend a week or so at the observatory to see what's going on there. Incidentally you were surprised Vilhelm Bjerknes was the first director. This was really… Leipzig University, the faculty was absolutely world-minded. For instance, even after World War I, Professor Debye, a Dutchman, was her minor professor. Professor Vandervagen, a Dutchman, they really didn't care, in fact, well I suppose they cared very well for quality but not if they were stamped nationals or not. So Bjerknes had full work and freedom and money of course, from American foundations like Rockefeller and so. But he told me, if he would have been in Leipzig and the Bergen type of cyclone theory, would have been a Leipzig type. This is quite clear, and so it was only left to Dr. Lummert to turn it around for the Southern Hemisphere.

Nicholson: We are getting a little bit off the subject. This also brings me to a question I want to ask but I am going to ask later we will go to it. Well go ahead were you going to finish a comment here.

Lettau: Yes about.

Käte: Next question.

Nicholson: I want to continue along the lines chronologically but this reminded me very much of a question that I thought of yesterday that I think would be relevant here. Everybody talks about the Norwegian School of Meteorology and we know what that entails with frontal theory and all of that, but we also know that there are extremely eminent meteorologists working in Germany about that time in areas of radiation and cloud physics etc. Is there any sort of general way that you would characterize the German School of Meteorology in the 1920's early 1930's.

Lettau: Yes.

Käte: Was it a school, I mean.

Lettau: No.

Käte: It was different between Leipzig and Munich, and Frankfurt.

Lettau: I would say yes it depends on the interests of the major professor.

Nicholson: But so there was no… I am thinking in terms of sort of the way that we identify cyclone theory etc. with the Norwegians. Is there anything we would identify with the German school.

Lettau: One thing is quite interesting. Everytime, everywhere the Norwegians went, they said that they were dealing with what they called geophysics. The Geophysical Institute was also established in Los Angeles or Delaware.

Käte: In Leipzig? (Oral History 2 – Track 2 only 34 seconds)

Lettau: In Los Angeles, they called it the Geophysical Institute there, with young Bjerknes, Jack Bjerknes.

Nicholson: Oh right.

Lettau: That is secondary, and among the assistants which Vilhelm Bjerknes in 1913 and 1914 called to Leipzig, was Sverdrup, Begeron…

Käte: Pieman. (Oral History 2 – Track 3)

Lettau: Not Pieman. He was not among the assistants for what they wanted and began to develop at Leipzig. You remember this was a time before the

computer and the thing, which was in just the mind of Bjerknes. (Not on CD)

END OF TAPE 1, SIDE 2

Interview with Heinz Lettau

TAPE 2, SIDE 1 (Oral History 2 – Track)

Nicholson: This is the second day's interview with Professor Heinz Lettau on March 11th 2002. We are going to go back and test to make sure this part was recorded. When we finished up the tapes yesterday we were talking about the Leipzig School of Meteorology, and when Bjerknes was there and what he conceived to do there. Would you like to continue with what you were telling me about Leipzig and Bjerknes.

Lettau: You mean Leipzig and Bjerknes. Well the main… Apparently the main effort by the Norwegians, and by this includes three, Bergerons, Sverdrup and Hesselberg, was a really boundary layer meteorology. Secondly they worked out graphical methods for integration and differentiation of weather maps. The fact that in Germany at that time, there were a few mountains and then a few aerologic stations like Lindenberg and at the Bodensee, Lake Constanz, permitted, for the first time, to work with upper air charts. And in fact, these same mostly German operations from these few (locations), Hamburg was also a station in which kite ascents were made, at the Bodenseee, at Lake Constanz the technique was varied. When the wind was too strong then they went downwind on the lake with a boat with a very… Let's call it a fast speedboat. It was very fast and drove against the wind upwind, to bring the kite as high up as possible. When there was weaker wind, then it went upwind and released a tethered balloon for getting it. After all there were… Then there was Hamburg. Lindenberg, Lake Constanz, Hamburg, and then a few mountains. And in fact, these were the upper air data (sources) which Richardson used for his first prediction. But Richardson was in fact, in the long end more successful then the graphical methods developed by Bjerknes because he really used computers, but it was very interesting to read that at that time you needed for each computation, one clerk as they called.

Nicholson: One what?

Lettau: One person was manually turning the computer. I had to work on such manually operated computers at the Geodetic Institute in Potsdam too, but it was time consuming and of course you could make it electric, but the input had to be really by a person. And so even though, at that time Sir Napier Shaw was the head of the department in Great Britain, he was grumbling that Richardson makes proposals for an enormous amounts of personnel (for computing.) He said, why don't you go into Leipzig, they do it with few

assistants and student help. This is… I cannot quote it verbatim, but it is something which was very, let's say adequate statement at this time, so in this book, about the lifecycle of the extra tropical cyclones Richardson of course (did this.) Is he really pictured here too?

Nicholson: He is pictured in there. There is a big picture of him.

Lettau: I don't know.

Nicholson: Where's the beginning actually. Oh no.

Lettau: No, no.

Nicholson: Sutcliffe is in there, not Richardson.

Lettau: Sutcliffe yes, but Richardson is in the picture at Leipzig, so apparently he took it to heart and he went to Leipzig in 19… This is the meeting here of the so-called conference of directors, it was in Bergen. But three years later there was one in Leipzig, and Richardson was there.

Nicholson: What year was that?

Lettau: 1924.

Nicholson: So when you talk about the manually operated computers.

Lettau: Oh I see.

Nicholson: You are talking about around 1920 or so.

Lettau: Well I… The little computer which I had to work at, when I got my degree, my first position was as a geophysicist, at the Geodetic Institute at Potsdam in an area where all environmental sciences, as you call it today, were represented. There was big building with a tower for meteorology. Then (there was) one even larger building, with three big domes for astronomy, then the Einstein tower for making the solar physics. And then the Geodetic Institute and then finally the Magnetic Institute. So in one of my little pamphlets I sent you, there was a picture of the building do you remember?

Nicholson: Yes I do remember.

Lettau: No it's not here. But this, of course for me, was really a paradise. I established very useful contacts (such) as a meteorologist, Dr. Süring, the

man who had in 1903, I believe, established altitude record in a free balloon which was only late in the 1920's exceeded by Piccard, but Süring's record was in an open gondola. On my magnetic… My friends at the Magnetic Institute, invited me to come to the observatory, which was at Nebeck, about twenty miles away from Berlin, because of the disturbances by the subway. And the thing which I had to do was to recalculate gravity measurements, which had been done by a German and a Danish group around the Baltic Sea to establish the configuration of the geoid as they call it.

Nicholson: And this was the salt mine experiments or…

Lettau: No, it was no real experiments. An experiment which I did was… The head of the department, a man who had really gotten his credits, by making the survey of the at that time German colony of East Africa. This is modern Tanganika (now Tanzania) and to determine, among others, the exact altitude of Mount Kilaminjaro, and to really establish maps of this country. This was Prof. Kohlschütter, head of this department and he had developed (and solved) the problem, (which) was determining, at that time gravity, by observing the period of pendulum swinging. You had to reduce the temperature, and since there was always the danger that the pendulum produced swinging of the suspension, so there was always two working against each other. The survey around the Baltic had been made with brass pendulums, which are not magnetic, and steel pendulum because the steel pendulum could be selected as being less dependent on temperature. But I showed the man (who) had done the survey, had not seen before, that the difference between the brass and the steel pendulum depended on the magnetic field, because you have to have such an accuracy. The determination of gravity was necessary to nine positions and so I had a hand-driven computer, which was… How do you call it…

Nicholson: Hand cranked?

Lettau: Yes, right, and it was a mechanical system with ten little wheels…

Nicholson: So you had the… I'm trying to envision how this works you have to crank the wheels?

Lettau: Yes, you have to really crank it all the time, and again the input was of course the technique of reading data into the machine.

Nicholson: How did you read data into the machine?

Lettau: Well you couldn't really read it in, you had to have it on paper.

Nicholson: You had to have it on paper?

Lettau: Ja, ja,but, it was really again something which I (could have) used yesterday at home, (instead of) the drudgery of, how did I call it in synoptic meteorology. Nowadays, people stand in front of the screen and produce with the click of mouse, the isobar maps, and the temperatures. In the old times, this was a drudgery to do all of this, with the hand and pen and colored tapes on paper. Okay, the drudgery was also in the form of making computations.

(Oral History 2 – Track 4)

Nicholson: Okay, you were thinking about the efforts in Leipzig again. I recall that you mentioned that he said it would have been called the Leipzig School if it were not...

Lettau: Well, I think I got off on a tangent because we were then talking about the computer possibilities at this time. But then you asked me about an experiment, which I introduced for this culture that I had developed, what they call a minimum pendulum. That was only a staff which was a pendulum this way and, had a minimum effect on temperature. If this expense, it doesn't change, but they used steel for it again. I demonstrated from learning from the mechanical workshop, a coil produced magnetic field down in the basement, and showed them that the coupling between these two pendulums depended on the intensity of the field. Unfortunately this was the end of our minimum pendulums, but he never was upset about it because he said thank you very much.

Nicholson: Well let's go back.

Lettau: Later on, later on of course it was a cinch to measure gravity to nine positions with electronic systems and so on and so on. But at that time in the early 1930 and the 1920's it was drudgery. Sitting in the basement, dark, watching the light. The point was really that you had a clock, making a flash every second, and the pendulum had a mirror, and the reflection moved gradually through zero and came back. He had to estimate exactly the time when it went past to zero and you were sitting for three hours in the dark basement and watching this drudgery.

Nicholson: Well yesterday we talked about the weather map plotting as being drudgery and having to finish this within ten minutes and today we are talking about the hand cranking of computers as being much drudgery. You decided to go

into meteorology anyway. What did you envisioned you would be doing other then these sorts of things that kept you going.

Lettau: Yes, well to avoid drudgery I decided to be into more interesting things, where I could lay my hands on it, and make experiments, and change things, rather than sitting there watching the reports coming in. And then sitting down with a big map and being always pressed by time. You have to do it in ten minutes, and then in the next five minutes you have to produce a prediction or forecast. Oh incidentally yesterday you asked for type of airplanes. In Germany we had mostly the Junker single propeller system, I forgot the number of it. But at that time they had already developed rather sizeable airships, the U32 or something like this. It had four propellers and you could also go into the front part of the cabin. Well it held about twelve or fifteen persons. Käte went with that to East Prussia once, with our little boy. But you see all these early Junker planes had the aluminum sheets with waves (corrugations) and they looked like wrinkles. This big thing was always known by the popular name of an old actress who was playing character roles, Adeles Rantroph. This is what they called this big plane. When I was sitting in at the weather station at the airport in Königsberg, this big ship came in several times and one after it had started to Berlin the pilot came back and started telling about a gust but the gust arrived just the instant when he was there and this was only one spike in the diagram. And so he was really disgusted because they had already warned him that he had returned too early in the flight.

Nicholson: Okay so we talked a little bit about your first job and just one small point about that. Did you, in choosing your career did you ever thing about whether or not you would be well compensated economically, or were you just totally driven by what you wanted to do.

Lettau: Well this really never came into my mind. Being born and raised into a family where quite different from Käte, she said her Papa had to refinance his life insurance to let her continue studying. There was no problem with my family and…

Nicholson: So you were free to choose what you wanted to do.

Lettau: Well, my father had always this philosophy, he said you may do what you like, if it's legal.

Nicholson: If it's legal.

Lettau: But even if I don't understand what the profession of a meteorologist will be, I think you will go ahead.

Nicholson: Do you remember what you were paid in your first job.

Lettau: Well let's see a salary of one hundred fifty Marks per month.

Nicholson: That would be about fifty dollars a month.

Lettau: It was about seventy or seventy-five dollars. But I had to pay thirty dollars for renting a room down in Potsdam, and the cheapest restaurants, where you went to lunch. Usually dinner was always at home, cold turkey so to say. You could eat well, even if it was only soup, for ninety cents. You needed also about thirty marks for paying your restaurant bill, and another thirty for buying bread and sausage and things like that.

Nicholson: When did you and Käte actually get married.

Lettau: When did I get married?

Nicholson: Yes when did you get married. Were you already in your first job at the time or was it …

Lettau: The position in Potsdam was what I called simply a stipend by a fund which was established by the German industry and it was given to the economy I think like this because the man who was in charge of this and to whom I had to report was Ostwald, and also a Nobel Prize winner in chemistry.

Nicholson: What was his name?

Lettau: I think Ostwald something like that. He once called my boss, and said this man has been assigned at your institute to do work on gravity, but he reports having done studies in limnology, another field which I came across because they were records available. Is it all right? Professor Kohlshutter called me in, and said, he called me and I told him that is all right what you are doing. Okay, but after Hitler came to power, there was no possibility anymore, to keep Horawitz, as he was Jewish, in Leipzig. Weickmann apparently said this, and I heard it later from Bernard Horawitz, when I met him again in this country. He was a Professor at New York University when I came here, not as a prisoner of war, but later on, on invitation to join the Geophysics Research Directorate. I met him of course in New York, and I asked him, Bernard, had you any thought about my becoming your successor at Leipzig after you being forced out. Horawitz didn't return to Leipzig, he could not be

– his appointment could not be extended. He was in Bergen and went from there to the USA. Oh no, he said, I had recommended you as my successor to Weickmann. Well this was that, but the position I was offered was one which had a nominal salary, which permitted me to establish myself, to get married. The certificate of marriage since I expected you to ask about this, and have here my documents from that time beginning with the maturity at high school. Then the doctor diploma and here is what you were asking for my….

Nicholson: You got married in 1937 in Plauen. Did you have to ask for permission from her father to marry her?

Lettau: No, no definitely not.

Nicholson: And did getting married effect your professional life in any way. Becoming a married man, did this effect your professional life in any way?

Lettau: Oh no, you see when Käte and I got engaged, this was about two years earlier. From then on she had a position as a climatologist at Marburg at the institute of hydrology maybe. But not meteorology; it was bioclimatology. She had to work with nuclei counting and so on, because the problem involved counseling the sanitarium for lung patients, lung disease patients. Also at this time, our first balloon experiment, with Schwerdtfaeger, funds had been run out. We had made our six flights described by Louis, and I had then received from Professor Süring who sponsored additional research dealing what we called air mass modification. Here we were beginning to use a balloon as a vehicle, as a carrier of instrumentation, going up and down making saw-tooth slides, which for the balloon moving with the wind meant that was making the "eta" circulation, measuring the "eta" circulation with the axis was perpendicular to the wind. We studied, among other problems the pollution changes along the trajectory of about 200 kilometers and evaporation because when you are…

Nicholson: All of this from the balloon flights?

Lettau: Well of course, if you are getting the profile which was practically twenty meters in two thousand meters of absolute humidity, and you make this with three or four loops, then you can come to a reasonable value for evaporation. We checked with the soil evaporometer, which was run, by Professor Geiger, at that time in Vandenburg. Okay, but the scientific cooperation between Käte and I, did not end with her doctor's degree, but in fact was, from then on intensified and had really more significance. It didn't change after our

marriage. In fact she joined me in this famous salt mine experiment, but is it what you were talking about.

Nicholson: Oh yes that's the type of question I was wondering and also I was curious in this country we had what was called nepotism laws. Married couples could not work at the same institute. Did that effect where she worked.

Lettau: I know what you mean. We were in danger of that being accused of nepotism only in Madison.

Nicholson: Only in Madison.

Lettau: Because Käte had no idea until we got there, of being involved in work in the department. But Bryson all of the sudden, when he had organized his institute of environmental studies, he discovered that Käte had a degree and was completely qualified for a position as a research assistant. So we talked at that time about being accused of nepotism. We said, well it is not that we are urging you to hire Käte, but you came to us and hired her because she was qualified. Her job there was essential also in pushing forward the phenology studies in Wisconsin, together with the Academy of Letters and Sciences. But there was no possibility and no reason for talking about nepotism in the old country.

Nicholson: Well back in Germany in those days after you got married in 1937 where there many two career couples of was it very unusual for the wife to be working. Very unusual for a wife to be working. Was it unusual to have two careers in one marriage.

Lettau: Well it was not very frequently done but during the time of the very severe depression, there was quite a number of occasions, where only the wife was earning money, and the man had to do the house work. One acquaintance of ours, it was the girl that worked as a cook in one of the restaurants. Her husband had no job, but he was so ashamed of doing house work that when the windows had to be cleaned, he took the window out and took it inside and cleaned in and put it back on. This was decent work for a man, but cleaning a window this was not. This is an amazing sidelight, but during the time of the depression it was quite common I would say.

Nicholson: Sorry I was just checking the tape I thought it had stopped. Okay I think that's the main thing we wanted to ask there. I am trying to see where we are at now at this stage in the career. We started talking about the ballooning and I had several questions about that but first I wanted also to mention your bicycle trip to study pollution. Was this before or after the balloon flight.

Lettau: Oh this was much earlier, this was when I was still a student.

Nicholson: Out of chronological order?

Lettau: And.

Nicholson: Tell me a little bit about that.

Lettau: Oh and.

Nicholson: And one of the reasons I'm asking is because your career has had this common thread in that you take very simple ways of looking at very complicated problems.

Lettau: Yes.

Nicholson: And I thought the bicycle trip showed this so well. Tell me a little bit about.

Lettau: Right but of course the equipment was also very remarkable, because I had paid for one of the more popular meteorological journals. Also, it's name was *Wetter*.

Nicholson: Weather.

Lettau: It was in German, at one time in 1929 or 1930 there was a short description of something which Professor Linke had created, together a color specialist displayed a blue scale. It was simply,about index card format, with colored discs ranging from very light blue to the deepest blue. You only had to hold this up, with the sun at your back, against the sky and compare the bluest point of the sky which is about fifty or so degrees in the vertical, from the sun, and compare it. This is a very simple measuring tool for, let's say pollution in the air, including of course clouds, but you had to do it of course by clear sky. The whole thing cost only about 5 mark. I bought one by mail order, from the department in Frankfurt. I did a series of operations from the roof of our house, and wrote a little tabulation of this, which was published in Weather. This was my first publication, but this had really hardly any scientific value, only except to increase the popularity of this little blue scale. I don't know how many other people bought one also. Then I found another use, after I had seen from an airplane, flying up to 3 to 500 millibar, or somewhere like this, how the different pollution sources, over my home city, were joining and forming really a band or let's say, a sheet which then gradually petered out. I made this experiment with a bicycle and crisscrossed

the city up the ten kilometers downstream. Then I had found that the Austrians had done some work, as you call it, about how the temperature is changing when air flows from warm land over a cool water surface. How gradually does it go up. Well I found that this is of course, not the solution. There is a close solution for this problem, when you assume the "differability" or "Ostreich" coefficient to be a constant, which is of course a first approximation, and tolerable. But the point here is, you must have the solution for the increase, or discontinuity in the release of particles, not a change that is from high to low temperature or low to high temperature, but you begin to release it. I found that the solution by Wilhelm Schmidt could be modified to serve as this. This then was my first full fledged scientific paper, which was published at the time when I also got my degree in Leipzig in 1931. So I later in Madison had of course contact with other people and there was oceanography who was had no oceanography in Madison but in Milwaukee there was a group who were dealing with the physics of the Great Lake of Michigan I heard him once talking that he had produced a written or scientific paper which cost him only somewhat like five dollars and he explained how he did it. He said no the really interesting thing in Lake Michigan is the discontinuity.

Nicholson: Are you talking about the lake breeze front.

Lettau: No, not the lake breeze front, the discontinuity in the water. The warm water on top and the cold water below and of course this depends on the wind and he said he figured it out.

Nicholson: Thermocline?

Lettau: Thermocline, yes of course, I couldn't think of the name of it. He had of course, argued that all of the electricity generating plants around the lake, take their water from the lake and apparently most of them from about the same level, and he asked them whether they were recording the temperature of the cooling water they that were taking in. He said that he wrote to seven or eight of these companies, asking them to give him a record for a certain time period, a month or so. Low and behold of course he could see that the changes of intake water temperature on the east west shore were opposite. And so he wrote a nice paper about the thermocline, and as he was a Scotsman, and he boasted of his research that cost only the price of a few postcards. They sent me and the response to my letter. And I said I really can beat this with my bicycle tour five mark blue scale.

Nicholson: Right.

Lettau: He didn't agree with that.

Nicholson: No, well with inflation he might have won out. Let's go a little bit back to the ballooning. I know there has been an article published about some of the balloon flights, but I had a few additional questions that weren't covered in there. Who – was it you who conceived of the idea of doing the balloon flights for studying the atmosphere and what gave you the idea.

Lettau: The idea came simply from the fact that practically every meteorologist of renown, in the old country, had a hobby of ballooning. Linke had quite a number of flights, Weickmann was also interested in it. It was simply that before the airplane was really well developed. It was a somewhat inexpensive way to travel through the air. Nowadays it's even less expensive because you are using hot air balloons. And the first hot air balloons, were of course the ones developed by the Montgolfier brothers, at the time of the French Revolution. They of course found that hydrogen is a more effective way of using it as a fill. Only one man who had said, why don't you combine both of it and of course that was a disaster. What was the name of that fellow? He perished, because he combined heat and hydrogen. Of course in a balloon you are strictly not permitted to light a cigarette or something like this.

Nicholson: So were you worried about the dangers.

Lettau: Yes and the point was really that we were beginning with the experiment with the air pollution in Königsberg where we used a blue scale. The point is really the theory always assume that the exchange coefficient the diffuser is constant but it...

Nicholson: Sorry I had to check something, ja go ahead.

Lettau: But the point is really that the diffusivity, not molecular, which is molecular movement, but the actual diffusivity is composed of little vertical motions, and Schwerdtfaeger and I discussed already as students in Leipzig how to measure this. Then I had the idea to balloon would be a really good point. My reasoning was approved by Süring, in Potsdam. My question to him was, can we keep the balloon at practically one level and record the up and down drafts. That the up and down drafts can be recorded, I had seen in Frankfurt at the Institute. They had in the display there in the stairways, of about an hour of up and down movements in the balloon measured by using a variometer for measuring the actual height change, and the vertical anemometer for the relative height change. If you record the two things simultaneously, the difference gives you the actual air movement and this of course is the eddying motion, which constitutes the diffusability or the

diffusing process. So then Süring said it is possible, but you need a good navigator and he gave us the address of this fellow Pecksho, who had made several hundred balloon flights as a hobbyist. He was a journalist or an editor of a big newspaper in Berlin, but every Sunday he came to Bitterfeld and hired a balloon. He had a few hair raising experiences, over the Baltic Sea nearly coming down. But anyway I describe it, let me say John Lewis let me describe it in his report about our experiments with the measurement of the vertical motion, the eddying motion.

Nicholson: Right I've seen that. Well in view of some of the things like these problems that your navigator had over the Baltic and the hydrogen and everything were you concerned about the danger of going up in the balloon.

Lettau: Well, if you are in that gondola away from the ground you feel absolutely safe. You feel as if you are in the arms of your mother. Mother atmosphere carries you where ever you want. You have to avoid of course, lightening.

Nicholson: Of course.

Lettau: Ja, but then they wouldn't let you start anyway if they are storms. But the nowadays even a hot air balloon has to carry communications. We never had such a thing, but the equipment is very reasonably described in John Lewis report on the first phase of my experiment. Schwerdtfaeger left the company, he went to my hometown Königsberg as aeronautical meteorologist dealing with these ascents. vertical ascents. I had Käte as the co-investigator, and we made these saw-tooth flights, as I told you between twenty and thirty meters up to three thousand and changing it three or four times during that trajectory over about three hundred kilometers and this gave us air mass modification information.

Nicholson: So what if you can give me a brief list of the topics that you were able to study with the balloon. You've got air mass modification and nuclei, condensation nuclei.

Lettau: It was Professor Süring, who said, oh my, you are coming with a new idea. Everybody else was doing, or wants to do, scientific work in the balloon, on either radiation or atmospheric electricity. The balloon is really for these two problems. They have been used since they measured temperatures in England in about 1860 and so on and so on. But he said eddy motion that's a new one, so therefore he was very favorably impressed by this, and said, let's go ahead.

Nicholson: Anything else that you measured with the balloon?

Lettau: Oh, you ask for more.

Nicholson: Yes what else did you measure with the balloon?

Lettau: What we planned after we had studied the effect of air motion in the Peruvian desert in forming dunes. And going back for the understanding of this tropical coastal desert, which is an anomaly. We really should learn a little bit more about the circulation which maintains the dryness of the air. So I had later, I think it was 1971, a proposal to use a hot air balloon for flights, again a saw-tooth flight, but while normally the cross wind component, the Y component… Let's say if you call downwind X, and crosswind Y, and upwards Z, you do have essentially our air mass modification over uniform land, only the "sea" circulation but the "eta" circulation is the one which is important to maintain the aridity at the tropical coast. And this of course, can also be done with a saw-tooth flight, with a hot air balloon, trusting that the average motion is coast parallel.

END OF TAPE 2, SIDE 1

Interview with Heinz Lettau

TAPE 2, SIDE 2 (Oral History 2 – Track 5)

Nicholson: I forgot to put the microphone back on you. Okay go ahead.

Lettau: All right.

Nicholson: Yes it's fine.

Lettau: Unfortunately this experiment never came off it was not funded. But I learned later that the Air Force had the balloon program. But I got involved in quite a lot of other activities, and it was only the last decade before I retired anyway, so I gave up on this experiment. I leave it to other people who will discover the possibilities, and do it, but even since hot air ballooning is not so popular now, eventually, I'm pretty sure people will see a hot air balloon also as a tool for research in certain meteorological conditions.

Nicholson: That's excellent. We got off on a little bit of a time jump they're jumping from the balloons in the 1930's to the use in the 1970's. Let's go back to the 1930's now and try to continue a little bit more chronologically.

Lettau: Well.

Nicholson: I think we're… yes go ahead.

Lettau: There's a great difference between the big gas filled balloon and the hot air balloon is the quiet. They are so deep in the atmosphere that you are always surprised to hear people on the ground talking, or dogs barking, or a chicken getting excited about the approaching balloon. It's quite more difficult to communicate from above to below because of this of course point of fraction of sound waves. The usual vertical stratification is that the sound waves are collected upwards and diverting downwards. So it is intensity by communicating from up to down is less good than from down to up.

Nicholson: This reminded me of a story you told me yesterday when the tape was not running and I wanted to come back to that for a minute before we go later in the 1930's. You mentioned that you were bicycling into the woods when one of your professors returned from was it a balloon flight.

Lettau: Oh no, Zeppelin.

Nicholson: Oh a Zeppelin, okay tell us a little bit about that story.

Lettau: Yes, but there is much more to say about it, because it was after I finished my oral examination was with Ddbye and Dr. Kurver not Kurver, the other. Anyway I gave you the name yesterday and I had time on my hands before I began my appointment at Potsdam. It was about three weeks and I took it easy. Once more we were talking yesterday about this Zeppelin flight in July of 1931, was the occasion where a radiosonde was tested and applied.

Nicholson: Oh yes.

Lettau: Only because this professor Karolis was begin permitted at the last minute to join the flight, and prepare the radiosonde so that it really worked. The two or three ascents were made around Spitzsbergen, that is more than eighty degrees north maybe already eighty-five degrees north. I'm not so sure about that. But the publication is in the German Journal of Bietrager zur Physik der Atmosphere.

Nicholson: In what year do you recall.

Lettau: Well it can't be earlier then 1931 but probably 1932.

Nicholson: Well we were talking about this I should put this on record in that you had seen a historical chronology suggesting that the first radiosonde was 1939 and you have documented proof by a photo and your memory.

Lettau: Oh sure.

Nicholson: That the first one was actually 1931 in Spitzbergen. Are you looking for the photo. Oh we can come back to it. Okay we are looking at some photos of the first radiosonde descents. Radiosonde testing that was done by Weickmann and Mulchenoff in 1931 and we are looking at some photos of them.

Lettau: Yes. Well let's first begin with this picture here. You see Weickmann and two students here, which I recall but they are looking at the first edition of the Mulchenoff sonde. Here the balloon is prepared, also with the help of students here. Here is a picture showing after release with, Weickmann , Mulchenoff Dr. Lumert here. This could be me, I am not so sure. It depends on who made the picture, but all of the other ones are students from Leipzig.

Nicholson: All of them?

Lettau: But you see this is really June 1931 and….

Nicholson: So many years before.

Lettau: This is a release that did not work satisfactorily.

Nicholson: Ah ha.

Lettau: Because this was just a few days before the two gentlemen had to go to… I don't know, I think they had to go to Friedrichshafen, to Lake Constanz where the Zeppelin was starting for this big flight. So on the next day or so, they must have, although I really have no documentation for that. They must have gotten Professor Karolis to really make the sonde workable. Take Karolis and the sonde with them on the zeppelin to Spitzbergen, make the ascent there, and publish it later by Weickmann and others. I cannot say which year but…

Nicholson: That's okay but it was fairly – it was around 1931 1932. Was this a historic Zeppelin flight? Was there something historic about the Zeppelin flight you referred to?

Lettau: Well, it was really at the time when there was very good cooperation politically and militarily between Germany and Russia. And the Russians were interested in photo how do you call it – photo mapping.

Nicholson: Photogrammetry?

Lettau: So the Zeppelin had to fly the course was established by the Russians. The Zeppelin had to fly, leaving Norway out, I believe. It had to fly to Norway Semmelyar, and from their north and return after reaching the highest point at the latitude of Spitzbergen I really don't know if they could go over Spitzbergen because the major idea was to fly only over Russia or Germany and so the Zeppelin…

Nicholson: Spitzbergen is Norwegian territory?

Lettau: Please.

Nicholson: Spitzbergen was Norwegian territory?

Lettau: Yes absolutely. Spitzbergen at this time was, the Norwegians called it Swalbach. The Norwegians, at that time had already begun mining of coal. Again I think it is something which got lost in the history, and you have seen that the wrong date for getting the first useful application and testing of the Mulchenoff sonde.

Nicholson: I see that. It proceeded it by eight years, so this is very important. As I recall you said that on your three weeks of leisure and mind you I can't imagine you taking three weeks of leisure.

Lettau: Oh well.

Nicholson: During that time you were bicycling, and you said that you observed the Zeppelin coming back.

Lettau: It was July and the beaches were very enticing at this time. And no, I really was looking forward to having my first appointment as a "stipendiate" of the Not Gemeinshaft der Deutschen Wissenshaft. That's what they called it. It meant funds given by industry, especially of course, the chemical industry was still working at the high point of depression. We had more then I believe twelve percent of jobless people at this time in Germany.

Nicholson: Oh the reason I asked about the bicycling was you mentioned yesterday that you were observing the Zeppelin returning.

Lettau: No, well, I couldn't help it.

Nicholson: You had your perch on the ground.

Lettau: Ja, I was standing on the ground and saw this big ship really passing nearly on top of me. When we were talking yesterday we mentioned flight. You asked about how were people dressed in class. Now this is my twelfth grade class. I myself only half honest because I used my camera with an automatic focus.

Nicholson: Oh I see.

Lettau: And when I put it in focus I couldn't imagine that I wasn't half on it.

Nicholson: Is that you.

Lettau: Yes that's me but you see everybody has a jacket, and ties, and about eighteen people I believe.

Nicholson: That was you. A really good idea.

Lettau: This picture was, must have been in… Oh, at another occasion, you see in this pictures they are publishing memories. Now I remember why I came on, it was because of Zeppelin. From the woods where I saw it, the zeppelin went over the city. There were some people photographing it. At one time they were published in this journal.

Nicholson: Oh I see.

Lettau: Zeppelin was over the city.

Nicholson: At this point we've covered I think most of the… Are there any other major experiments that you made when you were there that you wanted to mention before we go on to some other things. We talked about the balloons, we talked about the salt mines, various experiments.

Lettau: There were the real.

Nicholson: We talked about the bicycle trip.

Lettau: The real interesting experiment was using my double pendulum in the salt mines in the Alps. The point was really for Professor Steinhauser in Wien, in Vienna, had published a theoretical work computing the deformation of the earth's crust under the Alps by the seasonal snow cover. Assuming that the slow load was about four meters to the center petering up to zero to the rip of the Alps about plus/minus one hundred fifty kilometers. But of course we found that the earth should yield but a few centimeters. I wrote to him saying that with my pendulum I can measure inclinations of hundreds of a second of an arc. And then you could have predicted that there would be a depression in the center then the inclination should be strongest at the rim. I would like it, if you would agree to test your theory by going to some place. But I have no money for this right now. He said, well we can release some money from the so-called "sonder" funds. The aim is that a major requirement is that you have to use this money German Marks and it can only be used in Germany. So I had also in the meantime established contact with Professor Marschek, in Dresden who had developed a very highly version of the ordinary double pendulum and he was interested only in the tidal movements and tectonic theory of how the earth movements can be measured. He had prepared, he had the means for it, a chamber in the salt mines of Reichenhalt in the Bavarian Alps. I contacted him and he said Berchesgarten and he contacted me and I said well I know the chamber is still clean, and it was working good

there, And it is now maintained, or let's say, at least it has lock and key. and by the people at the Bavarian government who are in charge of letting tourists visit the salt mines to take a ride on one of the deep depressions with standing water, and looking at the various types of salt therein and so on and so on. Everything worked out fine. I went there after we got married and of course Käte came with as a co-scientist, and this was long enough after our marriage, that she was pregnant. Nevertheless we could work very well together but I mentioned this only because, at one time when we both went into the salt mine about fifteen minutes walk. First you had to activate a cable car, to go up, and down on a few of these trips.

Nicholson: What are you trying to remember.

Lettau: I do have a publication showing the concept of the salt mines, whether it was two levels or four levels.

Nicholson: You could show me that later….

Lettau: We will look at it later. So it was after we had stopped the cable car, we could walk to another floor, sliding down on a slide and finally arrived at the chamber. Once we were there, we had only one lamp, not even an electrical lamp only an acetylene lamp. But I discovered I did not have a key. So I said, I have to run back and get the key, but I need the lamp for this. Could you… Would you rather come with me, and not return or stay here and wait until I come. She looked at me and said, I will stay and so the poor girl was there, about 600 meters under the ceiling, in absolute pitch dark. Nothing, because the door was light to let (me see that) my instrument was working, and had of course batteries and light, but none of this light shown through the door.

Nicholson: Oh.

Lettau: So she was sitting there on the ground in the salt mine and I had left her there.

Nicholson: (Laughter).

Lettau: Tell what you said about it.

Nicholson: How did you find that? Tell us about that.

Käte: Oh, I was convinced that he would come back.

Nicholson: Oh you were.

Käte: It was a strange feeling.

Lettau: Yes.

Käte: Afterwards dark and quiet. No animals, no persons around.

Nicholson: How long were you down there?

Käte: Oh.

Lettau: Well, I think about twenty minutes.

Nicholson: About twenty minutes?

Lettau: I really hurried as much as I could, and always next time, we took both of us, a lamp.

Nicholson: Oh.

Lettau: But the point was this experiment was successful, in fact, it was even more than expected. Steinhauser agreed, when I showed him the results. The inclination was much stronger, not the tenths, up to the tenth of a second of arc, but it was not the entire system of the Alps, the mesoscale of the system of two hundred miles diameter, but the individual mountain range which yielded (data) and was tilting because.

Nicholson: Because of the snow pack?

Lettau: We had during these months were we had recorded the tilting, we had (on) two or three times, new snow falling on the mountain, in January through March. January snow melted away, but there were two or three times where there was new snow falling, and I could see this deep in the mountains, in the records of my tape meter.

Nicholson: Wow.

Lettau: Ja, so well this was of course 1938, one year before Hitler started this foolish war, so I had to give up on this one. I wish I could have continued. In fact, there would have been a very good chance, because in the middle of the war they appointed me as a professor at Graz, as the successor of Alfred Wegener and I couldn't go there because at that time I was drafted and working for…

Working? Attending so to speak, I was present but not needed, or having to do anything with forecasting. I had only been there… But we were there, and we will cover this when we begin talking about my activities during the war, but the point was that once we decided to spend a day trip by train to Gratz, and see my institute which I never had seen before. The unfortunate fact was that the Austrians annulled all appointments which were done during the Hitler time. Because as we heard very often Austria in 1945, they were always inclined to call Hitler a Prussian, and Beethoven an Austrian. Anyway all appointments being done by the German Ministry of Education were annulled. So I also have documentation of this from the Dean of the School, who had been the same Dean who had been very active in getting myself down there, he had to inform me, that he was sorry his appointment has been discontinued.

Nicholson: Well this apparently had a big….

Lettau: She received the money from Vienna.

Nicholson: You did.

Käte: I received something until the end of the war.

Nicholson: You were paid until the end of the war?

Lettau: Oh sure.

Käte: Ja.

Lettau: There well, you see.

Käte: He became a professor in Gratz during the war.

Nicholson: Yes I will just put it back there. So he was transferred but remained a professor at Gratz.

Käte: Yes he remained but he couldn't start there because the war was on and he couldn't go. But he was officially professor in Gratz and I got his payment which came to me. At the end of the war when Austria decided that all these positions were annulled so they stopped paying me. It was a short…

Lettau: Ja.

Käte: …time.

Lettau: In the name of the German people I appoint Heinz Lettau, already appointed to serve the administration for lifetime, Dr. *Viel Habil* Heinz Lettau for extraordinary professor. It doesn't say that this was Gratz but the date, 26 May of 1943. This was when I did not get leave as I was in France already. This is the stamp says Adolph Hitler and who is in charge of the Reichs ministry for scientists. Office was only an under secretary for science, education. Well I do have another like this one. I never have seen it really but it has the fact that I received my salary from the University of Grads but it was mailed to her to my account and for her disposal because…

Nicholson: Even though you were actually serving in the war.

Lettau: Absolutely. I really was, and always remained a, let's say civilian. I didn't get my ordinary pay according to the...

Käte: The position you had was professor at the university at Gratz. They got your compensation and it couldn't go to him and he couldn't come to Gratz but the money comes to me. That's the way it was.

Nicholson: Well certainly the war had…

Lettau: When Käte and I were in Vienna and an invitation in the late 1980's we decided to pay a visit in Gratz and to see my institution there. Of course, it was not the same anymore. It was a big, big building and the…

Nicholson: Is that when….

Lettau: My successor there was a man you know from the United States. This was one of the scientists who were brought over, like Helmut Weickmann at the time serving for…

Nicholson: Who was that.

Lettau: There were.

Nicholson: Elmer Reiter.

Lettau: Say it again.

Nicholson: Was it Reiter.

Lettau: No, this is the father of Klaus Weickmann.

Nicholson: Oh, Helmut Weickmann . Oh I'm sorry I didn't realize.

Lettau: Ludwig Weickmann is my major professor.

Nicholson: Right. So Helmut Weickmann .

Lettau: Helmut is your age.

Nicholson: No, no no.

Lettau: Klaus is your age. Yes. Okay so let's see the end of my experiments in Germany.

Nicholson: So this is about the time that you were drafted to do ballistic winds, to do wind work etc., but I was curious about to start off with I wanted to find out a little bit about how the weather bureau was structured about that time and how they decided which meteorologists were going to have to serve the military and if most of the meteorological activity was in the military.

Lettau: Well this is something I really am not the person to be asked. In fact I always remained in some way, a civilian. They didn't really know what to do with me. At first, when Hitler started the war in Poland, well, he said we begin the counter-attack. A lie. But anyway ten days before I was to receive the order, I had to show myself at the office of the staff meteorologist, in the region in Königsberg. We talked about it. Oh I said well, go home again, we don't know what to do with you. Then for a while, they said well we have at least one position for you. There is a little auxiliary airport nearby, about twenty miles from Königsberg. There are only two technical assistants, who plot the map, which is delivered there.

Nicholson: The drudgery.

Lettau: No, no, no. There is not, it is not drudgery, anymore, no no. There was already a center, which produced the map, and the map was distributed all over the place.

Nicholson: Oh I see.

Lettau: The only thing is they had to be collecting the data. There were two teachers from the small schools out there in the vicinity. There was one commander, the commanding officer, an old veteran the captain, who said also, I had to

show up in civilian clothes, because I had been only given the rank, but no possibility of getting into a uniform.

Nicholson: Wasn't that the case with most of the meteorologists that they remain civil servants rather than military. Wasn't that true of most of the meteorologists that they stayed civil employees and not military?

Lettau: No, the weather detachment was always part of the airport. I mean you had a commanding officer, for each airport and then military personnel, engineering personnel to keep the facilities in good repair, flight mechanic and mechanics who took care of repairing aircraft. And so on and so on. And there was the weather detachment. Usually all of these people were active in the service. They were treated like other military personnel having rank, usually the rank, for the technical people rank of a lieutenant, and the chief meteorologist on a project was a major.

Nicholson: Well what prompted my question was something I read in the articles that Schwerdtfaeger had written talking about the real officers versus the weather officers. He said that the insignia they wore was different and they weren't really part of the military.

Lettau: Oh well they did have the shoulder pieces of a major.

Nicholson: Ah ha.

Lettau: But had… the distinction was made clear by the color of the symbols on the… how do you call it.

Nicholson: Insignia.

Lettau: The insignia… but you see well I always prefer to wear a jacket which had no insignia and this is….

Nicholson: Well did – in the...

Lettau: Once more, some of the officers were old veterans from World War I. I remember one officer who was… How do you call it? The Signal Corps, here so these were the people who did the tele-communication etc. etc.. This was an Air Force officer doing World War I, or a Signal Corps officer, who had been assigned to go up in a captive balloon and look over what the enemy was doing. And these balloons were of course, no match for all enemy flyers, and he got shot down. His parachute had opened and he was coming down and the situation still wasn't too good. Then he said this pilot

turned again on him and fired always trying to hit him in his head. He was very strong, but was deformed from the attack. What he said all what I wish at this time that I can see again. This pilot who devilishly was aiming at his head, but succeeded only to shoot away some flesh on his side and so it was practically serious, he looked terrible, but he said I am a peaceful man. He is now from Mazuria, but this is what I want to do in this War, that I can see this fellow again and shoot back at him. Then the commanding officer, once had the visit of two other ones, from neighboring small airfields. At this time no plane landed there but I was amused, the only item they were talking about how do I punish my people because all these fellows were reserve men and the men under their command were considering it like a vacation time. They were absent with ordinary leave so the main item of talk there was how to punish them.

Nicholson: Oh that sounds terrible.

Lettau: Well this was my impression of war at the beginning. The first were the men who had this grudge against the enemy. The others were really farmers from the area. Now I am in command of so many Germans that don't behave. So it was.

Nicholson: That was your first job during the war then.

Lettau: Strange yes, but then they sent me back to Königsberg. Then they got slightly organized, but this was a time when France had also declared war. But it was you see, the Frenchmen says it was a "folly" where nothing happened really, at the western front. In early 1940, finally the German Army began the invasion of France and the date for this invasion, the beginning of the invasion, I think it was the 16th of May. This was in fact proposed by the chief meteorologist at the supreme command of the Air Force near Potsdam, Dr. Desing, an old time meteorologist, who really didn't hesitate to use all modern means but he was still one who used his thumb for predicting, and to fix a date, he used that what they call the singularities. I mean studying how during the period of the year, there are certain weather changes regularly appearing at certain dates, or certain times. And the middle of May, in France, is one time in which there is a predictable appearance of high pressure areas. And this made this man not only famous, but he got promoted to the rank of Colonel. Hitler sent him a watch with a date on it. So this Dr. Desing, a very nice man, I knew from meetings in the meteorology society. I finally was attached to him and again, he said what do we do with you. Well he said we do have here a small group who has nothing to do but prepare leaflets describing how climate develops in regions

where there is supposed to be activity. The other thing is to look over the middle …

Nicholson: Medium range.

Lettau: Short time predictions, supplied by Professor Bauer, at the Institute of Long Range Forecasting. So my fellow meteorologist was Dr. Phillips, Horst Phillips. He had been with Bauer's Institute. We had really nothing to do then for wait for special assignments like if the war was preparing to enter the Balkan regions, to prepare leaflets on what temperatures there, and so on and so on. But it was very simple technical matter and nothing really to do with forecasting.

Nicholson: Well what was Bauer using for medium range forecasting, what method?

Lettau: Statistical ideas, I had a chance to, when I was a student in Frankfurt, he had already established his Institute, and was giving lectures in Frankfurt. Only one hour every two weeks but it was sufficient, to learn what he really thought of it. He was not a meteorologist. He came from an Institute of Applied Mathematics, statistics his specialty.

Nicholson: Is this in Bad Hamburg?

Lettau: His Institute was established with the German government in Bad Hamburg by the Weimer Republic in 1930 I believe, or 1928 I believe. Because in 1929 when I was student in Frankfurt, he was already there, in Hamburg and gave as I mentioned before the one lecture every two weeks, at the Institute or the University of Frankfurt.

Nicholson: My memory about Bauer is that he was known for using sun sports for predicting the weather.

Lettau: He looked at everything, but he was always very careful in formulating his long-range forecast, and he had not very good luck. For instance, we had during the five winters of wartime, beginning with 1939, we had three severe winters and two winters followed each other severe winters especially in Eastern Europe. He argued that it is very unlikely, that within four years, there will be more than two severe winters, by just looking back. But this was one of the occasions, where you can ask the statistician, if you find such a statement by looking for several hundred years back does it mean that it will not, or is now ripe, to appear. His bad luck was that it did.

Nicholson: I did.

Lettau: So the fourth winter was also severe.

Nicholson: And this affected the troops on the eastern front in the Soviet Union. Is that….

Lettau: Say it again.

Nicholson: I'm asking the relevance of this. Was this affected the decision to send troops into the Soviet Union. I am trying to understand the relevance of this forecast of Bauer's for the fourth winter.

Lettau: Ja.

Nicholson: Was this related to troop movements into the Soviet Union or what?

Lettau: In general you see.

Nicholson: In general.

Lettau: The position of the German meteorologist was such that the command of either Navy or Air Force or usually the Army, expected the meteorologist only to say what the weather will be. But the meteorologist was in no way entitled to say, it is favorable for this or that action. This was always the case. Schwerdtfaeger pointed this out very clearly. It was only the assignment for the meteorologist to say what we believe there are reasons to assume that there will be in June around the 6th of June there will be conditions which are so that you with the military can apply your criteria if an operation is possible or not but it was not up to the meteorologist to say that.

Nicholson: Oh no I understand that but why was he asked to make the prediction for that winter do you recall?

Lettau: For the general reason.

Nicholson: Yes, why was he asked to make that forecast?

Lettau: I mentioned that when I got this appointment as an extraordinary professor in 1943, I was already in France and attached to the command of the Brigade headed by a Colonel Wachtel, who was really an anti-aircraft, flak, battery command and had shown certain ideas of being adaptable. Because he had this very efficient German gun, the 8 centimeter anti-aircraft gun, and the Baltic region mounted them on barges. During the siege of Leningrad, he

had distinguished himself, as a commander of such barges. Because of anti-aircraft guns mounted on barges, he was selected as the head of a Brigade, which was supposed to work with the flying bomb the so-called V-1 in Germany and what the British called the "buzz" bomb. But it was really the flight structure of the thing was developed by the Fieseler company which made the very slow moving aircraft which could land on practically a few hundred yards, less than a hundred-yard airfield. This was for instance flown by some people in a big hall in Berlin, inside the hall. Anyway Fieseler had the design of this one. There were other groups with engineering involved, and finally there was weather involved. The engineers always had said, we can guarantee such and such, accuracy for letting this non-guided little bomb fly over somewhat like 150 miles. The limit was two hundred twenty kilometers. But the thing was pretty slow… it had been developed as a very simple system, it had no propeller. It was a so-called ram jet. It is a very interesting simple system with.. What it did was like shutters, which when you push them from here they will close, when you push them from the other side they will open again, so if you explode something, then this will be shot forward. If it shoots forward it will open again and then the next. The thing made a terrible noise, but it was very efficient and could… Well the thing was very slow in rising, but on reaching the predicted course and desired height, it could fly a little bit faster than the fastest German aircraft, but not as fast as a British Spitfire, so it was not very effective.

END OF TAPE 2, SIDE 2

Interview with Heinz Lettau

TAPE 3, SIDE 1

(Note Session 2 was missing – this is Session 4)

Nicholson: Professor Lettau's time as a prisoner of war in the Washington DC area. We are going to go back to that conversation after I test whether or not the microphone and tape are working. Okay please continue telling us about the VIP that was going to meet you in Washington.

Lettau: The VIP, ja, well, finally, the day came when the VIP was available and I had asked that I should be driven to Washington downtown and meet Professor Landsberg at Cosmos Club.

Nicholson: Did you know at this point that it was Professor Landsberg.

Lettau: I knew him of course, we were both students in Frankfurt in 1929 and especially interested both of us interested and were among the few students who attended the classes of Professor Gutenberg.

Nicholson: Had they identified him yet at this point? Had they told you who the VIP was?

Lettau: Well, I was asked before, our mentor Captain Smith, CIC officer told us that we would have to stay longer than necessary, in the interrogation camp, before being transferred to a camp in which the Red Cross had access. He had said, it is necessary for us, because somebody a VIP, he mentioned for the first time, would like to see me. Why the two other meteorologists also to wait, I really don't know. Anyway, the first thing I was permitted to wear, was given a civilian suit, and a lieutenant drove me into Washington. With another Lieutenant, one German speaking and the other just an American. We had a site seeing tour, but I believe I talked about that. But a few days later again, I was informed that the very important person was now in Washington, and it was Professor Landsberg. And he wanted to see me at the Cosmos Club, at 6:00 in the evening. Again a civil suit was provided, and one Lieutenant only, brought me to the Cosmos Club and waited. Professor Landsberg stood at the stairs waiting for us, and addressed me, Heinz, why are you five years too late to come to Washington. Because he knew that I was assigned, in 1939 to attend the International Meeting of the Geophysical Union, International Geophysical Union in Washington. I could not go because travel to America was, in the end of July, interrupted, because the war was imminent.

Nicholson: And when were you drafted by the way?

Lettau: In August of 1939.

Nicholson: Okay.

Lettau: And this was a time when the meeting in Washington should begin, the international meeting. I cannot recall and I've tried to find out which subject I was supposed to talk about. The American Geophysical Union was trying to find out, but the only information they could give me that Professor Lettau representing the Albertus University in Königsberg, Geophysics, would be present. But not the type of address. Anyway Landsberg knew that, and therefore his first words were, Heinz, why are you five years too late in (coming to) Washington. I said I couldn't help it. But anyway, the

lieutenant said, well you don't need me. Landsberg said come again at 9:00 and pick him up. So he said, well have a good time in Washington. So Landsberg took me into a private room in the Cosmos Club, where we had one dinner table, and got served a very nice dinner and a good Rhine wine. So this was something apparently rare in prisoner of war life, but not absolutely uncommon. It is customary in all civilized nations to treat prisoners of war who are really (innocent of) know atrocities, to treat them decently, on both sides. There were American prisoners, or British prisoners in Berlin who were offered night life visits or restaurant visits. There were other prisoners of war in the United States much like myself. This special treatment was very enjoyable of course.

Nicholson: Why was Helmut Landsberg considered to be a VIP do you know?

Lettau: Well he was really not a VIP in the real sense, but he could not come earlier because he was involved in the wartime training of meteorologists, at the school I believe in Chicago. He was already… He had been a professor in a Canadian university. I don't know which one, I think it was Toronto, but he had been in the United States. Don't forget, our common student times were in 1930,'29 and '30. '30 ja, and so in the intermediate fourteen years he had been, first in Canada and later taking up… Later on he was at the University of Maryland.

Nicholson: Yes that's…

Lettau: It was by no means an interview, or an interrogation. We were just talking about old times and how common friends had survived and were still around. This was really very pleasant. The most impressive thing was, when we left the building at 9:00 and the lieutenant and I walked a little bit, around the premises, the little park there. All lights were on, people were sauntering around, enjoying life, talking. And it was such a contrast to the life in European cities, including Paris, which was not a bright city anymore. It was absolutely dark at night time, because every window had to be blocked, and no light was allowed. And so for me, this evening in Washington DC, with all lights on and people walking around enjoying life was really the end of the war. Then after I had returned, everything was ready for being transferred. We were asked, what kind of prison we would like to stay (in) for the rest of the war. So the choices were either camps which were run strictly by military personnel, mostly the officers and men from the Afrika Corps, who had of course been captured in Tunis and gone there from Algeria, the fight was in Tunis and Algeria. Or (camps with) absolute uncontrollable Nazis. Then further down, treatment of let's say more or less, neutral people. And (camps for) ones who had really made their mind up,

and wanted nothing to do with national socialism. All three of us elected the latter, because we didn't want to be in a camp ruled by military personnel, after having been relieved from any (of them.) Okay, so the so-called anti-Nazi camp, in Ruston, Louisiana was our destination. We were traveling by coach, about forty prisoners of war in all, from noncommissioned officers to us civilian employees of the armed forces, and a few officers, mostly lieutenants and second lieutenants. But the trip lasted two days because our coach was always waiting for one train to be attached to it, and it went over Jackson City across Memphis, Jackson City. Well first Pittsburgh, St. Louis, then Jackson City, then Memphis into northern Louisiana to Ruston, which is roughly in the center of the state, not close to the border.

Nicholson: Just a minute when you say coach, you mean train coach, you don't mean bus?

Lettau: Say it again.

Nicholson: When you said coach, I thought you meant bus, like Greyhound. You actually went by train?

Lettau: Oh yes sure a train yes. A day coach was always.

Nicholson: A day coach right.

Lettau: Yes, we had a day coach only two or three American personnel, accompanying us, I think five. And at one point, one of the prisoners got severely ill, and we had to stop over for nearly a full day near Memphis. We were usually getting our provisions by C-rations, but for certain reasons there were no C-rations for this day. So we were marched across the railroad yard, to a restaurant, which happened to be in the negro quarters. We were very friendly looked at by the negro girls who served us lunch. Oh, I forgot there were characters, within this group, like captured in Paris, as members of an actor group, which were also put in quasi-uniform and considered as prisoners of war. They marveled at the (meal), every one of these black people was a born actor. Okay so I finally wound up at Ruston, Louisiana and was in fields of cotton fields, but of course none of the cotton fields were in active use.

Nicholson: They were not at all concerned that you were going to have some sort of an uprising or anything like that or the prisoners would be so impractical or you were having such a good time?

Lettau: Well this was fall, I mean I think we were arriving there by the end of October, and we enjoyed of course, the freedom of walking around in compound, which had about twenty or so, of the barracks. There were some other compounds, adjacent ones, but this was not just only for officers, but for all people who really did not want to be under military discipline anymore. The camp, well I cannot say, the German officer who had to serve as the spokesman for the group, was a captain of the Army and I had the rank of a major. So I do not really know, the camp commander, a very jovial attorney from Ohio somewhere, Lieutenant Watts, I remember this name. He asked me, I want you to be the new spokesman. I said, well, sorry, I do have the rank higher than that of the captain, but I am not an officer. Oh, it doesn't matter, you are my, the next spokesman. So I had all that I had to do was to ask around if everybody was happy, and every evening there was, all the prisoners have to be in line. I got an attaché lieutenant who had to count and give me the number and I had to go to the camp officer, lieutenant, second lieutenant Watts and say one hundred twenty prisoners. And this was all my duties except once in a while a complaint. But everything really turned out to go well, (despite) quite a number of surprises. One day, a group of new prisoners came in. Among them was one with the rank of Lieutenant Colonel. I immediately went to him and I said, Colonel you are really higher ranking then I am, and I am really not an officer. You should be, really I would propose, that you be the next spokesman. Oh, he said no, no, no. I'm an engineer, and he had been in charge of supplying the motor vehicle operation groups, with materials. He said, I am happy that I am not anyone, Lieutenant Colonel, or not. No, no, you stay here that way. All the prisoners, who came to me and said, I have asked to be transferred, I couldn't stand it anymore, in one of the camps, where there was military discipline, rigidly enforced by the so-called spokesman. And I have quite a few letters from people who expressed their happiness to be in a camp free from any military discipline.

Nicholson: What sort of people would have preferred the camps with military discipline? I can't imagine anybody saying they want that.

Lettau: You see, the people who really found themselves as being, let's say most of the Afrika Corps, were convinced that they were not really beaten in the field. They had to give up because they get no supplies, no ammunition anymore, and no gasoline for the tanks and the panzers, and so on and so on. So they were let's say like the Taliban today they are fighting on.

Nicholson: Oh, oh, so the Afrika Corps was captured in Africa but brought back to the U.S?

Lettau: Yes and of course there were, let's see, we had on chaplin for instance. There and another very interesting man, a Count Arnam, he was as a lieutenant, also pressed into service and attached to the German governor, or military governor of the City of Paris. He had been selected as the one who should stay in Paris, and have the official task to contact by radio the American forces, and tell them what Hitler had announced. His famous order, that Paris has to be burned. And Paris was not burning, thanks to the wisdom and to the reason of the few German who were still there and took care of this fact. He said there were so Count Arnam, a person deeply religious and he had a good friend there he had later written a book about his experiences, and he is telling about something which I should mention to, that to keep prisoners alive and so we had of course a few activities. I mentioned before that there were active people who were trained theatre people, actors and we had a little show which all was attended by the American commander of the entire compound, the entire camp and we had the compound commander Lieutenant Watts suggested that you should have kind of a university. In addition we had the chance to subscribe to correspondence courses in colleges and we were amazed to learn that each college had a different approach to our problem. Some said oh ja you were members of the armed forces so the tuition is very low. Other argued you are foreign nationals and you have to pay a higher tuition that's all, but one of our number, he was a judge at a time and attorney, in I think in Bavaria in Eastern Bavaria. He later wrote over to me and said he had been an experienced life in other camps, those with rigid military discipline and he was really delighted for my very loose handling of everything which had to do with only the most necessary things of keeping discipline were necessary.

Nicholson: In other words you were responsible for the camp discipline?

Lettau: No not really responsible… nobody could give the German commander the responsibility. In fact it was only this little disciplinary authority could be misused. For instance there were "kangaroo" courts in these extremely nationalistic compounds which really had mock trials, not really mock trials serious mock trials and one was really a journalist coming to us after having been practically condemned to death, and he served as our interpreter of the news. He had all the papers, which we could subscribe to.

Nicholson: Where were this mock trial – where were these kangaroo courts?

Lettau: In discipline our courts were the old military system was rigidly enforced.

Nicholson: In the U.S?

Lettau: In the U.S. yes.

Nicholson: Ah ha.

Lettau: There was a book by one American author about the Germans as prisoners in this country and you can only say the non-commissioned soldiers had to accept work and do work and had only, according to the Geneva Convention, only the right to refuse work when it was for military purposes. So all of these work detachment were doing agricultural work, work in the woods, or part of our boys said to provide firewood, and I forgot what else they had to do. In general, for commissioned grades, commissioned officers there were… we got twenty-five cents a day and if you don't have to pay for anything neither living or boarding then it adds up. I bought after a while my salary as the spokesman was double, so I had fifty cents a day and this was really something fifteen dollars a month, with nine dollars I could by gold rings, and I did and in order to bring them safely home I had made out of the clay which was lying around formed a little ashtray. I made it like adobe and had engraved souvenir of… or what was the name.

Nicholson: The name of your camp?

Lettau: Ja, well anyway, this I brought safely through all further scrutinizing. If you were transferred from one camp to the other the first thing that was an agreed area where everybody had to clean out what he had in his bag or pockets, and were watches and so disappeared. I really saved my watch by putting it into a shaving cream container from the back and this way I.

Nicholson: That's incredible.

Lettau: Ja.

Nicholson: Do you still have the rings?

Lettau: Ja.

Nicholson: You still have those rings?

Lettau: No I had… in the emergency times, after I was released in Frankfurt, and had only the University at Frankfurt. I had written to Gratz, and said that I know, let's say I was informed that my appointment was how do you, what's the name…

Nicholson: Revoked?

Lettau: Revoked ja. I said, please send my papers to the University of Frankfurt and they had a little amount that was received there, until I had a position with the weather bureau, which took about more than a year. But in the meantime I had Käte and the boys, the two boys, come over the boarder legally. After I had.. well really this is after my time as a prisoner of war. Count Arnam was quite… in his memories about the time, he said, we had a camp university and the head of this was Professor Lettau a meteorologist. For a while it worked quite nice, but than very, very severe discrepancies were unresolved when it came to the history of the later years, and so on and so on. All what was left were the lectures about climatology by Professor Lettau.

Nicholson: From your POW camp or from. Let from what? From lectures you gave at the POW camp or lectures …

Lettau: No, no it was really lectures only to the people in the camp, the prisoners.

Nicholson: I see, so you actually gave climateology lectures there?

Lettau: We were only about two hundred prisoners in a camp which had houses and barracks for at least a thousand. So as we were really had space and we didn't even have… There was a mess hall incidentally, and of course also every week we had a movie in the center of this. But I mean life wasn't bad at Ruston, Louisiana. Souvenir of Ruston, was on my ashtray was the gold rings in it.

Nicholson: Why don't we go on to your time going back to Germany? When did you return from the U.S. to Germany?

Lettau: Okay, May 1945, the Germany army surrendered, unconditionally. And from then on they were practically non-persons, there was no status anymore and the American army had… This is in the book, I forgot the name of it but I could give it to you if you are really interested.

Nicholson: That's….

Lettau: They had the so-called re-education program. The beginning was some of the most, let's see trustworthy people to be brought to camp in the little island in Narragansett Bay.

Nicholson: Oh, in Rhode Island, ya okay.

Lettau: Ja, Rhode Island. And I was in the first group to be brought there, together with Karnove, the former SS man. And really… for some reason or not I was sent back to Ruston and Karnove had elected to stay there. But after all it turned out not to be too bad, because the first group of these prisoners had not very good experiences for getting finally released in Germany. After they had done this and learned by experience, our trip really was absolutely uneventful, and so I finally went for the second course at this re-training camp in Narragansett Bay. I recall they told me that they had a questionnaire for us, with very general questions. And I was the only one who had answered all the questions, but there were such questions like what is pasteurizing?

Nicholson: Oh, oh okay.

Lettau: I knew it was to bring milk, or any other liquid, to more than seventy degrees centigrade, in order to kill bacteria. Nobody knew that. So this knowledge, which of course, I owed to my father, because he had to deal with pasteurized milk. So good old papa, had helped me to beat the other students on this test But anyway, one of the most interesting memories there, was Professor Halsted. He was a professor of jurisprudence at Rostock University, but drafted for the war, for the military Jurisprudence. He had been with the navy at Cherbourg, and Cherbourg was of course severely… was first left out after landing on D-Day. But after about two or four weeks, they had to surrender. Halsted had also, after being in Rostock, Halsted had been in Frankfurt, and he was really a God send for me to get acquainted with this man. He liked me, so he said you don't know where to go when we are released in Darmstadt in November of 1945. I think I showed you the document that I was not anymore in the military service. He asked me to come to his place. He had an official apartment in the upper floor of one official building but this had been bombed and his caretaker, a young man and his wife and a little daughter had moved to the basement. In the meantime they had built up this basement to be livable. The brother of this girl, was a veterinarian and he was one of the few German people who were allowed to work for the Americans. And how do you call it, he was trusted to determine which meat was safe to be served to Americans. Of course it always was for him, no problem to declare certain beef not good and bring it home.

Nicholson: Oh that sounds good.

Lettau: Well but otherwise Halsted and I slept in one room for several weeks. Then he had immediately established contact with the university and became the rector of the University in Frankfurt.

Nicholson: Just like that, he became the new rector.

Lettau: Say it again.

Nicholson: Just like that he became the new rector?

Lettau: Of course, yes, he was the only one. You see he was one of the generation of university people who were full-fledged professors when Hitler's regime was taken over. If you wanted to become a professor, even to get habilitation, that means you had to get some service in the party. And I thought, the easiest way to do that was, since I had a little car, I said I will be serving with my car if there is somebody to be transported somewhere. This was the so-called "kraft auto motor" group of the party. Well anyway….

Nicholson: I understand that's why Schwerdtfaeger was not able to…

Lettau: This was the easiest way to push through. But this so-called re-education course, it included as the main point, a daily lecture, five days a week, by politician from the Chicago area, a senator in the Illinois upper house.''

Nicholson: Sounds awful, it sounds cruel.

Lettau: Anyway, when I mentioned that afterwards, where I had been, they knew, and said, oh this is the Senator with a "silver tongue." His lectures were really "silver tongued" lectures and enjoyable to hear.

Nicholson: Really, ah ha.

Lettau: Smith, was his name. A state Senator, not a US. Another émigré from Germany who was a professor in Colorado, at not at University of Colorado, but at the College.

Nicholson: Colorado State.

Lettau: No, yes, Colorado State. But anyway, we were then finally shipped, again to a camp in Massachusetts, and finally we boarded one of these Victory ships which the Americans were running from La Havre to Boston and empty back. Now this wasn't empty anymore, but we, a group of 80 prisoners of war were taken back.

Nicholson: Prisoners of war were taken back...

Lettau: Prisoners of war, with one American officer. And our task was, first of all to clean the ship. It had been transporting all of the mules.

Nicholson: After you got back to Germany, how long was it before you were able to make contact with Käte and your sons?

Lettau: I had written quite a number of letters. Of these, about one-third had been, or were delivered, but it was after I had already been contact her from Germany. So she was aware. She had received my official postcard from England, and one letter from America. But all the other letters, about a dozen of those I wrote, only I think six or seven came, after she had already been contacted. The interesting story is that we had, as a captain in charge of seeing us through and delivering us to the dock and final camp, Captain Hertz. He used the radio address system aboard the ship before we were leaving it in La Havre and he said, my name is Captain Hertz. I am living in Boston at the suburb called Brookline, and if any of you come later to the United States, give me a call. This was the last that I heard from him in 1945. Other then he was going with us, on the train. This was one of these trains where you had not a big coach, but one wagon in which transported forty men or eight horses. This was the famous military transportation of World War I. But we were on a relatively fast train, which was supplying American forces. So after we reached the German border, one of the fellows in our car, who had been there and knew that one of the next places would reach, would be the station where his wife was still living. After he had told this to Captain Hertz, Captain Hertz talked to the train commander. At the last station they had to take any water or supplies, they telegraphed ahead to the station where this fellow was from, and asked that they should try to locate the wife of this man. The train would stop and there would be somebody waving a white flag.

Nicholson: Just one-second, okay go ahead.

Lettau: The white flag was there, the train stopped. There was an exchange of a few things between the wife and the boy. She got away with a pack of dirty clothes that he had, a package of good things and so there was something on the human side.

Nicholson: So they just stopped long enough for them to say hello?

Lettau: Right it was….

Nicholson: He could not be left off?

Lettau: Right just an un-authorized, an illegal stop so to say, just to handle this exchange. But then in Darmstadt, we were really close, a little distance left to go we arrived in Frankfurt, again by a normal train. And we couldn't leave the station, because there was curfew at night time. There was a Chaplain, a German one, walking around and looked at us and said, you are really prisoners of war. It is the first time that I have seen healthy looking men, coming back from prisoner of war camps. Okay, the next morning we were free to go where we wanted to. Halstad was kind enough to take me into his domicile, and I stayed with him until I could really contact Käte and tell her where I was. At Christmas, I got all kinds of transportation, "hoboing" on freight trains to the border and finally walking a piece, and crossing the border at night time because the Russians didn't like it. It was the Russian zone.

Nicholson: Oh it was in the Russian zone, oh now I understand.

Lettau: Ja, this was near Plauen, which unfortunately, is very close to the old Bavarian border. So it was only necessary to reach one station on the other side, and the trains were running on that side.

Nicholson: So that's why it took so long for you to be able to contact her several…

Lettau: Christmas, 1945.

Nicholson: You said you stayed several weeks, in his apartment.

Lettau: Oh ja, I was in Frankfurt already at the middle of October.

Nicholson: Ah ha.

Lettau: For four weeks I had been arranging things so that she could expect us.

Nicholson: How were you able to contact her by telephone or telex?

Lettau: No telephone was working.

Nicholson: Letters or….

Lettau: Well, the postal service was working, and you always had the Red Cross helping you to do some exchanges. But the major thing was only to try personal contact and try to cross the border back.

Nicholson: Wow.

Lettau: I finally found out that Käte had to move the children and her parents twice, because every time, twice the house in which they were living had been bombed. I found the address, the Russians were kind enough to have all the street names in "Cyrillic letters." So Chamissoe Street was hard to find in Russian, but anyway, I rung the doorbell at the house, and a little boy came down looked at me, and ran back again and told Käte, I believe its Papa.

Nicholson: Okay we are now going to now start talking about …

Lettau: I didn't want to, and I couldn't stay in the Russian occupied zone, and Käte also didn't want to, even though the parents are there. But I had not yet a new position, I had only the little support given by the University of Frankfurt for me because I was a professor without position. But then old Weickmann appeared, and he had been in contact with the Americans. He had been in Leipzig, when the American troops had gone up to the Elbe at Torgo. They had then agreed that they would return all their troops from Saxony into Bavaria, and leaving Saxony to the Russians. But the Russians were supplying transportation for everybody they thought worthwhile to be moved to the west. So Weickmann and others, who had been all staying around Leipzig. took this opportunity and wound up in the western zone.

END OF TAPE 3, SIDE 1

Interview with Heinz Lettau

TAPE 3, SIDE 2

Nicholson: We were talking about people regaining their positions after the war, and the older generation of professors was untainted

Lettau: They could again accept them, unless they were really involved in party work. And so, Weickmann was in this respect absolutely clean, and was in charge of the new Weather Service, established in Kissingen. And he came to Frankfurt, we of course tried to establish contact all around, and he asked me if I would serve as the head of the section on research, which I gladly did. Now, one of the things, which really seemed too helpful for me later, I got a contract from the occupation zone. They wanted representatives of all sciences, to write a summary of what happened during the years from 1938 to 1945. And Forsamitte, who was in charge of meteorology, asked me if I would take over the section on dynamics of the atmosphere. I believe that

this was so-called fiat report. This was… Landsberg later told me, Lettau you did marvelous work on this one, and it has apparently helped to select people for the Operation Paperclip. That means all nations even South Africa, South America especially Argentina, were trying to grab the scientists of renown, and bring them into their country. I knew several people, Schwerdtfaeger was one, who had decided to accept this offer to go clandestinely to Argentina and after he had also been again appointed, as head of the Bavarian, the Munich, in Munich the office, weather service there. Weickmann became… The American supplied not only one of these hotels in Kissingen, this is a spa, ja, and it was and not only room but brought in the necessary people they had collected around and I also got then this job as the head of the department. We began to write articles in the newly founded Meteorological Rundshau. So life began to start again. Käte moved in… we had only two rooms, in a big hotel, where the main point was we had really no heat. The hotel had central heating, but it didn't work. So each of the rooms, if you had a two room apartment with an intermediate bathroom, the same bathroom. You had to have, in at least on one room, a stove, an old-fashioned stove. So this was good enough for us to come on, until one day the American officer attached to the service to Weickmann's office called me, and said, would you like to accept a contract to come to the United States at a newly established geophysical research directorate. I said, oh, it depends on the conditions. He said the conditions are, you will be on per diem, for as long as you are there for the first year. And then you have to decide either to stay or to come back. You will be brought over there, and the per diem was, at that time, six dollars per day. It was not much, but after all since again living was free, and this began in New Jersey, in Long Branch, in Ft. Monmouth. So we had free living and free meals, and of course six dollars a day. At that time it was quite a good deal.

Nicholson: I didn't understand who it was that extended the invitation to you, somebody associated with Weickmann, an American or a German or how did ...

Lettau: The invitation?

Nicholson: To go to Cambridge.

Lettau: No, (it was) the American liaison officer.

Nicholson: Ah.

Lettau: It came from, and I think this is why I was brought up. Landsberg said from your summary of papers written by German meteorologists with dynamics interest, apparently selected (of a few).

Nicholson: That's why.

Lettau: For instance Wahl is there, Penndorf is there, I am there...

Nicholson: So in other words somebody read the summary you did of the work done by the dynamic meteorologists.

Lettau: I think that's right.

Nicholson: And on the basis of what you wrote they selected certain meteorologists to invite to the US.

Lettau: Yes and of course. For each discipline there was different summary. It was really after the reports were submitted it was then published by one of the German publishing houses and of course it was very – some people said a very useful summary of what happened there. In fact I also mentioned the very feeble attempts for mathematical weather prediction by some people there. Of course the major author was Ertel. Ertel remained unmolested during that time, because he was given the charge of training meteorologists, so he was in some ways he equivalent of Landsberg, or the other people who had these training programs for Air Force meteorologists. Bryson was one of the people who had… He went to the school in Chicago.

Nicholson: Let me just ask you a couple of brief questions about this. One was actually the comment you made about Schwerdtfaeger about how he went to South America and it was a clandestine move to South America why was that? How did he get to South America and why would you call it clandestine?

Lettau: Schwerdtfaeger?

Nicholson: Yes.

Lettau: Oh I see. The government in South America was interested in hiring qualified people and they...

Nicholson: Who went to Argentina?

Lettau: Ja. It was a clandestine operation. I forgot how they were being able to move out. They went to Genoa to Buenos Aires by ship, Schwerdtfeger and his family. He was of course, especially worried because his older son really needed better nourishment as was available for Germans at this time in Bavaria.

Nicholson: What was wrong with his son?

Lettau: At that time a little older then, wait a minute, he was born when Schwerdtfaeger was a professor in Königsberg. Schwerdtfeger also had a teaching assignment at the University of Königsberg and I visited him once in 1937, and this was just a time when this boy was born. So he was in 1945…

Nicholson: About eight.

Lettau: About eight, but he was really pretty sick, and Schwerdtfeger meant this was the only way to save this child, to accept this offer. Weickmann was not very pleased with that. But I was very careful in getting his agreement to accept the offer given to me, via the liaison officer, to go to Geophysical Research Directorate which was being built up in Cambridge, Massachusetts.

Nicholson: Did Weickmann's son, Helmut come about the same time you did.

Lettau: Who?

Nicholson: Weickmann's son, Helmut.

Lettau: Oh no later, he came later, because he was in another group. I didn't cover (that) with my (discussion of) dynamics part of the activities in German science. The cloud physics…

Nicholson: Oh, okay.

Lettau: And this was the group to which Weickmann belonged.

Nicholson: I see.

Lettau: Weickmann and Aufenkampe.

Nicholson: Aufenkampe?

Lettau: And Küttner.

Nicholson: Ah ha.

Lettau: They were in this other group, no Küttner I believe was here, in my group, but they were the cloud physicists. They came later, but I got this offer in 1947, accepted, after the year. But let me tell you once more a human interest story. The condition was that I should first of all get my credentials in order, at the American interrogation camp, of the CIC camp in Oberorsel, near Frankfurt. I got travel orders to go there, and when I (arrived) this was the same interrogation camp in which Rudy Pendoff was a German Air Force interrogation officer of American prisoners. Now this was the CIC, which had taken over and I was…

Nicholson: What is the CIC again?

Lettau: The CIC, you know the Counter Intelligence Corps.

(Added Note: The CIC (Counter Intelligence Corps) was a World War II and early Cold War intelligence agency within the U.S. Army, whose role was taken over by the U.S. Army Intelligence Corps in 1961)

Nicholson: Ah okay.

Lettau: What is it?

Nicholson: CIS or CIA.

Lettau: No CIC.

Nicholson: Not the CIA. CIA is the Counter Intelligence Agency that's the CIA.

Lettau: The intelligence, yes CIA. When I showed up at the gate, somebody looked through, oh yeah, you are expected and the room so and so. I went to that room, opened the door, and who was sitting there, my friend from Alexandria, Virginia, Captain Smith, and he was really looking very well fed. Oh I said, Captain, I am happy to see you again, but apparently life in Germany doesn't seem to be too bad, not as bad as you were talking about when you were in Alexandria. And he grinned, and said we had all the very short job to do, and I had a few questions (to answer) and I got the okay. Oh, another touching incident, but this was the last, after this I break down. We went first by ship to New York, at the army base. From there I tried to call Mrs. Hochwald, and I knew she was… I found her in the telephone directory, but she and her husband were out with the dog. At this time you had an operator in each building, (in) these town buildings. The operator would say, well they are just gone. I could express myself sufficiently

enough, I said (to) tell them that I am here now, and I will stay for a year, and we contact them later. So the next thing was we were...

Nicholson: This was the person from Brookline?

Lettau: Say it again.

Nicholson: Who are you referring to, the people in Brookline? Is this someone in the U.S. or is this in Germany?

Lettau: No, no, this is Ilse Hochwald, Käte's friend, who lived in New York….

Nicholson: Oh, yes.

Lettau: So we first were going by train, to Ohio, to Wright Air Force.

Nicholson: Wright-Patterson?

Lettau: Wright-Patterson.

Nicholson: Wright-Patterson Air Force Base, in Dayton.

Lettau: And stayed there for about a week. Got contacted by several people, among others, Milton Greenberg, who was the first chief officer of Geophysics Research Directorate. He said, well you will first have to go to Fort Monmouth, in New Jersey, but this is only temporary, and then we will finally assemble, again temporarily, in Boston, in Watertown, in the old arsenal. So I had the inkling how that would turn out. And so (there) we were, with our six dollars a day, really happy to send package over package, back to Germany at this time, and all of these packages arrived. But the next thing, we then had to decide, either to stay or to go back. Again, (there was) the old-fashioned type, you had one professor, a civil engineering professor from Munich. He was glad to go back to Munich, where he was a dean. A meteorologist, who was teaching in Karlsruhe, he had all things were left to him, he went back. I had lost everything. Our home was burned down in Königsberg. Gratz had discontinued my appointment. I didn't want to go back to the Weather Service in Bad Kissingen, even though it was a very nice position. So I said I want to stay here. And so Käte came a little while later, in 1948, again by ship, and the three children, the boys. So we lived only a short time in New Jersey, and then we moved to the Boston area again, and we were there in October. I found a nice house, good circumstance, I had just happened to be at the right time at the telephone, when this man called and wanted to find a man (who wanted) to rent his house in Newton. And so

we were established in Newton in a rented house, very happily satisfied, with friendly neighbors and at Thanksgiving Day, so it was not November, it was October. Thanksgiving is...

Nicholson: In November.

Lettau: November, yes that right.

Nicholson: Third Thursday in November.

Lettau: That's right yes. On Thanksgiving Day, after we had put the children to bed, I called our Captain Hertz, and I said Captain, you remember the trip to Cherborg, a year ago, or two years ago, and your offer, that somebody that was on board the ship could call you. Did somebody call? No he said, not yet. Well I said, this is the day, Thanksgiving, I want to thank you for serving us so nicely. Oh, he said, where are you? You have here in an apartment in Newton, well, have you transportation? Yes, I have a car. Why don't you come over, we are still fighting the rest of the turkey. Everybody is sitting around, and cannot talk anymore, so please come and tell us about your life story. Well let's call it a day.

Nicholson: Let's call it a day. I would like to ask one quick question, that will be easy I think, for you to answer, and I think it's relevant here. When did you learn English and how was your English serving you well by now?

Lettau: Well I had in school, four or five years of English. The rudiments were there, the grammar construction and so on. The next time was of course, refreshing all of this, in the ordinary prison of war camp. Then the decisive thing I would say, was in the re-education camp, where we had English lessons given by a man, a very down to earth man, from Worcester, Massachusetts.

Nicholson: Worcester Mass.

Lettau: He was a non-commissioned officer, and he was in charge of teaching us English as it's spoken.

Nicholson: Do you remember his name.

Lettau: I can find out.

Nicholson: That's okay I just thought it was maybe it was…

Lettau: After all, you cannot find him again. It was fifty years ago, and this is also mentioned in the program for re-education in that book the author or which at the present time do not remember but next time we will do it.

Nicholson: So when you got to the camp you had basic English but maybe you weren't fluent in English but then by the time you got back to Newton you were probably fluent in English.

Lettau: Well I of course had…. I began, my oldest son was ten,, when the family joined again in 1949, no, in 1947, yes, he was nine years old, he was born in 1938. After having been as a… Okay, he and another boy had lessons in English with me, so this helped also. Then we had quite a bit of contact, first of all with the… In Bad Kissingen, with the liaison officer to brush up the English, and not getting rusty. Then of course, after having moved first to Fort Monmouth, we had to talk quite a bit with English people, and before I left there, I had also another chance to have enough money accumulated to have the down payment for a car. So this helped also very much, and the next thing was, oh ja… When I had my car, I needed of course a license. The driver's license was OK, but (I needed) the license for the car. In Germany, the title is Dr. so and so, and this is by law, a part of your name. If you want to sign a document you have to use a title. So I told these traffic boys, in Red Bank, New Jersey, Dr. Lettau but they did give me a Dr. license plate.

Nicholson: Oh, the medical.

Lettau: Yes, medical doctor. Well I didn't know that, but when I went to see my friend Ilse Hochwald, oh, she said, you can park everywhere. But don't be caught when there is an accident, or you will (thought to) be a doctor.

Nicholson: Oh that's good.

Lettau: Okay.

Nicholson: Okay we'll stop for tonight and I promise I will come back at a later time to continue our interview.

Lettau: Okay.

END OF TAPE 3, SIDE 2

Interview with Heinz Lettau

TAPE 4, SIDE 1

Nicholson: Third session with Professor Heinz Lettau on the afternoon of March 11th.

Lettau: Well this is of course something, which the final report I could help the German armed forces. At my assignment at the headquarters of the supreme, how do you call it, command of the German Air Force near Potsdam west of Berlin, I had only relatively trivial assignments like, together with Dr. Phillips preparing leaflets for the climate of certain regions which were of interest to the command or figuring out moon rises and settings for certain latitudes and etc. etc. and not preparing, not making short term or three days or five days forecast only, and long range forecasts but only reformulating them for military use after they came in from Bauer's Institute in Hamburg. Then one day the chief administrator for personnel called me and said, I think I have one new assignment for you with this Colonel Wachtel who is in charge of the development, and tactical use of the flying bomb. The military, the constructors of the bomb are sure that they can provide it with a gyro-system and a compasses etc. etc. and flight works, but the only thing they would like to know is how much turbulence is needed to be considered in keeping the thing on course etc. etc. Especially what is the best way of getting a short information on the effect of wind speed, wind direction. Since you had your experience with turbulence and wind structure in the boundary layer, then I think this will be this will be the reasonable assignment for you and I received travel orders to go to Peenemünde west, the air force part of the big research area and testing area for new weapons, and we were put at the disposal of the brigade, not at my disposal, three of the new "sondes" which are just super secret in the Germany Army the so-called "Fledermaus" translated "bat." This is a system in which the distance of the sun out is measured by radio… How do you call it?

Nicholson: Radio waves, radar?

Lettau: Well it is radar but it is relatively short wavelengths at about ten centimeters or twenty centimeters and the system counts the numbers sending.

Nicholson: An echo sounder?

Lettau: Well it is substituted in the sun and the windsonde the optical determination we do of course get height and we do have the distance out. We do have the

direction, so we can get a reasonably close approach to the wind speed and direction. He said well after all this changes continuously with height and with time. Ah well, this is exactly what you should find out and report to the brigade, the commander of the brigade. So after I arrived at Peenemünde, I talked to the… he welcomed me and said what can you do. I said the reasonable thing is to try an experiment to find how accurately we can really rely on these new systems which measure very accurate instantaneous wind speed direction as a function of height, but, we should also have to test how good it is and I proposed that there should be of the three systems these were motorized systems, with two meteorologists each and three or four technical personnel, and two of the systems established one at the Meckenburg coast and one at the Pommeranian coast of the Baltic Sea and one I would suggest you put in Bornholn, a Danish Island which was also used by the Navy, for submarine testing of… acoustic testing. So I ran an experiment, I let the weather people figure out, from the base of the two Fledermaus at the Baltic Sea coast in Germany, what is the most probable speed and direction, in Bornholn on the island about a hundred and ten miles out. I came with the result, we can only guarantee plus/minus for… Taking now in consideration that the "bird" the V-1 rises very slowly through the boundary layer and on top of the boundary layer it picks up speed, and then the entire time for covering the two hundred or a hundred sixty miles was about twenty or thirty minutes and one third of this was in the boundary layer. Nearly one third of the time so it was very dependent on this. I said I came out at the accurate prediction of the end of the trajectory as plus minus ten kilometers and this was very welcome to the Colonel of the evaluation. He said all the technical people, the flight engineers and the compass people, they… They talk about an error of a few hundred meters or so, and you said ten kilometers. I said well it cannot happen, it is an experiment but after all, it pleased him in some way because it meant that instead of the very pin point accuracy of the anti-aircraft gunnery we had. OK, so I was assigned to the staff, without any operational… In fact I was sent to Paris, where a meteorologist, at the rank of Colonel. Dr. Stöber informed me, that yes. I know you, we had met before, but you have not passed any of the rigorous training courses for forecast meteorologists. I said no, I never was really interested in that. I am a man of physical meteorology. Fine, he said, so I will really supply your forecasters with the best people I have, but you are not entitled to make forecasts. This was absolute… And I accepted that, because I had no ambition to do that, but I still remained on the staff of my Colonel of the anti-aircraft brigade or regiment. Regiment 155 or Flak Regiment 155, and when the staff, after having made their test, partly in Peenemünde and partly in East Prussia, in Düsterort, and where some of the missiles were fired, and some had landed in Sweden and had been photographed by… and published in the press, so it was not really a very secret weapon anymore. But, then we

were assembled, and the brigade had the… It was abbreviated as the "vehrgeltungs waffe" number 1, the V-1. V-2 was then the rocket, that the rocket people developed there.

Nicholson: What does "vehrgeltungs" mean?

Lettau: Please?

Nicholson: What does "vehrgeltungs" mean?

Lettau: Vengeance.

Nicholson: Oh vengeance ah.

Lettau: Vengeance number 1 and 2, but the… once they asked me to, again once more defend my results and the accuracy from my meteorological prediction was not less then about plus/minus ten kilometers in all directions forward and sideways. So this meant that the only target could have been a large area target like greater London. And the apparently several attempts to let the… In the meantime… established batteries also concentrated on the areas where the armada was assembled to cross the channel. But my Colonel remained, for him, I was never anybody else but a professor. And he… Well I do not want to talk too much about these more or less, personal affairs. After D Day came, the 6th of June, I was surprised as anybody, that because that the weather was at that time in Amiens, north of France. The Colonel was a little bit off, at another place, about five miles off, and with his staff, and he had been given the strict orders, within six days after the invasion, you begin your firing of the unguided missiles towards London. But the Colonel had repeatedly pointed out to the supreme command of the Army, Hitler and Kesslering, and all these big shots, that the conditions had changed, as preparation for the invasion the railroad and street traffic, was only possible at night time, reducing more and more the speed with which the material could be brought to the batteries. In the meantime they had found out, that the original idea to have all the batteries protected by gigantic "beton" (concrete) bunkers was given up because while the bunkers were still there, but bombarded by the British air fleet and the American air fleets. Instead, there would be portable batteries constructed, which could be hidden in woods, and so… But anyways, at the assigned time of beginning of activity, that would mean on the 12th of June, there were only four of these missiles landing in England. Churchill, of course responded in his communiqué and said, a few days later, the real… The commander found that now I am ready, so twelve days later, then let's now begin. There were about, oh let's see one hundred firing across the channel, and of these, about half of them usually

arrived. And when time went on, the weather got worse and worse and worse, it was stormy and rainy. But in July, Doctor Stöber from Paris came once and talked to the Colonel and to me, and said are you satisfied with the forecasters I have sent you. I could only say they are good people but he wanted us to extend as much as possible the height range of the fledermaus soundings. I said, well I have been told that for this particular purpose, we need only up to about two hundred to eight hundred millibar. Then have to make if necessary another sounding. Well he said well let's make a compromise in this respect and try at least once a day and twice a day to get higher for this synoptic purposes. Again he repeated that I personally, had no qualifications to make weather forecasts, neither for D-Day nor for the shooting of the unguided missiles. When I then… After about, end of July, traffic across the channel, even though impeded by the stormy weather and not the ideal weather as it should be, had reached a point that General Patton began his push southward and then eastward. At that time I received the communiqué, that the western most, of the radiosondes, assigned to the brigade, had been abandoned by the meteorologists there. He had left the station practically uninjured, I mean he left the station, because there were American day units in the vicinity. My Colonel called me and said, this is a little bit too early for running away. We have knowledge that all these forces are back again. So take one of the meteorologists, after making the special arrangement with the supreme command of the weather service, that this was okay, and let him take over this one, because the westernmost sonde is the most important one for us, naturally. So, since at that time… That day, nobody else had a car available, they said you go with him, and come back, but be careful that you do not get captured. So I went westward past, in the night time and this was of course a very interesting situation at once time, because we had to slow down, with hardly any light, because we were in the middle of a division going to the front, with horse drawn vehicles. These were Russians, who had been with their full armament put themselves mostly people from the top of Turkestan and the southeastern part of the Asiatic part of the country. So we had a while to wind ourselves through these Russian horses and cannons and then we arrived in Paris. I went to the weather center, we talked for a while.

Nicholson: A German weather center or a French weather center.

Lettau: It's German ja.

Nicholson: German.

Lettau: And the meteorologist told me, we just had a call from Rennes, and no activity way around. But then shortly after I had left Paris it was still in the

morning, we had trouble with the car. Carburetor trouble, but Chartres was another big town with this very famous cathedral, was on the way and we found there that everything was working quite normally and no enemy around. And so I had to make... I wanted to go a little bit farther south before going to Rennes, the place where our radiosonde was stationed. I had to go straight and apparently all the German retreats and the American advances were on smaller streets. So that we were all of the sudden within an American unit. This was the end of it. This was about a little village, still about ten or twenty kilometers west of Rennes.

Nicholson: How did they recognize whose German do they stop and ask for passports.

Lettau: No.

Nicholson: Did you have your uniforms on.

Lettau: You see this was a clear day, and all over the sky in northern France where American and British fighter planes were shooting at everything with a moving on the street. So in order be not surprised. All the time at daylight, one of us had to sit in front outside and to look at the sky back and forth.

Nicholson: This is at night or during the day, this is at night.

Lettau: The night is not needed. At this instant, as part of the day it was my job to sit far front… It was a nice day I had my jacket on. You see, the American, no, the German, Air Force uniform could be worn with a blue shirt and light blue necktie, so I looked as a civilian. Because we were… even when our car got fixed in Chartres, they said no, everything is quiet here, "all quiet on the western front" so to say. So I only had to look out for planes, but didn't expect infantry already. But we had as you say, luck or no luck, but we were not shot at, just stopped at the entrance of a little village. And asked, or let's say…. They of course, looked and found that the driver had a uniform and the other meteorologist had on a uniform, anyway, they didn't see it before, so they didn't shoot me. They could have shot me, because I was let's exposed. So for there on, it went through from collection camp to collection camp. Then across the channel on one of these landing boats who run up on high tide and could be entered at low tide and waited until high tide came and up. In a few days I was up in England, in Southhampton.

Nicholson: Did they ask you what you were doing there or anything like that?

Lettau: Not at this time only we are asking for name and rank and number.

Nicholson: Serial number.

Lettau: Serial number.

Nicholson: So you didn't need to worry about speaking English. How was your English in these days.

Lettau: No, no I you see after all, when I again put my jacket the symbols, insignias, were clearly identifying myself as, first of all the rank of a major and secondly in the Air Force weather service official, but not a real officer. But still from then on I was Major Lettau. The first more let's see the first time when the prisoners got separated out according to units and rank etc. it was in Southhampton. The next step was that… They really brought only the meteorologist with me, Dr. Kornrumpf. Incidentally very strange, this man, a very strange individual, as I say, he had a rather fanciful description, in one little booklet of his own, of this, with a few things really wrong. He had much more to be afraid of, because he had been, first of all a student of geography in Munich, and had been taking courses under this famous General Haushofer. The man who had created the term "geopolitics" and was in Munich for something like… Oh let's say. I have never thought of the term geopolitics as something very important, but anyway, other people thought differently though. And then he had been a member of the SS, the party organization and this of course worried him very much. When we realized that we were within the American troops, he went to the street side and threw up. But, he writes all about American troops he recognized, and with pistols out… How do you call it.

Nicholson: Are you talking about in France we are talking now.

Lettau: Ja, ja.

Nicholson: Yes.

Lettau: Okay fine, fine, but he and I were, for a while the same, because we were identified as a meteorologist specialist, specialist within the Air Force. But the first real interview by a meteorologist was then at an American interrogation, no a British interrogation camp at a big race track It was not Ascot, but some people knew the name I have forgotten but it doesn't matter. Here it was where Group Captain Stagg had wanted to see me and this was in a little room with tea and cookies and so. And Stagg had been in Berlin in early 1939 on a visit. He knew Weickmann , he asked how many of his old friends at the weather service are used now during the war. He knew of course that Weickmann was Chief Meteorologist at the Norwegian Section of

the German front. Then furthermore he said, why didn't you identify the short clearing, for the night of June 6th. I said well this has been… I didn't mention names, but when Dr. Stöber, the Chief Meteorologist with the rank of Colonel, had been coming to see Colonel Wachtel, of my Brigade, he had said, we had this meteorologist, of the service at the morning of the 5th of June, who had clearly said, in the report, that they will be clearing in the night and invasion is possible. So I knew that but Stöber had said, we were really clear that this was only a very short time interruption, and much worse weather would follow after this clearance was through, during the night. And this was really true, it was the right prediction. But Stöber told me then, that more or less out of his own initiative in Paris, of course, we were wondering why the invasion was started under such conditions, which all our military people thought were not very appropriate for this big undertaking. Because they always said, it would need at least five days of calm day. The Navy had said it is not, there should be a period of low wave action etc. etc. Favorable so-windows always were either high tides, either at full or new moon, and most preferably high tides at full moon, because this would provide it. All this fitted together, I mean the moon and tide condition, fitted for June 6th. The weather was only just barely possible, but well recognized by the German meteorologists in Paris. And in fact this book by this Polish historian, the two weather maps, the one which Stöber and Dr. Muller in Paris had at their disposal, and which Group Captain Stagg showed to General Eisenhower, they are pretty good identical. But Stöber had then ventured to say, oh let's say some of the people used, maybe as an excuse, the front which had passed and had left this clearing at the night towards 6th of June, prevented German Air Force fighters to come, to be used.

Nicholson: Is this the reserve fighters. Are you referring to the German reserve fighters.

Lettau: No – ja there was of course a certain number of German airplanes were ready as counter action when the invasion camp. But they had to be stationed practically in Western Germany, because all over northern France there was no possibility. I once had been sent to Berlin in an airplane in order to make a report there. In northern France, the Heinkel plane which I was in, was flying ten, sometimes only twenty feet above the ground, and when there was a tree or a fence and he simply lifted his wing, and it was really hair raising. After we reached the Rhine of course you could go higher, and trust on having warnings for enemy fighters. But this was a situation. And when we were on our trip we always had to sit on the hood to watch out for planes. So there was absolute superiority in the air and the German fighter planes, which were put in reserve as counter action, really were hampered by the front, which had left the clearing in the channel zone. And I tried to make this to Stagg understandable. That the forecast was right, but that the German…

The affect which apparently made the success of the invasion, were that the German fighter weren't used. And Stagg said, oh, the German Air Force was no factor anymore for us. And this is the basis for the ongoing stories.

Nicholson: Why don't you summarize that story for us. I have an idea but I think it would be better if you just tell us a few sentences to summarize the story.

Lettau: Ja.

Nicholson: Is this the Humphreys book or.

Lettau: This is the book by Captain Butcher. Here is the original – he had apparently reported the same day, to German weatherman, I'm not the Major but I would.

Nicholson: You would like me to read this.

Lettau: Ja sure.

Nicholson: Okay.

Lettau: It is a short.

Nicholson: It's called the German Weatherman. Shell burst to Normandy Thursday August 17, 1944. It came to that the allies were not the only ones who had weather problems on D-Day. Group Captain Stagg had an interesting talk with Major Lettau the Chief German Meteorologist who was captured by U.S. Forces while on his way from Paris to Rennes.

Lettau: Right.

Nicholson: The German weatherman was anxious to know how our forecast had been made.

Lettau: No!

Nicholson: From allied invasion was made and why we decided on the night for June 5, 6. His job had been to provide the German commanders…

Lettau: Absolutely wrong!

Nicholson: … a forecast of invasion weather. He advised his superiors that invasion after June 4 was impractical because of the stormy weather moving in.

Lettau: Fantasy!

Nicholson: He had told them that bad weather would continue without improvement for several days after the 4th. Group Captain Stagg found that the German meteorologist had failed to draft the significance of a weather front, which passed through the channel early on June 5 with relatively good weather following it. On the basis of the German's weather forecast many officers of their divisions in Normandy were on local leave and others were on maneuvers. The German Major said that they were taken completely by surprise when allied invasions started on the morning of June 6. Not only because of their own weather forecast, but because the allied forces went in at low tide with all the underwater obstacles exposed. Whereas the Germans assumed we would attack only at high tide. General Ike is a bit disappointed that because of the extraordinary defense ring created by the Germans north of Feliz which has taken so long to break; a total bag of prisoners in the pocket will not be as great as he first thought. However the beating up of the enemy along the whole front, greatly weakened them.

Lettau: Okay.

Nicholson: I hear reports it is a massacre.

Lettau: All my merit… I should get a cross of merit for that. But really it all developed of this… I would say my English was not too good at this time, and except for talking about what Group Captain Stagg had seen in Berlin, when he was there. But again, the report you read, is written down by Captain Butcher. And Captain Butcher heard only what Stagg said. But this report was then taken over, by the American meteorologist, who was also there, Jacobs, and reprinted in the same form, even with the black lining around it, in one of the reports of the American Meteorology Society on the meteorological experience of the war. I cannot recall the exact title, but this is Jacobs. Now...

Nicholson: That's when I interrupted, but this is not the only place the story had been reproduced. I was wandering around...

Lettau: The only source for this is Group Captain… Captain Butcher.

Nicholson: Right but I also found this story in a book that I found in an antique bookshop in Cambridge Mass. I was wandering through an antique bookstore.

Lettau: Oh well.

Nicholson: I found a book called by Humphries called "Physics of the Air."

Lettau: Ah ha.

Nicholson: And the exact same story was reproduced in the Humphries book.

Lettau: Well this is really understandable as long as it was not possible to check the accuracy of this, but I knew about this story. I knew what Group Captain Stagg told me, and I knew what I was telling him, and this does not match what is reported here by Butcher, and all of the other people who used Butcher as a source. So when I arrived here and took… I arrived again in the United States in '47, in September and it took several months before I learned about this. And I think I mentioned it also here in the preface for the Schwerdtfeger report. Then I heard that one of our people from the GRD in Boston, would go to England to a meeting and would see Group Captain Stagg. I asked him, please, tell him, that I am a little bit dismayed about the different version which emerged from our "tea" conversation in southern England. And, Gundwarten, this was the name of this fellow, came back and said, he (Stagg) wants to apologize. He said, apparently he (Stagg) also "embroidered" when he came back and talked at Eisenhower's headquarters about it, the way Captain Butcher reports and I had also as I mentioned here...

Nicholson: Oh, he did say this to Butcher. Are you saying that Stagg did tell this to Butcher.

Lettau: No he didn't address Butcher. He apparently talked in general about this, and so… I would say, it seems to be like dinner talk or mess hall talk. I had a chance to see Stagg in person in Helsinki a few years later, and here again, he laughed and said, well, I cannot really explain why all of this happened. But you remember then what I have written down here, various people have recorded, as having me said, that and that. This was Sutcliffe, the Englander. I send it to you.

Nicholson: Oh yes, also the experience of R.C. Sutcliffe an actual participant in 1944 in conference sessions preparing the D-Day forecast on the allied side. Written down, four decades later in June 1985. It says, various people have reported me, as having said this or that, in connection with Overlord and have always surprised me. Yes, the rumors of my death are greatly exaggerated.

Lettau: Ja, but of him I really complained about is not that during wartime there were exaggerations. There were on all sides but the fact is really that the forecast by the German meteorologist on June 4, warning the invasion has enough favorable weather, was good, as good as Stagg's. But the conclusions, the allies… that Eisenhower drew, and that the Germans drew, were absolutely divergent. This is not the fault of a meteorologist.

Nicholson: Let me summarize what you had written down here, I think it is important for the record. And I think we should also try to go a little bit further, in saying what really was the truth. I am quoting what you wrote down here. Fiction made me to be (1) the German weather man who's job had been to provide the German commanders, with forecast of invasion weather and; (2) Chief Meteorologist, who on June 4, 1944 advised Field Marshall Rommel that there could be no invasion during the next fortnight. So we know that is not true, but it is true that the Germans were caught by surprise, is that the case?

Lettau: Well I cannot say surprised, I can only call it this way. They had established criteria, what they thought were the right criteria that Eisenhower and the supreme command would require, before they started the whole thing. There are, of course, things, the window on June 5 to 6 is left… Not used, then we have to wait two weeks more, and then another two weeks. Because only then the conditions are again so the point is, the weather was not favorable enough, for really when you are… But it depended on the way the military really interpreted this. Just call it surprise, I think is not the right expression.

Nicholson: That sounds, that's probably not the right term It was judged that it was unlikely that it would happen. Well in terms of this judgment what struck me is the Germans had concluded that you would want high tide, but I read what the American criteria were and they wanted low tide because they wanted the submerged obstacles exposed. I guess that would be because they wanted to avoid hitting the obstacles. Why would the German side have thought that we needed high tide.

Lettau: Sharon you shouldn't ask me a question, which I can't answer.

Nicholson: Oh okay.

Lettau: It was reported that Hitler was definitely convinced there would be a major push of the army, further east, where the distance are smaller. But you see these are mistakes which are made by military personnel, but from my point of view, first of all, I was not advising anybody, because I had strict orders not to make prediction, because I wasn't qualified.

Nicholson: I believe it I know your background.

Lettau: I was still the professor from my… And in fact it was rather amazing, Colonel Wachtel reports later on, he survived and became the director of the airport in Hamburg. Then in Germany stories were published, and Wachtel was telling his story, that he said twice the secret police came to me (Wachtel) and asked me what was wrong. Why did you do something wrong. First of all that you didn't fire after six days, the first big salvo of unguided missiles. Secondly, why did you let Lettau escape. But in both cases he said they went away and nothing came out of it. Well...

Nicholson: So they viewed you as having escaped. The Germans viewed you as having escaped, that was the term you used?

Lettau: The German military made the mistakes, they were not, the weather was not favorable and this was the case. But really, no American meteorologist has asked me anything seriously. There was also some writer, that had written that I had been interviewed by American committee of historians. Nothing of this is true.

Nicholson: The material that I read concerning the forecast suggested that initially both sides thought the weather would be very bad, and then both sides a few hours ahead of time, decided there would be a break in the weather.

Lettau: That's correct, absolutely true. The weather was very stormy. You see I mentioned before, the distinction for my chief meteorologist in 1940, who had gotten the golden watch from Hitler, because he had been proven correct, that a favorite day for making war in France is May, around middle of May. But beginning from the middle of June there can be, the kind of monsoon weather, with continuously coming westerly rain and the clouds and so on so on. And this happened in 1944 with the only single interruption. The point is the German Army, the commands were advised that there would be a slight clearing. They said this is not enough. Group Captain Stagg recognized also that this clearing wasn't lasting, advised Eisenhower go ahead, because it can only be worse, perhaps two weeks or four weeks later.

Nicholson: Well we talked for a minute about how the forecasts were made and some of the difficulties. What strikes me is we have two different sides trying to understand what the entire atmosphere looks like when half the atmosphere is essentially the auspices of one and half under the auspices of the other. Are you forecasting with big gaps in the map or how did you get your information.

Lettau: Good, good that's a good question. I would say the weather is much more important for the aggressor, then for the defender. This is absolutely true. Then the defender does not decide, but he has to be prepared, and cannot be always fully prepared. Okay but...

END OF TAPE 4, SIDE 1

Interview with Heinz Lettau

TAPE 4, SIDE 2

Nicholson: Did they get information from the Atlantic U-boats, from submarines?

Lettau: Ja, submarines.

Nicholson: And how would the submarines actually provide weather information? Did they provide sub-surface currents which could be used to interpret winds, or what?

Lettau: Well they could only provide information on surface pressure and temperature.

Nicholson: Ah.

Lettau: And none of the… As far as I know, but anyway these were secret, that was one of the reasons why I was warned not to make predictions. These positions of the U-Boats were, of course, kept secret as much as possible, and that only, let's say, the command in Paris, of the second air fleet, it was the first air fleet, it doesn't matter which one. They had the information, and could make responsible forecasts. But let's say...

Nicholson: How else did you get your information? Did you intercept messages from the allies with their weather reports?

Lettau: Well …

Nicholson: Or I should say you but the forecaster.

Lettau: Let me say, the answer to that question is, it depended on which period of the war you are talking about.

Nicholson: Ah ha.

Lettau: Actually, let me first… Weather reconnaissance by airplane was of course one of the major, and very efficient tool, for the first two years of war. And here is a book by one pilot, who was working for Schwerdtfeger, when Schwerdtfeger was in Königsberg, as the aerologist. The name is Schutzer, and Schwerdtfeger had the diary of this.

Nicholson: "Wetter Flieger in den Arctic" weather flyer in the...

Lettau: Ja, weather flyer in the Arctic. The Major, originally they were located also at peak of Denmark, but after Norway was occupied, they had one big airfield in Varnes and a very small airfield here in Barnap, nearly at the north cap. These, the flights, were going to Iceland, Jahnmain, Spitzbergan, Nova Semilya, and these were of course, informations with full aerological measurement, between surface and up to five hundred millibar, even less, four hundred millibar. The story is very, very interesting, but this was practically impossible at the time of the French invasion, of D-Day. In 1944, the only aerological information outside the occupied region, radiosondes, was from Spain, as Spain was neutral.

Nicholson: Yes.

Lettau: And.

Nicholson: So basically you had big gaps in your weather map.

Lettau: Right it was but the surface observations were really, from what I've seen of course, and we have quite a number of publications about German weather maps during the war. The maps were available to the high level meteorologists, at points, usually about five observations from the Atlantic, middle and North Atlantic.

Nicholson: There was a lot of guess work with the forecasts. Yet I've seen this...

Lettau: It's a fact, that was established by this Polish historian, the weather prediction for D-Day, of course, nobody knew that would be the name of D-Day, for the 6th of June, in the channel was correct in most cases. In fact, this Polish meteorologist, or historian says the two were equally good.

Nicholson: I read that and I saw reports on both sides.

Lettau: Now what was in the mind if German commanders, I don't know. But let me just add one more. I was of course, when I had started on my travel assignment, always was some kidding, my military son always kidded me, that I went missing on travel duty, not in action, but travel duty. So in fact, there were nearly 2000 of these missiles fired. 200 of these, roughly, had never reached the channel. Some of them, by the malfunctioning of the steering system, made one big circle. And Hitler had been coming to France on his train, and was located in one tunnel, and it happened that within about two kilometers one of the things came down. And so he decided, it is too

unsafe for him and his valuable personality. There was again an investigation. Was this intended? But my Baumhof experiment the Baltic Sea experiment, established accuracy of plus/minus ten kilometers. That means six to seven miles, and this was really about right. But the plus/minus hundred yards, up to one kilometer, given by several of the people, the compass people and the others, they were sometimes "misfiring" by hundreds of percent.

Nicholson: Wow that's incredible.

Lettau: Well, after the end of the war, the brigade had fired nearly ten thousand of these little things. Well these are big numbers, but again the number of… In Butcher's book records are given on how much. In fact, after the discussion with Group Captain Stagg, I was also for a while in London at one suburb, I forgot. I couldn't say which because we always were transported in buses with no, or all the windows closed or darkened. I heard one of these birds passing by, but the overall effect was less then the "blitz" of 1940 in London. And in fact, it began hope for the British people, always hoping that it will go past, it cannot last forever. And in Germany the opposite was true. It got worse, and worse, and worse from bad to worse and even more. I mean the air attacks, and so on and so on.

Nicholson: If I may I still want to ask a couple of more questions about the forecasting. You may or may not be able to answer these but you were showing me this book with Barock and it reminded me of an interesting story that I read from Schwerdtfeger, that I think sheds some light some things that you had mentioned earlier. You were saying that the meteorologists were told in no uncertain terms that they should not provide any military information. That they were only supposed to say what the weather would be like.

Lettau: That's what Schwerdtfeger also said.

Nicholson: Exactly.

Lettau: I think it was in some way understandable, because the meteorologist was not aware of what kind of devices, or how do you call it a device, was available. And so Schwerdtfeger had, apparently at one time, he writes this in a rather humoristic form here, but he was "reproved".

Nicholson: Reprimanded.

Lettau: Ja, ja, to saying that, oh landing will not be possible. But the Air Force man said, do you know what kind of capabilities we do have? So the thing is

really, that the meteorologist should be relieved, when he was only asked, what will it be weather wise? But what we, the military can do with that weather, this is our business.

Nicholson: Well the follow-up to that story that Schwerdtfeger reported was it a few days later. He was sitting there and they were trying to decide if they could land at Barak and nobody but Schwerdtfeger had ever been in Barak.

Lettau: Ja, you see.

Nicholson: And nobody wanted to take a guess.

Lettau: Everybody went here to Denmark and live off the fat of the land. A few knew that one, but nobody had been up there.

Nicholson: He said at that point after being reprimanded, he was too afraid to say anything and just kind of looked at the General, and the General finally said, okay can you tell us what you meant.

Lettau: At Passau, have you checked on this fellow who wrote this book Hands on Meteorology and then.

Nicholson: The Polish guy.

Lettau: Ja the Polish guy. Who has designed the first – automatic weather station.

Nicholson: No I didn't but I'll bring that book back this evening and we can check that out.

Lettau: Ah ha right.

Nicholson: Do you think he was wrong on that too.

Lettau: But here was one German development which was used in the Arctic. Which this fellow had transported to...

Nicholson: Oh this is the Arctic flyer. This is Schwerdtfeger's book about the Arctic Flyer.

Lettau: No, it's not Schwerdtfeger's book. It is a diary of the pilot.

Nicholson: Right, the "wetter flieger", yes.

Lettau: But Schwerdtfeger had the diary when he was in Argentina, in Buenos Aires. And he had succeeded in getting this printed, in Buenos Aires, to print thisin German.

Nicholson: Oh I see.

Lettau: But it has been later on reprinted unchanged in Germany. But this was Schwerdtfeger's contribution towards it. These were the typical Heinkel 111's which landed in Spitzbergen. Really you see… Would you like to hear a little bit about human experiences, really.

Nicholson: I would like to, but why don't we do this one later, because we have still quite a few questions, that I think we need to look at. Maybe you can tell me...

Lettau: Sharon.

Nicholson: About it and we can take a...

Lettau: Sharon, you see, this is a typical result of the weather reconnaissance. You are flying, you swoop out at the end of the flight, you make a vertical ascent up to six hunderd millibars and then you come back as quickly as you can, and the entire flight is a little over 1000 kilometer, depends on the wind again. So if you like it, since you know German, I would like to give it to you.

Nicholson: I would love to have the book.

Lettau: I do have the… Now I gave already away, the later published edition to Bernie. So there is one copy in the family. But what really wanted to mention here is, first of all Spitzbergen, I will come back to this a little later. After the German occupation of Norway, the people in Spitzbergen were of course, without any contact with the world. And when this German plane landed there for the first time, the Norwegians were very kind, and then Mr. Schutzer, Rudy Schutzer, made an offer to them. Would you like to let me take letters to home for you, to tell your relatives that you are still here. And he said, immediately everybody ran for a piece of paper. And he said, only make clear which address it is. Some of the Norwegians, they are very, very straight people, said, well we don't have the currency for paying the postage. Schutzer said let me do it. In fact, he said when they returned to Barnard from Spitzbergen, he and this man were sitting for several hours, sorting and stamping postage on it. Then there is…

Nicholson: That sounds like a very human experience in the war that was really so tragic to millions of people, but it also strikes me as some of your experiences, with being in a POW camp, meeting Stagg were also very human.

Lettau: Ja, at Janmain Main.

Nicholson: Oh ja.

Lettau: Also on this island, this one here.

Nicholson: Novaja Zeml'a?

Lettau: Ja, they established… Well here they tried to establish, but they couldn't do it, because the Russians chased them away, an automatic weather station, which worked.

Nicholson: Oh I see.

Lettau: So the first one, if you ever find somewhere in literature that the first automatic weather station was established only in 1950 or '60, and this is 1944, 1942.

Nicholson: 1942, wow, we will make sure we get that on record.

Lettau: I cannot find it anymore, the picture of it but really.

Nicholson: Oh, I will look through and I will try to find it.

Lettau: Oh, ja, if you want to hear more human stories.

Nicholson: Well I was just thinking about just the human aspects of you sitting, you are a prisoner or war and you are sitting down to tea and cookies with Group Captain Stagg. I am thinking about how human this was, how civil and gentlemanly it was. You are a prisoner of war but you are sitting down to tea and cookies with Group Captain Stagg.

Lettau: Yes, of course it was. You see, when we were starting our guest book here, just a new established family, we had a few signatures of people, and one student's name here is Etienne.

Nicholson: Etienne, French.

Lettau: Now this boy had a very interesting background. He too, was a Huguenot descendent. His father was the head of a county, in Saxony, but Eric was really a nice guy, and he had been like Rudy Pendorff, been… Like the University of Wisconsin had this junior year abroad. The University of Oxford had always, at the time of reasonably good political conditions, German students. And Rudy Pendorff was once there, for I think two semesters. And Etienne was there too, at another time. Etienne attended with one other fellow, who had a chance to take part in what Oxford was doing with the students to go for a summer period to Greenland. So he had experience in Greenland, and he served on the weather staff. He was also drafted as a meteorologist when WW II came, but he served as meteorologist, as an observer on these flights. The author of this book is the pilot, Rudy (Schutzer) was a pilot in Königsberg. His father was a well known medical doctor there. And I had never met him (Rudy Schutzer) there, but it meant that he was really a decent fellow. Especially the story of taking care of the mail from the Norwegians, which was quite nice. But Etienne made a proposal, that since they had landed in Spitzbergen, and landed once again, after the British fleet had been there and forced all the Norwegians to go away, and started to fire the coal which was already there. They took away all the Norwegians, except for one, who had no intention to let the British take him away. And the Schutzer found him and Etienne knew Norwegian, and could talk to him. Then they made a proposal that after the British had gone, and they had established a little airfield there, to really remain for the entire winter in Spitzbergen. That's what they did. After this was over, in the next year Etienne wanted to find out what happened in the meantime. As Schutzer tells it here, in 1943 he wasn't heard anymore, he got lost. And Schwerdtfeger apparently also didn't know, what actually happened, because the Heinkel was shot down by a British destroyer. And on this British destroyer was, one British meteorologist with whom, as a student Etienne had this experience in Greenland. They identified of course the dead as Germans, and he recognized Etienne as his old study friend. And this apparently was reported also here, by the press, as one of the stories which can develop in such a brutal war as we were living through. I didn't know this either, but when I came here, and established again, contact with Käte's friend, with whom she had been in Plauen at grammar school, at elementary school together.

Nicholson: Who was that.

Lettau: Ilse Wolfberg, later Ilse Hochwald, when she married this man (Fritz Hochwald.) Ilse said, oh I remember this was the story here in the paper about a British meteorologist who was on board a destroyer shot down a German air flight over Spitzbergen and discovered then, that an old friend

was there. The other part, more interesting to me, part of the story, that Etienne had married shortly before, this little girl here, which was seen in one of my… the secretary of...

Nicholson: Oh yes, you showed her picture.

Lettau: I met her once more when I… And she had married again, of course why shouldn't she, but they had also found after the war, these British people had tried to contact the relatives of Eric and Etienne and notify them that Etienne had been shot down and is buried in Spitzbergen. That's one of the other stories of meteorology during wartime.

Nicholson: Well when you were captured and sent over to England and then the U.S. was Käte informed.

Lettau: Which one?

Nicholson: When you were captured.

Lettau: Ja.

Nicholson: And sent to England and then the U.S. was Käte informed of your absence.

Lettau: Yes, I believe already from Southhampton. We got forms postal cards. She has it, saying that… It was prepared, you could scratch out or indicate, alive, healthy, prisoner and so on and so on. She got this.

Nicholson: I thought she had told me that she had gotten a report that you had died in the war.

Lettau: Say again.

Nicholson: I thought she had gotten a report saying you had died in the war.

Lettau: I died no.

Nicholson: Didn't I thought maybe I am mixing up two people.

Lettau: No, no, no, no, no.

Nicholson: I thought she had received word you had died.

Lettau: No she was informed that I was missing.

Nicholson: Missing.

Lettau: Missing. It worked extremely quick. Because, on both sides there was no interest in keeping the information back from her. And so she was only informed by letter from my brigade, the Colonel that I didn't return and was lost, on this travel duty, but only… I think it must have been no more then about, six weeks later, that she received my postcard that I am alive. Up to that time she didn't know.

Nicholson: So it was uncertain for six weeks, about his whereabouts?

Lettau: Well, we were just finishing the story. When did you receive the postcard that I am still alive as a prisoner of war?

Käte: Oh, I think it was in September.

Lettau: Ja, I think so because.

Nicholson: Oh, yes.

Lettau: I was captured on the 3rd of August, and it was no more than six weeks.

Käte: Ja, but the card came not… It wasn't the official notification, from the Red Cross, but the card from England.

Lettau: My card, they provided prisoners of war, with these.

Käte: It was the first indication, that he was a prisoner, before, missing in action.

Nicholson: I guess that's all you knew.

Lettau: Ja.

Käte: That wasn't...

Nicholson: Tremendous relief to get that postcard.

Lettau: Ja.

Käte: I didn't know different until then…

Lettau: She received it, as a letter from our regiment, the brigade, by the other meteorologist, the SS man. His wife was informed about by the party.

Nicholson: Oh I see.

Lettau: A very nice difference between the two of us.

Käte: She had heard it first from me before she heard it from them.

Lettau: Oh ja, you told her, then the party came and told her.

Nicholson: The next question I wanted to ask was if you knew if any Norwegian meteorologist, or allied meteorologists, had been captured by the Germans.

Lettau: British, why should they?

Nicholson: British or Americans or Norwegians.

Lettau: No, I know that Rudy Pendorff, I mentioned before that he had reasonably good English language because of his year or 2 semesters, in Oxford. He of course was immediately put in as an interrogation officer for interrogating American personnel, pilots and flight personnel crashing or shot down over Germany. So he said, we had never meteorologists there, I had him ask the question once. From the interrogation and replies by American flight personnel, especially pilots, we knew how they were working, how their meteorologists were working.

Nicholson: How were they working ? Do you know what methods they were using for forecasts?

Lettau: They usually said they had good information, and this is quite typical. But on the other hand, I should say some of the information, you asked me about before when we were talking about Etienne, other information which came (was available.) If the weather was bad over England, and there was a continuous flight, from the United States to Britain and the weather was bad. The pilots asked for, in the open to avoid decoding, surface pressure. This was also very important information.

Nicholson: Oh I see.

Lettau: Another information (source) came from paid spies. There were always a few souls, which had personal reasons, who had sold their soul and had submitted clandestine radio messages, all things were there.

Nicholson: When you and also in print…

Lettau: Oh incidentally I should also say that the American usually tend to glorify their espionage system but the Germans were also active. For instance the American Embassy at Ankara, Turkey had one Turkish employee who photographed all the documents relative to the preparations of the D-Day and so these things were renowned.

Nicholson: The Turkish employee photographed it and gave it to the Germans or vice versa?

Lettau: He sold the information to the Germans, and the German Ambassador, I don't recall the name.

Nicholson: Is this information commonly known?

Lettau: As long as war is going on, it is secret. But later on it wasn't, the name of this man was also learned. He always… To make it a little bit more palatable, it was said, he got paid by fake money. I don't believe that. A man who is so intelligent, to open the secret vaults of the embassy, and photograph (documents) and sell them, he would not accept any fake money.

Nicholson: I wanted to clarify something about the information gathering. Sometimes you have used the word decode and sometimes Schwerdtfeger used the word decode. In some cases we are talking about turning the synoptic code into information.

Lettau: Right.

Nicholson: But when you are talking in the war time, and you refer to decode you are actually talking about something that has been subject to a secret military code, as well as a synoptic code is that right.

Lettau: No, no, this applied in meteorology, only to the weather.

Nicholson: Only to the weather. All you are talking about was intercepting it and plotting it.

Lettau: Ja, the German system was to add, a big book of random numbers. So you could only decode it, when you knew at what time of the day, and hour of the day, which line you should use.

Nicholson: That was the German observation.

Lettau: That is the German version, but this is of course cumbersome because you had always to have such a big volume with you.

Nicholson: And how about the allied information, did they try to code it.

Lettau: Well they did have a decoding system for measurements, let's say of course, which were navigational. For instance, what the submarines were submitting to the headquarters. This was decoded in another way, by a machine and this machine, of course, I understand had been rebuilt by the British. I do not think that the claim which one of the Norwegians who was in England was real. He told me, oh yes, your weather reconnaissance was very helpful for us, because we could decode it. I don't think that here he was right, because he said he let them fly because we could use them. I think this was the only time I heard about it.

Nicholson: We've talked a little bit about the methods of gathering meteorological information but talk about the forecast methods per se. Would there be any difference between the forecast methodologies in terms of moving isobars around or whatever could be used by the allies?

Lettau: There were synoptic forecasting is essentially one of analysis, to make a sound analysis of the weather.

Nicholson: And project it into the future.

Lettau: Ja.

Nicholson: So this was used on both sides.

Lettau: But during war time there were on the German side, only very unsuccessful attempts to calculate (weather) ahead. There was one Navy man who tried his luck on this one but as I said already before.

Nicholson: They were doing ten-day forecasts, is that right, for the Navy.

Lettau: Well it was only very simple minded measures of pressure forecast by either fully extension I think that it was cumbersome, but none of the really the methods which were later developed after the big calculating machine at MIT was developed.

Nicholson: I recall Schwerdtfeger mentioning that he and his people he was the chef of ZWG that he kept getting pressured to give forecasts beyond two or three days, and he kept saying, you couldn't do it, yet they kept mentioning, the Navy person who was giving ten day forecasts.

Lettau: This unfortunately.

Nicholson: It put a lot of pressure on them.

Lettau: Ja, unfortunately, there was no good cooperation between the services. The Air Force was of course, the most refined service, as far as I can judge. The Army had very poor service, especially… They also had their own ambition… The meteorologists of the Army had the ambition to develop their own radiosonde, which was not very good. The Navy also had another system, and the Navy of course, had the possibility of bringing by U-Boat, meteorologist to Greenland and let them (work.) We were told after having arrived at the interrogation camp, near… South of the National Airport, near … Alexandria, Virginia, there was this big compound, with a division camp. Once, (I was) told the friendly host officer, a very friendly man incidentally, that they had just a group of Germans coming through who were taken prisoner at one of the Greenland meteorologist stations. This was usually two radio man, one technician and the man who was handling… Two technicians for handling the radiosonde, but there were not really meteorologists.

Nicholson: I think that was the main things that I wanted to ask about the war. There's probably fifteen twenty minutes left on this tape if you could manage to go that long as we continue.

Lettau: Oh, sure I can, ja.

Nicholson: Okay I was thinking about a little more about post D-Day, and when you were interrogated and sent to the POW camps and, I know you gave an interview to somebody at University of Florida, but maybe you could tell us just a little bit more on how they decided to send you to first Rhode Island, and then Louisiana, and what life was like in the POW camp. 36:17

Lettau: Oh, sure I can, no problem. But let me make a short (digression.) In the interrogation camp, near Alexandria Virginia. We were… And also there was this third man. When the situation (in Germany) really got desperate, they had taken quite a few meteorologists, out of the weather service and put them in uniform. So this man, who was captured in Southern France as a… Not a corporal but I think a lower grade… But always, they said, pointed out they just demoted me in some way. My rank is one of a major, so he was put

also in our unit. He was one of these reserve meteorologists. He had no… He was a teacher. But we three, were really never interrogated by meteorologists. We always had only the interrogation which was practically, only on general questions of, how is the morale, and so on and so on. And do you think the code can be broken. Incidentally, the simplest code was used by the Russians. And the Russians had, for our decoding, for our secret people who were decoding trying to decode… They had favorable habit, for us for the German side favorable habit of sending observations, from the far east uncoded and a little farther (west) decoded. People with knowledge of the climate and so could really use the two sets to find out the code and the code was a very simple one so the Russians really were never very successful at decoding the weather information. The other thing I wanted to mention the only time during the interrogation period in… Let's start over again. Our friendly host, a Captain who spoke very nice German, he said he had been occupied as an operetta singer at the German opera. But I think he had been an immigrant, at an early time, but anyway he had been in America long enough to be drafted, let us say. (He was) introduced into the CIC, the intelligence gathering organization. He was quite unhappy, and said, well, I lost my job in Germany, and who will hire me here as an opera singer. Well maybe this was invented. But he told me once, you really are entitled now to be transferred to an ordinary prisoner camp, an interrogation camp is not accessible to the Red Cross. You cannot make complaints and you are really… We were once transferred from one group building, to another, and apparently, up to that time we were in a room, which was bugged. But we never had anything to talk about, which was of interest, so we were then moved to a more decent (place.) We got movies to be shown.

Nicholson: And where was this location now.

Lettau: Near Virginia.

Nicholson: Near Virginia okay.

Lettau: Near Alexandria Virginia. There is one great complex of American hospitals now, right at the Potomac and we had to walk around the premises with this friendly man every day. He called himself Captain Smith but I don't really know if it was his real name. Let me go on with that. Once he asked me, well he began the story and said… We were sitting on a few benches on top of the Potomac and enjoying the late September nice weather. He said you really are entitled now to be transferred to a camp where there is Red Cross accessibility, and so on and so on. But, we have to keep you here, because there's a very important person who wants to talk to you. He didn't say

interview here, talk to you, and then he asked me, do you know a man name of Landsberg. Oh but sure, he was the VIP.

Nicholson: He was the what.

Lettau: Very important person.

Nicholson: Oh VIP, yes. Well you did know Landsberg didn't you?

Lettau: Sure we were together as students in Frankfurt. He was just finishing his doctor's degree with Gutenberg and I was one of the few students who went to all the courses with Gutenberg. And at one time I knew Gutenberg was living in Darmstadt, not far from Frankfurt, and that he was known in… First of all he had been co-author of some of these big handbooks of geophysics and written very interesting articles, and was a very nice man. But one knew that he had inherited a soap manufacturing plant in Darmstadt. And this intrigued me so much, that I took my hat, went to Darmstadt looking around and found the soap factory. And asked the man at the door, can I see Dr. Gutenberg? Oh yes, he said, he is just right around the corner in his office. And he was sitting there, and as Weickmann said, as he later told us. He on one side, the orders for materials for making soap, and on the other side, he had the handbook of geophysics. Well I had a very nice reception with Landsberg and he told me very pleasantly impressed, by his year long trip to Los Angeles and that he would be really going there, and so on so on. This was 1930 he wasn't forced, but he did foresee what would happen. So Gutenberg was doctor father of Landsberg, and Landsberg had been a little later also moved to the United States, first to Canada and then to…

Nicholson: Landsberg was Jewish right.

Lettau: Say it again.

Nicholson: Landsberg was Jewish, so he had to leave.

Lettau: At least half Jewish, for him there was no possibility to get ahead in Germany. He realized this also very quickly. So but after I was told, we were told, that we had to stay longer then it was really necessary, but we we will compensate you for that. How about a trip to Washington, a sightseeing trip. Now about your uniforms, really nobody would really notice that this was a German uniform, but after all, we can give you civilian clothes. So the next day, we had civilian clothes, and got dressed up in a jacket, a good suit, and the Lieutenant drove me into Washington. He asked me, what do you

want to see? Well I would like to see the White House, from the outside and I want to see the Capitol, and if possible walk into the Capitol. I know we cannot go into the White House. Oh fine, all right, so we went up into the galleries and the Senate building and heard how very big… There were only about six or seven Senators present, and the pages were running around, because there was a very big action on improving the American system of highways, etc.

(End of Track 2, Album 5.)

But it was boring so I said well let's go. We went over… What's next he said, oh he said, opposite here is the American Library, Library of Congress. Every book in the world is here. My book too, I said. Oh well, let's find out. So we went into the Library of Congress, and he talked to some of the people. We were (led around, and shortly, I had a copy of my book in my hand.)

END OF TAPE 4

TAPE 5, SIDE 1

Sharon Nicholson: Tape 5 side A. (CD Album 5 Track 3)

Heinz Lettau: Oh, you want me to say something. I am happy to see you here again for the continuation of our discussion of my early history. It is a nice day, cumulus clouds in the sky, and not too hot.

Sharon Nicholson: This is the second half of the interview with Professor Heinz Lettau, the date is May 27th, Monday, 2002. We are interviewing at Mount Pleasant, South Carolina, just outside of Charleston. I am Sharon Nicholson, a former student of Professor Lettau's. This is side 1 of Tape 5 of the interview with Professor Lettau. OK, when we were here before, we pretty much left off with time that you left Germany and took a position in the United States for the first time. That's where I wanted to start, but you made a few interesting remarks a little while ago, based on an interview you were reading with

Professor Riehl. I think they may be of historical interest, and then we will go back to Newton, Mass. You want tell me about what you were telling about Professor Riehl and you?

Heinz Lettau: Pardon me, can you make the question more specific.

Sharon Nicholson: You were making a comment about Professor Riehl and yourself being invited to the United States, by a gentleman, I think his name was Wallace.

Heinz Lettau: No. Pardon me, this had something to do with…

Sharon Nicholson: Cloud-seeding in Costa Rica.

Heinz Lettau: Yes, right, right. Wallace had been and, I mean, was a free-lance meteorologist, and his business was cloud-seeding.

Sharon Nicholson: What year was this?

Heinz Lettau: It must have been '65 and he had a contract with the coffee growers of Columbia. And the coffee growers in Columbia are getting their… Coffee growers? Ah yes sure, sugar growers, not coffee growers. And the sugar in Columbia is cultivated on the Pacific slope of the Andes Mountains. They of course, need lots of water. And the water is not there from local rain but comes down from the Andes Mountains, and they had cloud-seeding programs with ground based silver iodide burners, and it didn't work really to satisfaction. There were very meager results, I believe, this is why he wanted to fortify his position by inviting two experts and apparently had the idea that Riehl is an expert in tropical meteorology and I am an expert in, or know the reason for dryness along the Pacific coast. This was Wallace's own idea, but Reid and I joined him in Columbia, at his invitation, he paid for this trip, for both of us and we went up to Lima then... I have to correct myself, the first trip was to Columbia, but the main trip was to northern Peru, in the region about 100 miles north of Lima, where the sugar bowls, sugar growers had their main refinery. And we also went up the mountains, to a point 4000 meters high where the sugar growers… Strangely enough, nearly all of them were Germans. They were interested in an observatory that they had installed on the tip of the 4000 meter mountain. But, really Sharon, I was not really prepared to go into detail here.

Sharon Nicholson: Oh, OK.

Heinz Lettau: But, anyways, they were absolutely flabbergasted because there were no hot towers around, no convection, it was only on top of this mountain we learned there was recording of the wind direction and wind speed that had been going on for several years. It was really strange for me, and fitted really in with what we knew from Arequipa and the observatory there. First of all a strong diurnal tide in wind direction, at this altitude, away from the mountains during daytime and towards the mountains at nighttime. In addition, there was a periodicity of 10 to 14 days, which I could not understand, and we hadn't really time enough, even later to analyze this, to know the duration of the diurnal tide, either the easterlies or the westerlies were changing. There was a building up of the duration of the easterlies on the expense of the westerlies, and then it went vice versa. I had could never really understand this perfectly, but I would have to refresh my memory, because it was a long time ago and we never followed this up.

Sharon Nicholson: I asked because it sounded like it was one of the first operational cloud-seeding attempts since this was in 1965 and I thought we should at least get mention of it on tape.

Heinz Lettau: Oh, yes. You see Howell had been very successful in upper state New York. There had been a drought, I think it must have been in '62. I remember that when the State of New York hired him, that within a few days it began to pour. There was a very interesting cartoon in the New Yorker that two priests were looking out a window, a church window apparently, saw it was pouring outside and they also had prayed for rain. One says to the other, "I wonder if it's ours, or it's his?" So, was it God's or Howell's? So Howell had a very good reputation at this time, although I don't think it was in any way justified at that time. Also, I do not think that his ideas of silver iodide seeding on quite a number of different positions on the Pacific and on the other slope, the east slope of the Andes Mountains had any effect on the rain.

Sharon Nicholson: OK, let's leave that topic for the moment and let's try to get in chronological order again.

Heinz Lettau: But, let me…

Sharon Nicholson: Oh sure.

Heinz Lettau: Just add one sentence in addition, Riehl was apparently really intrigued the other way around. There were no cumulus clouds around, there were always kind of status clouds which were there, which we knew from southern Peru. Riehl mentioned once in his interview with Joanne` Simpson, that what happens in North and South America is quite different and really he didn't touch any of this. Well OK, perhaps this is what we can say about it. When you reach over… there is…

Sharon Nicholson: In the book over there?

Heinz Lettau: One of three things, it must be the exploring of atmosphere's driest climate…

Sharon Nicholson: Oh, I have that volume.

Heinz Lettau: Now, the intriguing thing is that I had been a student at Frankfurt University, where Professor Linke, a very, very good German climatologist, not so much meteorologist, he had been talking in his course about the fantastic mountain breezes encountered along the Pacific slope of the Andes Mountains. This basic work was done by Harvard, the astronomical institute, because around the 1890's, 1895 to the turn of the century. Because at that time they were contemplating erecting a high altitude observatory in the tropical desert of Peru. They had established a chain of stations from sea-level to Arequipa at 2000 meters then up to El Misti, a volcano up to 6000 meters. The recordings at Arequipa had shown that there is only an east wind or west wind, alternating as a diurnal tide. So I was in some way, this is still in my memory, and think it might be natural when I think we have one of the questions why did I go to Peru.

Sharon Nicholson: Ah yes, OK, then we can come back to that question.

Heinz Lettau: The interest since my early youth was the movement of sand and the formation of dunes. There is this famous dune chain only 30 miles from my home town where I was born along the strip of land separating the Baltic Sea and a very large lagoon. This strip of land is about 15 miles long and only on the average less than a mile wide. It had been forested but during one early occupation by the Czar's armies around 1700 they had began to take down the timber, and the result was the formation of the dune chain which is quite

substantially developed and became famous in Europe. It was an unbroken chain about 10 miles long and the height of the crest is somewhat like 150 feet with a very steep slope to the lagoon. Now I was always interested in the fact that reports are that this dune moved very slowly and buried villages which came up again. So my interest in dune motion was always there. But I had found in one of the geomorphical textbooks, a very interesting picture of another expedition by the, not Harvard but another university institute which showed archeological finds in the Peruvian desert from the air. These people had done a very interesting photograph of the so-called Pampa de la Joya plain about 1000 meters above sea level, halfway to Arequipa, which showed about a 1000 well formed barchan dunes. And these had intrigued me since I had seen the textbook and I was talking to my class in clinical meteorology about it, and I told my students, that at this time included a few geology students. One came after class to me class and said, well do you know that there are now measurements of these dunes described in a geological journal. I said no, and it turned out that these measurements had been done by support from the Peruvian Air Force who had added more air photos of this region and the dunes. This man had measured the dimension of the dunes. From then on it was of course a matter of follow up. I had originally written to the people in New York… at the, what is the name of the university, Columbia University.

Sharon Nicholson: Columbia University.

Heinz Lettau: I think they had done this expedition, ecological evolution…

Sharon Nicholson: The Lamont-Doherty?

Heinz Lettau: Ja, in the ‘30’s. And I wrote to them. Oh no, this was the American Geographical Society. And they wrote back to me that the negatives are so deeply buried in their archives that they cannot find any. It would be better if you go there and make new photographs. This was about the same… But again I found an Israeli, he was interested in attempts to…

Sharon Nicholson: Tsoar, was his name Tsoar?

Heinz Lettau: … settle people in this plain. And he had the experience with, how do you call it if you bring water…

Sharon Nicholson: Oh, irrigation.

Heinz Lettau: He was an irrigation expert.

Sharon Nicholson: Evenari?

Heinz Lettau: No, he was Finkel, ja. Of course the dunes were bothersome to him because the channel would be covered and blocked when the dune moved there. This was his interest. But he had no wind observations close enough to the field. The next airfield was about 30 or 40 miles away, and he had news from there but it was very unsatisfactory, so I proposed to Reid Bryson who at that time had just started this institute of environmental sciences. He had enough leeway to say, well after having done an expedition up to Baker Lake in Canada, and looking around there really without any direct meteorological returns. I said well Reid, how about an expedition down to Pampa de la Joya and bring Chuck Sterns along with his wind masts and let us really make a study of what is the threshold velocity of putting sand into motion and how can one possibly prevent it. The Peruvians had an old technique of preventing the dunes from moving across highways, they simply put stones on the upwind slope of the dune and it dissolved. This theory should be combined with a little bit of more information of how is the grain distribution along the dune and so and so on. So we had a substantial group of people. Reid came along… (CD Album 6 Track 1)

Sharon Nicholson: Let me talk to you for a minute.

Heinz Lettau: OK, so we had a group, I said I also would like a scientist who is fluent in Spanish. And this was a German, Schwerdtfeger knew him, who had been living in Buenes Aires who had just begun to move to North America. All the names are in "Exploring the World's Driest Climate." He came along and stayed with us for a while there. Even Dr Finkel showed up because he was on another United Nations mission to look at one of these possibilities of the dry region irrigation settlements, etc. Right, so this is how the Peru experiment started. It was really something in my mind about the need to know more about the physical mechanisms which forms dunes and the more or less unexpected thing that in my class there were geology students who could tell me that there was more information available. Is this all right?

Sharon Nicholson: Yes, who financed the expedition?

Heinz Lettau: Well, Reid had, of course, at that time, funds from the National Science Foundation. A certain amount for more or less justified experiments, so he was happy to do it, and he also went along…

Sharon Nicholson: And you spent 6 weeks down there?

Heinz Lettau: Say it again…

Sharon Nicholson: How long, 6 weeks?

Heinz Lettau: Not quite, we were on the site only 12 days…

Sharon Nicholson: 12 days? And how many people?

Heinz Lettau: We were living in tents, I had several things which were reducing the costs. I had my good friend Dalrymple at the Quartermaster Corps in the Boston area, had arranged that we could use Army vehicles, 2, this was, of course, very helpful to carry the equipment up into the desert…

Sharon Nicholson: The vehicles were already in Peru? Or you had to ship them?

Heinz Lettau: They were in Peru, the Army had a stock of vehicles and all possible materials near Lima. And so they had arranged that we had this very important thing, transportation within Peru was then very easy. Chuck, and another helpful member of the group was young Schwerdtfeger, who was of course fluent in Spanish, he chauffeured one of the vehicles and Chuck the other. We met at the desert, they had brought down the tents that had too been supplied by the Army, so we had no logistics problems.

Sharon Nicholson: Werner Schwerdtfeger?

Heinz Lettau: His son.

Sharon Nicholson: His son?

Heinz Lettau: Ja, one of the two sons of Werner Schwerdtfeger, who is now with the Deere Company in Wisconsin or in Iowa. He was used by them mainly the representative for Spanish speaking countries for the machinery. All of this is described in "Exploring the World's Driest Climate" and the point is really that the rule along the coast is not the

ordinary sea breeze, but a sea breeze that is initiated by the heating of the land, but the near equality of the solar day with the pendulum day, there is from the beginning a breeze that sets in at about 9 or 9:30, on the Pampa coast parallel. All the dunes, even the ones farther up north, where you find dunes along the beaches, and very big ones, they are pointing with their "horns" parallel to the shore, documenting this way, of course, the wind direction. There are only a few cases where valleys are coming in, where the sea breeze is ordinarily going in to land in the daytime and coming out of land. The rules is for the diurnal breeze to be shore parallel. This of course is related to the dryness of, the extreme dryness of this tropical desert, this coastal desert.

Sharon Nicholson: Right, well I have this follow-on question about that experiment, then I want to talk about one other one. I was wondering if you remember what the overall cost of the experiment was?

Heinz Lettau: I cannot say that but I think it was less than $100,000.

Sharon Nicholson: Less than $100,000. My reason for asking …

Heinz Lettau: In comparison to the O'Neill experiment, which was about close to $2million…

Sharon Nicholson: O'Neill was close to $2 million. I asked the question because I know you have a track record of doing wonderful field experiments on very small budgets, and using very simple techniques to get incredible measurements. With that I wanted to go to the next, one of the other experiments you did which was the bushel basket.

Heinz Lettau: Well the bushel basket experiments came…

Sharon Nicholson: Was it before, or after Peru?

Heinz Lettau: Before. It was going on, the wind profile equipment and the temperature were developed for my experiments on the ice of Lake Mendota. And what caught my eye when it was winter in Wisconsin was this beautiful plane surface which was aerodynamically smooth, extremely smooth and any roughness boundary would create interesting results in the wind profile structure. So I was thinking for a while, talking with some of our contractors. You remember, I had been previously in charge of supervising experiments paid for by the

Air Force in my time at the Geophysics Research Directorate (GRD). And my major was micrometeorology and we had contractors, beginning with the Thornthwaite Group in New Jersey, the idea was always to support university research, Thornthwaite was associated with Johns Hopkins. We worked also with Texas University, and Texas A&M, the University of California in…

Sharon Nicholson: Los Angeles?

Heinz Lettau: No, the other place, east of San Francisco, the near the capital of…

Sharon Nicholson: Sacremento?

Heinz Lettau: No, Davis? Anyway, we had contracts with these people. At that time with Texas A&M was Mr. Glazer, and he said he would like to make experiments using bales of hay, when they are baled and lying around. Then I said well, the point is really they are lying there and you cannot order the farmer to change the density, of the obstacle density. So I then saw bushel baskets and thought if they are turned around they are very well defined obstacles of the right size, so we bought 300 of them, for arrays usually at least 20 by 50 meters. One of the systematic theory was one by Kutzbach, who finally added basket by basket and created a new smooth surface. So it was quite a nice way of demonstrating it. We had quite a few more experiments. One really came out from the other one. The people in California had redesigned the "drag plate" which could fit into the ground. I talked to Chuck about it and can't we cut out a 10 by 10 square meter piece of ice and keep this as the turbulence control and measure the drag? This turned out to be an unsolvable problem because it was too unwieldy and the inertia of could not be handled really. But Reid Bryson and Peter Kuhn had previously done experiments on vorticity of currents by having a "cross" of planks, and you see that twice the rotation is the vorticity. Vorticity is twice the rotation, ja. But then we did another experiment where we used floating buoys. This was something that was something introduced into the theory of air ground interaction, by Richardson, who was one of the most, let's say thrifty experimenters, he used parsnips, these are like… what do you call them…

Sharon Nicholson: Like turnips…

Heinz Lettau: Ja, floating, and photographing them, and seeing the separation of the original arrangement of them. Or, putting a line and seeing how

this went. He, of course, from this developed a theory of, ah, I forgot the name, but anyways, it is one of the many theories of about turbulence effects on the ground. But we used floating buoys. One of the doctoral dissertations was by Professor Super, who is now in Montana, measured the distance of the route of a motorboat around free floating buoys, and monitor the total length which is of course the diversions and of course you also get the idea of what kind of meso-scale and the vorticity. So there were lots of opportunities, and we found out that there were more and more possibilities of making measurements during wintertime on the ice and also measurements during the summertime, by trying to understand the situation. Then there was of course, Harry Hamilton, he is now also in the academic profession. Something really was suggested by Dr. Glazer, at Texas A&M, to make temperature profile measurements, he was using a rotating beam, but we decided that it was absolutely more reasonable to let the beam go up and down. And this was Harry Hamilton's dissertation in showing that the structure of the temperature profile, when there is cold air over warm water is really, practically isothermal.

Another experiment was the pontoon on which one establish the wind profile, the temperature profile to run from the upwind to the downwind end of the lake. More successful was running into the wind. So there were quite a number of experiments which were one really related to the other. I believe, a total of… The summary of experiments…

Sharon Nicholson: As I remember, if correctly, you also used Christmas trees? For roughness experiments, didn't you? Did you use Christmas trees on Lake Mendota as well , or just bushel baskets?

Heinz Lettau: Oh, oh, ja. This I was just coming to. The one experiment was, of course, using optical distortion of the beam of light across the lake in either wintertime or summertime. This is, of course, something which really developed later in the technique of using, not just a point, but a target, where three 45 degree lines are photographed at established various distances. And these experiments were repeated at Antarctica, on the ice, and established for the thing… The schedule, you can almost see it but it is much more informative to use the series of 45 degree targets at equal distances separated. And you see…

Sharon Nicholson: And that's what the Christmas trees were used for? No?

Heinz Lettau: This was also an experiment on the ice with the Christmas trees. This simply was a result of…, oh, this was the bushel basket experiment, wind profile modification. And you also asked for the black and white?

Sharon Nicholson: Yes.

Heinz Lettau: The black and white showed up not enough. You see, after all, at the Wisconsin latitude, the insolation, even on a clear day is not very strong, the effect on the wind profile is just noticeable, but not spectacular. The Christmas tree experiment is of course, quite spectacular results, you see here this blocked areas of the Christmas trees of about 5 feet tall on an area about 20 by 20 meter.

Sharon Nicholson: Let me mention for the record, that we are referring to a summary that Professor Lettau made of some of the experiments, particularly those on Lake Mendota, and we've been talking about the materials used, natural bushel baskets, white and black painted baskets, and Christmas trees. I'm trying to remember what you told me about how much some of these materials cost… I seem to recall about a dime apiece for the bushel baskets. Were the Christmas trees salvaged, after Christmas?

Heinz Lettau: It was of course, not very expensive, I'm pretty sure that my budget, my annual research budget was during that time supported by the Army, at Fort Huachuca, the Signal Corps. By all means, I think it was very strange that the Army never really could justify as one of their legitimate expenses. Unfortunately, when I was on a trip around the world, Chuck reached me, in the Philippine Islands visiting my son, and told me that the Army has to cancel. So we were a little bit at a loss, but usually, I'm not sure but annually we had a budget of about $150,000 for this research.

Sharon Nicholson: For this research?

Heinz Lettau: Ja, and Chuck was always engaged as the main and principal investigator, but he had really got his degree by working out the measurements in the desert in Peru. But one thing I haven't mentioned before, let me just say a word about the Christmas tree experiment. My last hurrah will be an article here

Sharon Nicholson: The Life Cycle of Pleistocene Glacialization, by Increase Lapham Professor Heinz Lettau with Chuck Stearns and Linda Keller.

Heinz Lettau: In this we will refer to the Christmas tree experiment. An experiment really as a replica of the Arctic timberline. Because the idea was as the life cycle begins as a nucleus ice shield around the Arctic Circle. A little bit later about 65 degrees north on the continents. The first mechanism that spreads the ice is an effect of the roughness boundary of the tundra against the taiga. The arctic forest against the tundra. This is of course, the upwind pressure we are measuring here, which is the one like polar, the downwind effect of hitting rough ground. But the major effect is because of the dimensions is one effect of vorticity. This has been shown already by Prandtl and Revis Jones. Some of the textbooks in meteorology, the German textbooks argue the sum of the vorticity, the stress of the bound. The result is upwind at the top of the boundary layer. This is sufficient to make out of the "baby laurentide" or the Scandinavian or Siberian shield, large ice sheets. Later on another effect takes over, but also a boundary effect; the gist of this paper is really we do not need the general circulation to stimulate the buildup of these gigantic ice storms during the ice age, but it is a local effect on about 6% of the earth's surface only.

Sharon Nicholson: Very interesting. Do you know where you are going to submit this article?

Heinz Lettau: Well I am just finishing the last part of my contribution. Linda is a very, very intelligent girl, who had previously worked with Chuck, now she is in charge of the automatic station network, which is still established in Antarctica and has data collected in Madison. It is given then especially, among other people ,to the C-141 and 17 transport group of the Air Force, these gigantic 4 engine planes. Well anyway, Chuck is also helping. I had a manuscript completed about a year ago and Chuck and Linda read it and said you will never get this accepted, because my style is to try to bring as many things as possible into one sentence, which makes it impossible to read.

Sharon Nicholson: Well, I hope it gets published. OK, Let's talk a little bit more generally about the University of Wisconsin and your days in the department. My first question is how you came to get to the University of Wisconsin?

Heinz Lettau: Well, I think I mentioned before that I was managing the micro-met research program of the Air Force from the Cambridge Center. And

one of the contractors was the University of Wisconsin and Suomi. Suomi had begun experiments a one of the University farms, not the area of the campus at Wisconsin, with wind profile equipment etc. But the new thing introduced by Suomi was the sonic anemometer, and also the…

Sharon Nicholson: He created it, or introduced it to you?

Heinz Lettau: He introduced it as a possibility in the area

END OF SIDE 1 TAPE 5

TAPE 5 SIDE 2 (CD Album 6 Track 2)

Sharon Nicholson: This is the continuation of the interview with Heinz Lettau. We were talking about Vern Suomi.

Heinz Lettau: Right, Vern Suomi, he had begun, in essence, a research contract with the extension division, department, of the university on light frost prediction in Fall, for the benefit of the cranberry industry, for cranberry bogs. He had developed a very simple net radiometer , a poor man's rheometer as you could call it, which permitted him to reasonably well predict, at the beginning of the night, when the cranberry "bog field manager" should water the field, flood the field as a protection against frost. So this was a very down to earth experiment for Suomi, and this is the way he really started. There were two professors in Madison, Reid Bryson, who was the founder of the department, and Suomi, the second man there. And in 1947, '57 I believe, Bryson had been offered a position at Arizona, the University of Arizona in…

Sharon Nicholson: Tucson?

Heinz Lettau: Ja, Tucson, and he went there for a least one semester. But during this time, Suomi offered me a visiting professorship on a salary. I went there, enjoyed it and had a very good… I always wanted to return to academic research which I had done previously in Germany before the war. So after I returned to GRD at the spring semester to

the Boston area, to Cambridge, and at the beginning of the summer I got then the offer for the permanent position. They had offered me a joint professorship in Letters and Science, the meteorology department, and in Civil Engineering in the engineering department, because they were interested in my turbulence research, and wanted me to teach a few courses in atmospheric turbulence. So it turned out that in the list of my doctor "sons and daughters" there is one engineer. This was Professor Slotta, who is teaching in Oregon, but I'm pretty sure he is retired now. Even my doctor "grandsons" are retiring now.

Sharon Nicholson: OK, what courses did you teach in Madison?

Heinz Lettau: Well to begin with of course, I was teaching micrometeorology, and physical meteorology. These were the only ones. I never had any real interest in synoptic meteorology… this was simply not my field. I knew enough about it to wisecrack about it, but I never taught it. There were of course… Bryson returned, he was not happy in Tucson, he returned so there were three of us. Bryson used to compare this with, "now we exceeded the critical mass." From then on, in fact, it came to pass that space began to be of interest, and Suomi turned from the bottom to the top of the atmosphere, and this is how Chuck Strearns came in. He was first an assistant to Suomi for developing the radiation equipment to be used in satellites certain satellites. Suomi went on and on in this, but Chuck was not too happy. After I had returned as a professor to Wisconsin, with appointment as a full professor in 1958, he was happy be my assistant and work with me, and we continued our work.

Sharon Nicholson: Almost half a century.

Heinz Lettau: 44 years, as it was. Chuck was a very interesting man, he was, practically from high school he was drafted in the Army and sent to the war in the Pacific…

Sharon Nicholson: This was Stearns, Chuck Stearns?

Heinz Lettau: Chuck, he was really in the hardest fighting on Okinawa. He said from his full company there were 34 left alive. This really was really a bloody fight.

Sharon Nicholson: Let me ask a few...

Heinz Lettau: He said lately in addition to that, the only wise step that we, the soldiers who were fighting this bloody war, were not sent to Japan, first of all not for invasion, as this was unnecessary and not for occupation force. We had been brutalized.
So does this answer your question on how I came to Wisconsin.

Sharon Nicholson: That answers the question…

Heinz Lettau: My ideas had been formed as manager of the "micromet" program, and physical meteorology had always been dear to my heart from Germany. And of course also micrometeorology. If you look at Geiger's very well known book, "The Climate Near the Ground" if you look at his list of references, I am pretty well represented there. So this was in some way a continuation of my research that began at Leipzig. I wanted to continue it at Königsberg, then the war came in between and prevented further work. And all along in my academic career I was considering myself more a geophysicist than a meteorologist, especially not as a synoptic meteorologist. This brought me in 1943, first the offer, and then the confirmation that I would be appointed as successor to Alfred Wegner at the University at Graz. Again, the Austrians did not honor these appointments being done by the Berlin ministry. Then I got a friendly letter that unfortunately, they could not conditionally accept me and only asked that (at that time I was just released at Frankfurt, at the end of 1945) they were sending my credentials to the University of Frankfurt, which paid me then a stipend of 100 Marks per month, just to keep me alive.

Sharon Nicholson: Let's talk a little bit more about the University of Wisconsin. Some general things about academics. Did you use any specific textbooks in the courses you taught?

Heinz Lettau: No, this is a point, I thought I'm not really happy, Geiger's book is fine, it's reading matter, it's not a textbook. So I was really well known by my students as a man that came into class every day and handed out the one sheet of material that was to be discussed during the class hour. This thing was of course was improved gradually because if I taught again a course, this is especially true for micromet, for physical meteorology I realized a textbook like geological books. In one of these I discovered the aerial photo of the barchan field. On the other hand, also, the Britisher, the sand specialist, ah I know his name…

Sharon Nicholson: The British sand specialist? I'm not sure who that is.

Heinz Lettau: The British "sandman" he had begun to study tractability of desert sands…

Sharon Nicholson: Oh, you mean Goudie, one of the younger ones? Warren?

Heinz Lettau: No, no. He had first written about…

Sharon Nicholson: Oh, I know who you mean…

Heinz Lettau: Accepted…

Sharon Nicholson: In the war…

Heinz Lettau: He was also working in North Africa.

Sharon Nicholson: In the Libyan desert? Yes I know who you mean, we'll come up with the name later.

Heinz Lettau: Oh well, I met him several times, he was brigadier, he had the rank of a general. "The Physics of Blown Sand" …

Sharon Nicholson: "The Physics of Blown Sand" is the name of it and I can't remember his name.

Heinz Lettau: This really was not a textbook either, but I used it of course. What was his name?

Sharon Nicholson: It'll come to both of us… in a little bit.

Heinz Lettau: Well I met this gentleman, up in the 80's at a meeting on soil erosion, in of all places..

Sharon Nicholson: Bagnold, Bagnold…

Heinz Lettau: Bagnold. So I met General Bagnold in Las Vegas at a soils erosion meeting. We had a nice picture of him and Käte in Death Valley. I met him again at a meeting called by Danish soils people at a meeting in Alrus at the northern tip of mainland Denmark when he was 91. I said it was marvelous that the old fellow is still interested, but now I am 92, and he is dead. Bagnold had of course really no good profile measurements, he could really have improved with

Chuck's work on the profile system. In addition, on the experiments we have not mentioned before, are ones I also began not on Lake Mendota, but on solid ground, which was later continued were the shading experiments. On daytime insolation conditions and seeing how the uppermost soil layers react to the taking away of the full solar radiation. The intriguing feature was that a homogenous soil like the sand of the desert in La Joya in Peru is such a nice harmonic oscillator, that the box curve, at the surface at about 50 to 20 centimeters is a perfect sine wave, because all the higher orders (amplitude) are eliminated and only the longest remain. And this is of course one of the experiments which is always brought up in class and discussed.

Sharon Nicholson: OK, let's talk a little bit more about the department. I was curious about how your department was governed over the years, and how it was decided who would be chair, a rotating chair, an elected chair?

Heinz Lettau: Well the major impact came, as you perhaps recall, in 1958 when I joined the department and were in the red brick building, the old Science Hall, on the top floor, shared of course with geophysics at the bottom and geography at the main part second and third floor and meteorology on the fourth floor. Half of the building was shared with geography. Then in '58 Sputnik revolutionized the ideas of research useful for the government. Here of course what Suomi had begun, it was the simple minded "lecter geometer" to be lifted by balloons in order to get the vertical profile. To me it seemed to be a good system to be put on a satellite and measuring the global heat budget. And of course, the energy budget especially including water and ice was always dear to my heart in physical meteorology and this was part of the basis of climatonomy. But it began when Suomi said that in order to do what you want me to do I need more people, and more people needed more room than what was available in Science Hall. So at first he rented parts of private housing down on Park Street, and then a rather sizable piece. Then Bryson moved because he also benefitted from this environmental institute down to University Avenue. So we were at the end of '59, we had locations in Science Hall, where our Marie Riggs, the secretary controlling everything, down Park Street, down University, and Park just beyond the viaduct, on the left hand side there was a big lot which Suomi then occupied. Then we came to the ideas that it would be nice to get into the building program of the University, to get a real descent building even if it's separated into two halves. So the plans grew out from a little brochure called, the future of the department,

was the name of it. We had at that time one graduate student, who came later to me and made the experiments with the optical distortion across Lake Mendota. That was Sparkman. Joe Sparkman, who had been trained as a science writer, and he gave us a very nice pamphlet on the future of the department, which had enough impact on the Regents, that they got very quickly to let us have this big building on Dayton Street, with Suomi's Space Science Center, the Engineering and Space Science Center. He together with Parent had developed the camera which could move from the satellite and could make a full earth picture. So the first full earth pictures could be seen by everybody that was interested, up in Science Hall. From then on it went on into the big building…

Sharon Nicholson: I know the big building…very well.

Heinz Lettau: Well, I think this answers the question. Let me say that number four was Charley Anderson.

Sharon Nicholson: He was the fourth professor.

Heinz Lettau: The fourth professor, especially for the work done with Suomi. In fact I had met first Charley Anderson when I first came here on invitation from GRD. He was with GRD in 1947. When I joined he was a young Air Force captain at this time. Later on, we had more and more positions, for instance, I had one… Well you can look it up. It began really to blossom. It was not just as Reid wanted to put it, getting beyond the critical mass, but it was also Sputnik and the space program, which were absolutely the reason for this expansion.

Sharon Nicholson: Were you ever department chair?

Heinz Lettau: Right, but I didn't like it.

Sharon Nicholson: You didn't like it?

Heinz Lettau: I was happy after they had elected me, but I got the offer as visiting professor to Hamburg and Reid was happy to take over. I said, Reid, you like it and I don't…

Sharon Nicholson: So how did it work? There was an election each time for chair for three years.

Heinz Lettau: Well, when I came back, I said Reid you are now so solidly in the saddle, so please continue.

Sharon Nicholson: So Reid was chair of the department for many years.

Heinz Lettau: Repeatedly. He was, before he left for this visiting period in Arizona, Tucson, and Suomi was, and Marie was unhappy, when Suomi was chair. But anyways, he had gotten me into the orbit, so to say, and when Reid decided to come back, Marie was happy, and Suomi was happy…

Sharon Nicholson: And you were happy…

Heinz Lettau: And I was happy, so this was really kind of a critical mass. And then Schwerdtfeger was invited. I overheard once at a meeting that we had about future plans for general meteorology and somebody said, apparently he didn't know that I could overhear, "What, another German. We have to stop that."

Sharon Nicholson: Oh dear…

Heinz Lettau: I don't know who said it.

Sharon Nicholson: How did it happen that so many Germans came to Wisconsin?

Heinz Lettau: Well, Reid was of course, not looking for nationalities, but he was looking for background. And Schwerdtfeger at that time was fed up with Argentina, he had left, only with the grudging approval of Weickmann. He said I cannot hold you, because it was more or less the health of his oldest son, which made him accept the offer, which in 1946 was given to quite a number of German scientists to come abroad. Argentina was very active in this respect, South Africa collected quite a few more, and even Central America. And so in this way Hastenrath came later to us, because he had been in Central America. I don't know where…

Sharon Nicholson: Oh... El Salvador… How about Eberhard Wahl, he came also.

Heinz Lettau: Oh ja, Eberhard came specifically because he had really a very "news" relationship to meteorology, especially synoptic meteorology. He had gotten his degree in astronomy in Germany in Berlin, and had meteorology only as a second part of his…

Sharon Nicholson: His minor…

Heinz Lettau: Especially, statistically as you call it, but these were things which Reid found, and of course Suomi agreed to, that they'd like to have somebody to compute all these things, somebody that knows statistical meteorology. So Eberhard was also picked, I had nothing to do with it. The choices were always made by Suomi or first of by Reid. So Reid was also quite heavily, directly interested in Werner Schwerdtfeger, because of his synoptic experience, and his experience in the southern hemisphere. Many, many years in Argentina, and one year visiting professor in Melbourne, qualified him for this, more than anybody else.

Sharon Nicholson: I see, so in other words, Suomi's budding interest in satellites is what brought many of you to the department.

Heinz Lettau: That's right, it brought especially Wahl, he would not have been in the department, if he would not have been working… When I had left GRD, Wahl was also there, he came in about two years later, I think about '50 or '51. He worked in the beginnings of the space program at GRD. So this selling out of German scientists, was helpful in this respect.

Sharon Nicholson: Well I know it wasn't just Madison, the University of Wisconsin Milwaukee had three or four Germans.

Heinz Lettau: Well, first of all I remember it was Baum that was there at the department.

Sharon Nicholson: Right.

Heinz Lettau: There were one or two others…

Sharon Nicholson: One or two that worked in South America… I can't remember the names…

Heinz Lettau: It was the one which I said was on his way from Argentina to the United States, to Milwaukee, who stopped for a week in Arequipa, and looked at the work…

Sharon Nicholson: Was it Weichert? Weichert maybe?

Heinz Lettau: No, he…

Sharon Nicholson: Oh, I know who you mean, he worked closely with Schwerdtfeger.

Heinz Lettau: Ja, he was a soils man. But his name was very familiar in Germany because his brother was a very well known director of a symphony. I think it was, a very well known symphony.

Sharon Nicholson: This the continuation of side 2 of tape 5, the interview with professor Heinz Lettau. OK, we talked about the work in Peru, we talked about the bushel basket experiment, one of the other major things you worked on in Madison was your development of climatonomy. Which one can say is perhaps the first effort to develop a land surface atmosphere interaction model. Would you like to tell us about how you got the idea, and your original work there?

Heinz Lettau: Right, but may I relate back to the experiment on Lake Mendota, because it was not only bushel baskets and Christmas trees, but it was the refraction, photographic... The photography of targets across the lake to study the temperature gradient and the other experiment was the moving of masts and moving the thermometers up and down in order to get the fast changes in the temperature gradient while there was cold air, especially cold air blowing over the warm water. And the last experiment was the shading experiment. Here too we did it on the lake with ice, one of my students did it. But the beginning of this was on solid ground and we had once invited Professor Baumgartner, the successor of Geiger in Munich…

Sharon Nicholson: Yes, I remember meeting him there…

Heinz Lettau: And he carried out the first of the shading experiments, which are very simple in nature. You do… This is the example of the shading experiment in La Joya. You make a box curve of heat influx and you see how, from 1, to 5 to 20 millimeters, the box curve always loses it's higher harmonics , and finally at 20 millimeter, the solid band is only one perfect sine curve. This has some other applications, for instance, we had once the sand experiment, and experiment on ice which had a number of factors, namely ice has radiation penetration of the ice. So the outgoing radiation is different than the incoming. And this was investigated by one of the students, was it Turner in Australia. But another experiment we did was… There was a partial eclipse of the sun. And the air temperature is known to react hardly at all to a partial eclipse, so this is air temperature at about 1.5 meters above the platform, but these

are the responses of surfaces of different consistency. But the bigger practice is the albedo… The albedo of snow, has of course the highest amplitude, and then the wooden planks lower and lower and finally the air temperature is practically zero. These were the offspring of first experiments simply invited by the smooth ice surface, generated every winter around Christmas in Madison on Mendota and lasted till the first weekend in March. Well, my viewpoint we can put aside, mentioning who the students were who later benefitted from these experiments. So the question is now?

Sharon Nicholson: Oh, I wanted to know how you became interested in Climatonomy and tell me a little bit about it.

Heinz Lettau: In some way it was the same as earlier, I wanted always to begin with the energy budget at the surface. Now the energy budget at the earth's surface has two immediate consequences, let's three. It warms the air, it warms the ground and it evaporates water. So these things seem to be quite different, they are conventionally handled by three different sciences, soils science, meteorology, and hydrology. I like to always refer to Alexander von Humboldt, who said, look at the… Well let me make it really exact as it reads, "Recognize the oneness and multiplicity." And this is the idea which was underlying Climatonomy. Because first of all you had to know how to prepare solar radiation to be absorbed at the ground level. Secondly, you have to know what kind of physical properties are at the ground. Thirdly, you have to deal with the diffusive property of the air and finally, if there is one or not. It depends very strongly on determining climate of arid zones or very humid zones, or even farther back to lakes and water surfaces. So this is, in some way, the common route of both climatonomy, originally I used the term synthetic climatology, (which I didn't like.) But later other people… I remember one very, very well known geographer, who listened to my discussions of this nature, and I said climatonomy is simply coined after astronomy, as is, in some way a development of astrology. The suffixes are "logy" to teach about, and "nomy" to put numbers on it. He shook his head and said it's ridiculous to compare geography, the third level is "graphy" just what he described. I didn't want to say anything more, but he stood up and said "graphy," "logy," "nomy" he said it is absolutely absurd to compare geography with astrology. Well, he got it all wrong, but was a very famous geographer. But anyways, to recognize unity in multiplicity, this was in my mind, the background. I started with the two papers. First of all I would say, Käte, my wife, with her degree in applied

bio-climatology. We sat together and designed… How can we "parameterize" the loss of radiation in the air and which is received at the ground. And we called this idea in a paper, which was very, very nicely reviewed by the editor "Østrem of Tellus." I still have this letter, he said this is a very nice new approach, instead of the wave length approach, using always the spectrum, and seeing what happens to the different wavelengths. We locked this together, and this is the remaining factor which we need to understand climate. The next relatively simple branch was "evapro-climatonomy" that is again taking out the hydrology, or hydro-meteorology, as some people call it, and try to understand how is water preserved, how is it stored away, and how accessible is it at the surface. We had to design a few new concepts like the evaporivity which leads to which part of the solar energy is used for evaporation. And here we had really difficulties for acceptance for the insolation climatonomy, by physicists, who were still saying that we need to have the spectrum distribution in order to understand it, and so and so… Anyways, everybody has his right to disagree, but this was the lesser part. But hydrologists were in general not very happy with evapro-climatonomy because some of them, like Professor Kutzbach wrote a thesis, not a thesis, a paper on Lake Chad in the desert, which is of course, for me as a climatonomist, and for him, at that time still my student, (let's say he had been my student for the Master's degree), but had changed to Bryson for his doctor's degree, because he wanted a change. I recognize this as a very important point, because I also went around as a student, from Frankfurt, to Königsberg, to Leipzig. But anyways, he had applied climatonomy to Lake Chad. He separated out the rushes and the open lake zone and of course the desert surrounding. But he told me he had quite a few difficulties with the reviewers, if they were hydrologists. One had said, very clearly, he doesn't expect a direct relationship to absorbed insolation to be useful to hydrology. After all, you find this amusing?

Sharon Nicholson: Well I found similar things with reviewers, with hydrologists.

Heinz Lettau: The very last thing is of course what you call thermo-climatonomy. That is trying to understand how the ground absorbs the heat and redistributes it and here again, it is not so important to deal with the wavelengths of the solar energy, the spectrum of solar energy, the harmonics, and the fact that the annual wave penetrates usually up to 10 meters and on and on to 20 meters, which is the square root of the two frequencies. For homogeneous soil this is very nicely

established and in fact, some observations at my home university were always quoted in literature. Because the astronomical observatory at Königsberg is on a moraine hill, with very nice and uniform sand. They had arranged for measurements with mercury thermometers with 10 meter long capillaries. These measurement at the "sternwarte" at the University of Königsberg were classics in all books on soil movement. So climatonomy was really an attempt as Humboldt said to combine things and see unity in multiplicity. This was followed up with quite a number of applications of this, and I am happy that you, Sharon, were also taking an active part in following this up and …

Sharon Nicholson: It took me 20 years to do it.

Heinz Lettau: Well, you didn't need my boots, to walk on this field on your own, I'm happy, of course that you did.

Sharon Nicholson: OK, did you want to talk some more about your students? You mentioned talking about your students.

Heinz Lettau: Ja well, this is of course, one occasion, because climatonomy had always the good side, that it wasn't too difficult to design for the interest of the individual students their thesis, either master or doctor. Most of the students who benefitted from the approach of climatonomy were masters degrees. For instance, one biologist, who was… I told him, look, if you are talking about the forest climate, you have to distinguish the active surface, which is the crown of the trees, and you have the air filled space between the stems, and then finally you must know what happens at the ground level. I said if you are looking at a real forest, then it is always very complicated because the effective surface is usually 15 to 20 to even 50 meters above the ground. So I was really impressed by seeing in our arboretum and also near Lake Mendota shores the sumac stands. I always had the feeling that these are beautiful replicas of a big forest, and you don't need a tower to go above the crown space, you can simply use a stepladder. So one of my students did this.

END OF TAPE 5

TAPE 6 SIDE 1 CD

Album 7 Track 1

Sharon Nicholson: This is tape 6 in the interview of Heinz Lettau, he was just talking about a student working in the arboretum in Madison using sumac stands to represent conditions to be found in a forest, in the crowns of a forest. He will continue here.

Heinz Lettau: Fine, now this student had of course, another challenge given to him. You will not get much of waiting of just saying what is the diurnal variation of heat at these different levels, you have to make an experiment. This means we should wait for days, and do the recording only on days when there were stratocumuli . And when your little forest is hidden by a cloud shadow…

Sharon Nicholson: I'm just trying to make sure you are getting on tape. OK we're back continuing with the…

Heinz Lettau: Well a true experiment would be to make your observations only on days when there were fracto-cumuli drifting and you wait for a shadow coming across your setup. Well this means waiting and waiting, but he succeeded in having a few days which were quite interesting and show the penetrating effect after a long shadow. So now, another thing happened, I said well, and I forget the name of this boy, Chuck has met him later in Washington, he has somewhere a position in teaching… As I very often advise my students, I'm not really interested in making a publication, with you and me as co-authors. Be on your own, learn how to write a publication and send it in.

Sharon Nicholson: I remember you telling me that.

Heinz Lettau: My recommendation, but this fellow came back to me and said the reviewer said it is custom that your master thesis advisor has to be a co-author. I said try it at another place, he succeeded. When I, for instance, some of the experiments which were regularly elaborate, like the first time that we were doing really somewhat "meso-scale" experiments. This was with an airplane, looking down and making surface temperature observations with infra-red radiometers pointing down.

Sharon Nicholson: You gave me a slide from that, over Madison?

Heinz Lettau: We had here established a flight course, with Lake Mendota as a checkpoint, then traveled north to lake Wisconsin, as another checkpoint, then over the dry sandy regions, and returning over the "driftless" area. So, this was… The major point I am always making is there is not much gain in having a daytime flight without following up with an early morning as a minimum. So the idea is to have the maximum and the minimum, the spread of temperatures is much more useful as the instrument for theoretical climate research, than the temperature distribution and the local gradient. So the was the master thesis by Dutton, who is a professor at Pennsylvania. But here again, I let him do this publication, he had to report to our "money-giver", but besides that, it was up to you (him). So this is my philosophy and I think it came simply from the fact that at my old alma mater, Leipzig, if a student had written a thesis, it was published under his name in the reports of the department or institution. But there were only a reference, "thanks to my advisor, and so and so on…"

Sharon Nicholson: Well I remember wanting to have your name on it as co-author, on my first publication, and that was when I was working on the street canyon work with you. Totally different than work I did later, and I was amazed at your philosophy there which basically said, you don't need my name on here to get published. But I always felt that your name should have been on there because, although I did the work, the most important thing was the idea, and it was you that had the idea.

Heinz Lettau: Well, that's right, but nevertheless, we did in the old country, simply gave the idea away, to the student who did the work, and who acknowledged only the guidance. For the major professor or the head of the department, who was of course appointed there for an indefinite time, it was a different system anyway, the output of the department was the thing which was under his guide. It wasn't too important, but each published contribution to the department publications was the name of the report. So this was my philosophy, and I think we have talked enough about that.
The climatonomy concept had not too many… well, in some way I do not know how I should have put it. We had of course the benefit of programs, for instance, there is for some people an unfortunately large number of parameters necessary. I don't think the number of parameters is (should be) more than absolutely necessary. Because it is not only a multiple process, but one with multiple aspects that we

are talking about, beginning with the radiation, and how it is used, for heating ground and air and using water, etc., etc. But the point really was that when I began to think of retirement, we hired Professor Stull, and ha had been with the Air Force for a while and he was a very capable programmer. He designed the program for determining the best possible parameters for these experiments. We are not particularly sure if this parameter has this particular value, but let's assume that it is, or has one value and see what is the outcome. And run through especially annual variation and see how the discrepancy between observations, if only for test method is minimized. So this is something that I appreciated very much; I personally was never able to do it myself. I don't know, have you ever used this Stull's program?

Sharon Nicholson: No, I haven't.

Heinz Lettau: But really, I think it deserve wider application. You see the major point came when I still was active in Madison, I was active a long time after my retirement. But really, before my official retirement, there was a paper, I had written a paper on… Let me tell the long story, Schwerdtfeger had a student who he liked to have because at that time when Landsberg produced the volumes of earth climatology, Schwerdtfeger was the chief editor for the volume for South America. And he had me contribute a little bit, because he was unhappy with the man who had to deal with the dry, tropical desert climate in Peru. But he had for Central America, a student who had also experience, he had been with the Panama Company, in Panama.

Sharon Nicholson: Bill Snow?

Heinz Lettau: Bill Snow, ja. And Bill Snow had told me that the Panama Company has one problem, namely, they had created a reservoir, on the Rio Chargas, for regulating the water needed to keep the better part of the canal at high water level. But with the access road to the reservoir, the native population moved in and what the major problem was they took away too many trees, in order to have their chicken farms and other products. The effect, of course was less… more evaporation, and less water for the canal. I had at this time, my second son, who was an Air Force officer, an engineer, had been stationed in Panama, at one of the compounds there. When I was down there I asked if he had contact with the engineers of the company, and yes, he had. I asked him if they would be interested in

having me visit them there, and they said yes. So I went there and talked to these people, and when I said Bill Snow had told me… Oh they said how convenient, could you came along… Yes I said, he was a student of mine. And this of course, opened the gates, and I said all I would like to see is your data. I would like to test it. It came out, it's very likely that the increased evaporation isn't caused by heat, but of course by the change in the surface. This of course raised strong objections by the reviewers, and in fact they didn't accept that paper, because they said we know that with reduced forests (this is true for the Rocky Mountains) then we get more in our reservoirs. Because the percentage of precipitation in the Rockies is mostly snow and is caught aloft in the tree space, it does not get to the ground you see. But with the tropical conditions, the way with "hot towers" and convection produced, the rain doesn't reach the reservoirs. In this forest, the shade, the forest shade is removed, so to speak. So I had another chance to publish my paper about the effect of removing shade trees in the upper regions of the Chargas river system. I got invited by Baumgartener to talk at the meeting on forest meteorology in Munich about it. And they were delighted about it, this looks reasonable, and all the people in Panama have to do is plant new shade trees, then they get water.

Sharon Nicholson: It sounds like it was an important piece of work, that didn't get published. Why didn't you choose not to resubmit it to a different journal?

Heinz Lettau: Well, it took longer because I had submitted this paper to the hydrology…

Sharon Nicholson: The Journal of the Hydrological Science?

Heinz Lettau: Well I got it back from… the Geophysical Union has… a hydrological paper?

Sharon Nicholson: I think it's the Journal of Hydrological Science.

Heinz Lettau: It is published here under this title… the **"**anomaly"

Sharon Nicholson: In 1990, it was published.

Heinz Lettau: Well of course the acceptable explanation was there is a change in climate and there is less precipitation. I showed from their data there is no change in precipitation over all the 50 years there in the record.

And they did have reasonable records. They had two objections against it, two reasons for refusal. First of all I had only dealt with the watershed of Chargas River, they said you will have to put in a little bit more. And the reason I could do it was that the Panama engineers, from the Panama (Canal) Company, at this time it was still the company, they had farther downstream not far from the Golden Gate reservoir, at the Atlantic end of the canal, a 5 square mile reservation, where they had controlled conditions of water storage. And then there is a little island in this great reservoir lake which is run by a research station… the Smithsonian Institute?

Sharon Nicholson: I don't know.

Heinz Lettau: We used the three watersheds of Panama, in my paper with Hopkins. If you look that up you will find it. On this island they had one little watershed which they had controlled for many years. You see this is one of the very primitive things where you had a weir, which has a "V" in it, and you look every day to see how high is it. But anyways, this was fine, and everything pointed at the fact that it is, of course the shade of the forest which prevents evaporation, opposite to the experience of the people in the Rocky Mountains.

Sharon Nicholson: Well that's too bad. Did you have difficulty with other publications?

Heinz Lettau: Oh yes, other publications were refused, for instance, Käte and I had once submitted, after we had been encouraged by "Østrem Tellus" paper, the wave UV parameters arising the gain and loss of solar energy at the bottom of the atmosphere. This was also declined, not accepted by one of the paper's publishers. But anyways, we gave up on this and so it wasn't necessary anymore.

Sharon Nicholson: I think a lot of people would be reassured to know that even somebody with your stature…

Heinz Lettau: The point is if you do have enough ideas, as I always was thinking… and talking about a man in the Potsdam Institute before the Second World War, Dr. Albrecht, who later went to Australia, and has a son there too, a leader in equipment. He was a man recommended by Professor Süring that had requested money for the research flights by balloon, he said if you need a very sensitive vertical anemometer, Professor Albrecht may provide you one. Of course he had developed the vertical anemometer, with parts of a Wheatstone bridge, where the difference between equal resistance. You know

equal resistance was done that you had two thicker wires, a pair of thicker wires, opposite a thin wire, and if you are calm, then the Wheatstone bridge is balanced, but if you cool the wires, then single wire losses more heat than the double wire. Because it has a smaller surface exposed to wind, and is hotter than the other two. That is the main thing, that it is hotter. So the cooling goes with the difference in wire temperature in air. So this was very simple, but when we had this gadget, this Wheatstone bridge, at a broom pole out of the gondola, and Werner had to put it out and I was reading the ampmeter, and he broke it. Then we discovered that our pilot, a very experienced one, always used a vertical anemometer, of the gill type, and we found out, in flight that this seemed to produce good readings, we were looking at it for a period of 10 to 15 minutes. Well he said when I look at it in the balloon, I only see if it goes this way or that way, because at the same time he looked at the anemometer and the rate of climb meter, and if the two agree then we are in a current, but if the two disagree then we were rising or falling. This is the navigation aid. But fortunately at this time I was the assistant at the institute in Potsdam which had a huge stairway with stairs all around so there was free space of about 15 meters, so I had one of my friends, a colleague, there to watch at the bottom as I pulled it up and down to calibrate this thing, afterwards. This was the balloon experiment, the first one.

Sharon Nicholson: Well, we're getting a little bit out of sequence here.

Heinz Lettau: We are still with experiments.

Sharon Nicholson: Yes, exactly.

Heinz Lettau: Experiments in climatology have supplied enough ideas for work on the master's degree and even on the PhD degree.

Sharon Nicholson: Well at this point let me ask a couple of general questions, and I think some of these may have been suggested by Chuck Strearns. OK, what do you think to be the most important thing you have done?

Heinz Lettau: Marry my wife.

Sharon Nicholson: Marry your wife, OK. I'll make sure she hears that. Besides marry your wife, what was most important?

Heinz Lettau: You know she was a student and I was assigned as thesis advisor. And, no need to go into more details, we got engaged after she got her PhD degree. This was of course with Weickmann as the major professor and Van der Vag, the Dutch mathematician, in applied mathematics… She told me later that he asked about what she really thought she could present, namely work about the methods of the least square regression that is. The third example was Heisenberg, and Heisenberg, and all very great physicists and researchers, are, I shouldn't say, more able to tolerate students, more readily than lesser people. But anyways, she had the degree and a PhD afterwards… I didn't make this a condition. And she was then, for two years, working in applied bio-climatology at Marburg University, at the medical institution, the Institute of Hygiene, at Marburg University, until we married. In the meantime when I was through with the first balloon program with Werner Schwerdtfeger, on the direct measurement of eddy motions in the lower troposphere, I had a sequence dealing with evaporation from the land, by making saw-tooth flights and comparing ascent and descent and ascent again and descent again, and usually we had three up and down flights between ground level and let's say 3000 feet. This was well enough to get an idea how the air mass modification can be pin pointed and put into numbers.

Sharon Nicholson: OK, let me rephrase the question, I don't want to get lost. What do you consider to be your most important scientific finding?

Heinz Lettau: Well I really should say I got thrown out of my development by the war. Before the war I was really calling myself, and tended to be a geophysicist, dealing with solid earth geophysics, just as well, in fact, with more emphasis than meteorology. I had made one invention, this was the highly sensitive amplitude modification of the horizontal pendulum, which was used for many years to study earth tides.

Sharon Nicholson: I think you showed me a picture of that.

Heinz Lettau: Well the instrument which was finally… It looked like this, this about a half a meter, and the system horizontal pendulum is to have one pendulum suspended by two wires so that it has a very slow period. The sensitivity technically depends on the period. When you are adding here some pendulum, you can make it unstable, and before it reads just fine. And it increases very definitely, and these are earth-tides, recorded at the lab. The most important thing, which

I would say, at that period was the double pendulum, which was really a new idea. And we talked about this before…

Sharon Nicholson: We did, yes.

Heinz Lettau: For my so-called second degree as an academic I mean, with Dr. Habil, I needed a thesis, and I needed a test lecture period, and taught it to the entire faculty. My second reader for the thesis was Heisenberg, and the subject was this pendulum. He had looked at my draft for the thesis and called me and said, I do not understand what you have done there. Come to see me. I went to Leipzig to the Geophysical Institute and we talked about it and found out it didn't help, it was Heisenberg. The best way, can you come out to the Observatory and look at it. Oh yes he said. I had one of these small two-stroke cars, I advised, and he said oh no, I have a better one. So he came out and we looked, and he said oh now I understand it. He was sitting at my desk and filled out 6 or 7 sheets with formulas, if you do it this way then I think, I accept it. Now this picture over there…

Sharon Nicholson: Oh yes.

Heinz Lettau: Was done in Bonn in 1974, when Heisenberg was the head of the Humboldt Association. There was the annual meeting and "fest" assembly at the Beethoven Halle in Bonn, and all the recipients of the Humboldt awards were filing past Heisenberg. Käte came first and said, oh Professor Heisenberg, I have been… You were the examiner for my PhD thesis. Well, he said, (he's a very,very nice man) this is very nice that you remember this but I am sorry, I had quite a number of students passing and so and so on… But then I came behind her and I said, Professor Heisenberg, you remember the observatory at Collm? Oh yes he said. And so he put his finger on his nose and said, there was this Dr. Lettau who had invented this pendulum which was very interesting. I went out there and we sat together and fixed up the theory. Then Dr. Pfeifer, the secretary of the society said essentially, Professor, this is Dr. Lettau… The rest is in this picture.

Sharon Nicholson: That's wonderful.

Heinz Lettau: And he said, oh well, after we are through with the receiving line we will sit together and talk a little bit about it.

Sharon Nicholson: Are you getting tired?

Heinz Lettau: Ja, but so let me come back to your question. What was the most important thing? This would have been mine, because after all, I had application of this in the mountains, in the Alps, where I had access to a cabin, a little room, where Tomachek from the Dresden Institute of Technology, had used his single pendulum, called earth tides. I asked him if I could use it. It is free, why don't you go there. So Käte and I went in 1938 to Bertchesgarten, where the salt mine was and we had our instrument and the recorder, traveled by car, and got very well received by the people. The salt mine is not in use anymore, it is only a tourist attraction. There is this picture showing myself, you will remember that…

Sharon Nicholson: I do remember that.

Heinz Lettau: In front of the salt mine… What we are using now, is my paper about the life cycle of Pleisticene ice storms. What they call now the restrained, remarked, Steinhauer had written a theory on how the Alps would react to the seasonal snow cover. His theory was summarized here in this… Ah yes, this was Professor Steinhauer's theory, the load, the snow load, the depression, ranging farther out, and the inclination, plus and minus away and toward, and in both cases away, of course. And I said my instrument is sensitive enough to measure this at the northern rim of the Alps, this is of course, the Bavarian Alps. He said fine, we do have money for research, but this is expected to be used only on the German side of the Alps. So I got the money from Austria for doing this. And the fact that there was restraint, rebound in March, was amplified by the fact that there were two days during our 20 days of measurement, with new snow on the mountain. And the restraint stopped at this time, it didn't stop completely, but made a dip. This was the beginning, and in fact, this I believe, was one of the main reasons why I was picked out as the successor of Regnitz in Graz. Because this had been appealed, the Austrians didn't like to really honor what was done before. But really, this would have been the geophysical subject of my main achievement, when I would have continued my academic career in the old country. But after the war, when I came here, under contract with the Air Force, it was strictly as a micrometeorologist. So I was tossed so to say, in this direction. The only chance, after I had taken the chance, as a lecturer at MIT, which is, of course, not an academic job, but it served me very well to get acquainted with what was going on at an American university, and prepared me for accepting, or for getting the position at Wisconsin. So from then on I had to

start practically from scratch, or again build up at climatotonomy, I would say, which then came up as the major incident.

Sharon Nicholson: What was the most enjoyable for you?

Heinz Lettau: Enjoyable?

Sharon Nicholson: What was the most fun?

Heinz Lettau: Oh, things, let's say, like really doing outdoor things, like balloon flights, like… I didn't really enjoy very much, the airplane as a vehicle for doing research, I left it to people like John Dutton, I went with him only once to see if the selected course was alright. And then things like going to Peru, and staying in the desert there.

Sharon Nicholson: What do you consider to be your biggest failure? Would that be not finishing the geophysical work on the pendulum?

Heinz Lettau: Well, well I had a few things which I wish I had not done. I cannot not say, it was more or less, missed opportunities, but really not, I wouldn't call it a failure. I leave it to other people.

Sharon Nicholson: How about the biggest disappointment, I know you had expressed disappointment about not doing the dry convection experiment.

Heinz Lettau: Well the ordinary way of being disappointed is not to achieve things which you would like to achieve. Now there were no disappointments in this respect. A few things were hurting for a while and when we were getting miniscule returns, and things like this. But you simply disregard it after a while and start anew.

Sharon Nicholson: Do you have any hobbies, things you do besides science? What do you do outside of work on science?

Heinz Lettau: Oh well, working with my hands, I mean if you are looking around in our apartment here, there are things, like the table, I once made. In the bedroom, the headboard of our double bed. Things like what I could do by hand. Something I did when I was a high school student, I built a canoe, not a canoe, a kayak, with a wood frame, and sailing cloth skin. The Eskimos do it too, but they do it with fur, or with pelt. These are the things I like to do.

Sharon Nicholson: OK, I still want to go back and talk about Air Force Cambridge, or do you want to do the tomorrow? Do you want to go on for a while today?

Heinz Lettau: Well, I think tomorrow. End of Album 7 Track 1

End of Tape 6 Side A

Tape 6 Side B Album 7 Track 2

Sharon Nicholson: We were talking about climatonomy.

Heinz Lettau: Ja, we missed two things, the physical science division accepted my proposal to teach climatonomy as a two hour course, for two years, and this officially established it.

The author is one of the students, Douglas R. Clark, who later married a Danish girl and moved to Denmark, where I met him again in Copenhagen several years later. But the occasion was on the 15th of December, '78 when I had established the course and he was a member, of course, with other forestry students, and the title is "My Darling Climatonomy" and the tune is "Clementine." He is poking fun a little bit at my generous use of stars and stripes, asterisks and dashes, double dashes. It begins with, "In a classroom, in a corner, going down in history, busy wrestling with the climate, friends of climatonomy." And the refrain is, "Climatonomy, climatonomy, it's a method we prefer. Sunshine, clouds, the snow and raindrops all in one parameter." And so it goes on…

Sharon Nicholson: Do you want to read the rest of it?

Heinz Lettau: "First comes short wave with albedo, solar forcing flux and so, taking time to fudge the numbers, we ensure you won't be bored." And so on. Could you continue…

Sharon Nicholson: Well I can continue, "Next evapo handled moisture, from the sky on to the land, though it fits it to a letter, it is just a slight of hand. Then there's thermo with respondence, and of course retention time, keep your eyes on the notation, don't you love the stars and rhyme." Wonderful song.

Heinz Lettau: Well it got accepted by the students at the… Well they didn't call it a celebration or Christmas party, they called it "solstice" party.

Sharon Nicholson: Yes I remember the solstice party.

Heinz Lettau: The solstice party was the occasion where everybody got a copy of this and joyfully sang a song about climatonomy.

Sharon Nicholson: That is good that you mentioned the solstice parties, do you remember the origin of the solstice parties?

Heinz Lettau: Yes, the origin of the solstice party… we had at one time in the early 60's, I believe, Stig Rossby, the oldest son of the famous Rossby, as an instructor. And he invented, not that, he introduced the Swedish custom of having at Christmas time, first of all having enough lights in the room, candle lights, and secondly what the Swedish called a "glug". That's a kind of a hot brew, of all sort of alcoholic mixtures together, with some kind of spices, which I didn't like very much. But anyways, it was duly taken as medication for suffering during the winter solstice and looking ahead for the summer solstice.

Sharon Nicholson: Oh I thought it was some type of pagan rite to welcome back the sun.

Heinz Lettau: Well unfortunately Stig was not a very good instructor. He didn't last very long. He was not approved as an assistant professor.

Sharon Nicholson: Where did he go after leaving Wisconsin?

Heinz Lettau: He went to Colorado and took over a restaurant, his specialty was buffalo steak. I visited once there, he was a very good innkeeper, sort of.

Sharon Nicholson: Do you remember what town he was in, in Colorado?

Heinz Lettau: I have forgotten the name, it was in one of the valleys, not really somewhere on a peak. I don't think he lasted there very long. Quite a difference to his younger brother, who I believe became a professor in Florida, in Miami. I have some vague memory of the…

Sharon Nicholson: I thought one of the younger brothers became a professor at UCLA, but I'm not sure.

Heinz Lettau: Oh, it could have been UCLA, but my first memory about this younger Rossby son was his teaching at Miami.

Sharon Nicholson: That became an annual tradition at the meteorology department, as I remember. A very fun tradition.

Heinz Lettau: So this was what I wanted to say about climatonomy. Again I enjoyed it very much, especially the kind invitation to Copenhagen, where we met… Ah well… the man who was…

Sharon Nicholson: The turbulence person?

Heinz Lettau: No well, the chief of the department there, but anyway. Then I believe we should say a word about … That I introduced a few concepts into the meteorological language. First of all, boundary layer, this was not very often used before. They called it… They had a different names for that layer of the atmosphere which is directly affected by contact with the earth. But more interesting was the reaction of all the "wise men" of meteorology, at a meeting in Oxford in the early 50's, '56 or '57 where I suggested to use, even for modeling, but definitely only for full understanding, the boundary layer structure in physics, the concept of the geostrophic drag coefficient. This was entirely new and quite interestingly, there is documented here the reaction of quite a number of famous people. I believe I can locate a little bit about it, ja. After I had presented my paper, then there were contributions in the discussion following, by Deacon, G. I. Taylor, B. Bolin, the theoretical, K. Batchelor the British meteorologist, and Beyers and Shepard, and finally Obukhov and Stewart. So these were quite a number of very important persons, and some of them were immediately very kind, for instance Deacon, he said, I think it was a very useful departure to relate tone out, the surface drag other features in the… Here, you can read it…

Sharon Nicholson: OK, ah this is the comment from Deacon, "I think it is a very useful contribution to relate tone loss and other features to other general

meteorological conditions in terms of the geostrophic wind." And do you want me to read any of the others?

Heinz Lettau: Not all, read only what Shepard had to say.

Sharon Nicholson: Shepard said, "It is of course important to bear in mind the type of problem we are dealing with. For large scale dynamical meteorology, there is a good deal to be said for Lettau's approach. For an understanding of the momentum transfer problem, it would be dangerous, after all the velocity, "v sub g" does not necessarily exist, as does "u" star. "Ie" minus "u" prime, "w" prime "bar", the square root of minus "u" prime, "w" prime "bar". It is merely a pressure field parameter, and the relationship between it and the turbulence field, momentum transfer must be very involved, and indirect, particularly in a changing pressure field."

Heinz Lettau: And here's my reply to that…

Sharon Nicholson: I was going to do that, OK, Lettau's reply. "I agree that V sub g is a fictitious quantity." V sub g is the geostrophic drag coefficient, right? OK. " But then we could substitute for this, the horizontal pressure gradient, which is a physical reality."

Heinz Lettau: OK, this is what silenced him.

Sharon Nicholson: Very good.

Heinz Lettau: I think nobody else thought of it as being a "dangerous" concept.

Sharon Nicholson: I also seem to remember there was a bit of a conflict between you and Monin, Monin and Obukhov, concerning some of the aspects of the descriptions. Do you want to talk a little bit about that?

Heinz Lettau: Not really… It is only a fact that I had introduced something like the constant, Monin Obukhov constant, several years, or one or two years before they published it.

Sharon Nicholson: And what did you call it?

Heinz Lettau: Well, I introduced in some way the… The paper was Geophysical Research Paper Number 1, in which I labeled the… The title was not very good. I called it isotropic and non-isotropic turbulence, here this is the point where the theoretical turbulence people

objected. I used it for turbulence affected by either heating or cooling at ground level, by convection or damping. They said that this is not really what everybody else understood of isotropic and non-isotropic. But anyways, I dropped this and didn't use it later. But I introduced there, a non-dimensional, a thing like the Richardson Number, could be used, but it was composed of heat flux, either up or down, and the "chew" of friction velocity. I had immediately, at that time introduced the geostrophic wind instead of friction losses, because I wanted to create something which is useful for modelers. Because, after all, as you saw from the discussion of geostrophic macro-vision, geostrophic wind is not a reality. That's right, but the horizontal gradient is a reality, so this was my idea on that. Pandel, when he saw this paper, he said again, he had some objection against using hydrography, but this non-dimensional combination of using heat flux per unit density, this makes it of course, energy, velocity square. With the velocity "chew" of either pressure gradient or geostrophic wind, he said this is very interesting, you should follow this up. This became known later as the polynomial constant, or number. Oh no, this was not a conflict, in fact, every time I met good old Obukhov, who was very, very kind to me, and we had a very good time, especially when had I met him for the first time. This was at the AGU meeting in Toronto, where I came there actually from Nebraska, and showed to a selected group of people a very rudimentary film of the proceeding of the Great Plains Turbulence Program. Obukhov was very much interested in it. We met again at another meeting when my report, "Exploring the Atmosphere's First Mile" was already in print. The Academic Press had displayed it at the next meeting of the Geophysical Union. Now I'm getting my meetings confused… This was the second, the meeting where the report was ready, and Obukhov was very eager to get a copy. I urged the Academic Press, please give this man this copy, he has such a hard time to get American or other literature into Russia then. And he was very grateful for this. And at the following AGU meeting in Helsinki, I arrived there late and already the conventional first evening party was in full gear. And Obukhov, when he saw me, came with two glasses, and said well lets toast to the "Steppe" field program which he had.

Sharon Nicholson: Oh, very good, I'm glad you set the record straight on that, there was a perception that there was conflict between…

Heinz Lettau: Oh this is conflict that is natural when science has progress. So this is about the concept. I believe you should have a look, but it is very

difficult to see around this globe. This is full of little needles, which are points where I had visited, either doing some research there, or getting people to cooperate with publications. You see, they are, of course, very densely represented in South America, in Chile, Peru, in Brazil, and even up in Venezuela, where I was invited for a short seminar.

Sharon Nicholson: I recall, thatat your retirement party, John Kutzbach joked that you and Dr. Schwerdtfeger got together and decided to divide the world into two hemispheres, that you'd take the northern, and he'd take the southern. But your globe proves that you also did quite a bit of work in the southern.

Heinz Lettau: If you turn it around, please, do me a favor and give it a 180° turn, and you see that Africa is also nicely represented, and down to Australia.

Sharon Nicholson: So you moved into Schwerdtfeger's southern hemisphere too.

Heinz Lettau: After I have no complaints of being a "homebody." Not anymore, nobody can force me into an airplane now.

Sharon Nicholson: When is the last time you flew somewhere? When is the last time you went abroad?

Heinz Lettau: Well, the last time I travelled was, maybe the visit in Madison at the 50th anniversary of the department. That was in '98. It may have been that I had been in Washington, one year later too, because of our great-grandchildren coming of age. But they are ready to visit us here. It's from Washington only a one day trip like really a flight from Tallahassee.

Sharon Nicholson: So you were travelling until you were just about 90.

Heinz Lettau: Oh ja, that is right. Now it is too cumbersome to wait, and inconvenient when you are not… I always tried to travel in first class, but very really, you cannot do it from here and it's very expensive. Let me say one more word on which I saw on your list, about German meteorology …

Sharon Nicholson: Oh yes, you are going back to some of the questions I had.

Heinz Lettau: OK fine, this was not touched before… But then you had a question about what was the reason to go to Africa in 1938.

Sharon Nicholson: Yes, we may have covered that already.

Heinz Lettau: OK fine, I saw it only on your…

Sharon Nicholson: It was one of the questions.

Heinz Lettau: You see it was really, I may repeat it once more as best as I could do it. The reason to make this particular trip to central part of Ruanda-Urundi near Lake Kugoma was, in 1937 there had been an approach again, internationally between Germans and some other ones. There was an international meeting on bio-meteorology was either in Frankfurt or somewhere along, either in one of the Benelux countries, or Frankfurt, I don't know. And Professor Linke had made an arrangement at that time. Professor Linke was my doctor… I liked his lectures on climatology in Frankfurt. He had made an arrangement with Belgium, and, of course, also with Britain, that it would be desirable to develop this region of Runada-Urundi, around Lake Kivu, which is about 1200 meters above sea level. At least it is a level where malaria is practically non-existent. Secondly, Lake Kivu is one of the few substantial bodies of water which has no crocodiles. I was swimming in that but always had the feeling that maybe one of these reptiles had found his way here. But after all, the only outlet is so full of cataracts that, really no crocodile could manage to get from Lake Tararipa to Kiwu. The idea was to develop this as a spa, lets say a sound region for developing healthy resorts there. The major point was that at that time in the late '30's people were still afraid of the sun in Africa. They said it was especially dangerous, the South Africans, the Boers, were always saying you had to have a felt hat, a double thick hat. One thick hat was not enough. The Britishers had these heavy cork helmets. The major point was, Linke composed the group of five people, one geographer from Frankfurt, one botanist from Heidelberg, Orth, who was very interested in spectral distribution of sunlight under tropical forests, then there was Büttner who had been established later a long interest in skin reaction to sunshine. He had quite an instrument cargo, and for quite a number of years later, I had spots on my skin which were exposed for 5, 10, 15 or 20 minutes. The first thing was always to make the albeto measurement.

Sharon Nicholson: This was in the 1930's right? 1938?

Heinz Lettau: Ja, ja, then there was Suckstorff, who was interested in tropical thunderstorms, and had very instruments. I was there measurements of radiation, nuclei and condensation on the ground, there was another instrument available at that time to measure the content of solid particles, by having a pump and making a jet of air into a sticky layer and counting under the microscope.

Sharon Nicholson: Do you think you still have the data on the condensation nuclei?

Heinz Lettau: Well they are enclosed in the report, which was a publication of the Sachsonian Academy of Science.

Sharon Nicholson: So they would be in there.

Heinz Lettau: Yes, it's in there, especially Linke was interested in comparing the red part of the solar spectrum to generally what his idea of the turbidity coefficient was. The red and blue turbidity coefficients, I presented the results in a diagram, plotting red against blue. We began that in the Mediterranean and then in the Red Sea, and in the Indian Ocean in the monsoon at this time, and finally up in the highlands around Lake Kivu. We stopped at last, in Angola, at a farm there, a coffee plantation.

Sharon Nicholson: This is incredible, it seems to me that some of these measurements you made concern baseline measurements…

Heinz Lettau: Right, the major point was we were demonstrating only, and this I believe was an agreement between Linke and some of his colleagues in Belgium. At this time, the Runada-Urundi region was a Belgian colony, under Belgian administration, let's call it this way. It can be reached by public transportation, so not really by rail, but you could go by rail to Ujiji, there with steamboat traffic up to the northern part of Lake Tanganyika, and from there you could have a 20 mile or 30 mile taxi ride up to Lake Kivu. But we did it the other way around, Büttner and I arrived at Lake Kivu by going by rail from Dar es Salam to Ujiji, and by steamboat from Ujiji to Kingolvira, and from there by taxi, over the very interesting mountain road, at this time very nicely passable by car already, to Lake Kivu. Then back down to Lake Tanganyika, and again by railroad to Lualaba, Lualaba upward by a very slow ferry boat, pushing barges, but having accommodations for about a dozen men as passengers. Just a few years ago I saw a picture of a Britisher travelling up to Lualaba, and

this was the same boat, a back paddlewheeler. It was just the beginning of the rainy season, at the end of the dry season and the Lualaba was very low, and we got caught quite often on sandbanks. The technique was to let one of the boys carry a line or cable and tie it to the next tree and pull it. But we then reached a region where you could travel by the Lualaba railroad to the coast. The demonstration was in three respects, general agreement. First was to demonstrate that you could reach this sound region by public transportation so to say. Secondly, that you should not be afraid of the dangers of the African sun. Nobody in South America was wearing a habit or so, why should it be different in Africa. But people believed that.

Sharon Nicholson: Well apparently now there's concern about that because of UV radiation and skin cancer. It's turned around…

Heinz Lettau: Well that's right, but again at that time it was not fully appreciated. Büttner had done some work on the different kinds of "melanismus" and the reaction of the body to the ultra-violet "B" and the high energy ultra-violet, there are two different kinds. So this was Büttner's part of the work.

Sharon Nicholson: Very interesting. OK let's terminate this session and go to another tape. No, we have a couple of other things we're still going to deal with. What else did you want to mention?

Album 8 Track 1

Heinz Lettau: Again, here I could say that the meeting in…

Sharon Nicholson: This has to do with my question on German meteorologists?

Heinz Lettau: You are seeing here, Sutke, Merica, Kleinschmidt, Higger, Helmholz, and Ketzke, these were of course, the leading spirits of German meteorology around the turn of the century from the 19th to the 20th. Kleinschmidt was of course still in Göttingen, but before that, it was, of course the Conference of the Directors. This was the forerunner of WMO and there was always a very strong German presence. I believe there was a conference meeting in the early '20's, which was without the Germans.

Sharon Nicholson: I am trying to find… There doesn't appear to be anything about that in here. What we are looking at is a pamphlet called "The Life Cycle

of Extra-tropical Cyclones" and a photo album put together by Mel Shapiro, at an international symposium held in Bergen, Norway in 1994, and this is about the development of cyclone theory. And you said there was something in the meeting that is relevant now?

Heinz Lettau: Right, may I refresh my memory on this… Ja… No. No…

Sharon Nicholson: This is it, 1921?

Heinz Lettau: No it is not the one. Maybe we should look at the index? Oh ja, this is what I wanted to say. You see, this is the international aerology foundation of 1921. At this time Germany was not at the meeting, they were still, let's say, under the aftermath of World War I. So, but before and later when you saw such pictures from the international aerology commission, they met also every three years, the strong German effect, or influence, on the development of aerology was quite obvious. The following meeting in 1920… This was '21, then either '25 or '24, at Leipzig, showed that still, the old timers were there, like Linke and Weickmann, of course, and a few more. But previously the effect of Germans on the science was even stronger. Now the old timers are, of course, gone now, there is a young generation, especially by the strong support by the Max Planck Society, for one. It was of course quite interesting that one of the Max Planck Society of applied chemistry elected Junge, Christian Junge, as director. He was not very successful, because most of the "lab- type" of chemists were not very happy with meteorologists at the end. But he stayed through, and unfortunately died, too early.

Sharon Nicholson: But they have a few more eminent people over there now, in atmospheric chemistry, Andreae for example.

Heinz Lettau: But now is of course, all over the world very strong national groups, always working together with international groups relying, not in Germany, on American funding.

Sharon Nicholson: Yes I think they've got groups that excel in areas like boundary layer, and atmospheric chemistry, and probably radiation, remote sensing…

Heinz Lettau: This is of course…

Sharon Nicholson: Climate modeling I should mention too.

Heinz Lettau: This is… Look a little bit into the background… When I'm looking back at the first years, let's say, of the important recognition the aerology is important. The American Weather Bureau established in the '20's, a network of captive balloon and kite stations, from North Dakota to Texas. There were 7 or 8 stations. And the each of… Like the observatory in Lindenberg had two techniques, either by boat going upwind, and releasing the captive balloons and going then with the wind, downwind at the eastern end of Lake Constance, or going to the eastern end, when there were strong west winds and releasing a kite and getting the data. This was one of the very early aerological demonstrations. The network of kite and captive balloon stations in Hamburg, Lake Constance, and one in west Germany, and one east of Berlin, these four were really the first substantially useful data set which Richardson used for his first weather computations.

Sharon Nicholson: It seems to me that the Germans were active even as early as the 1890's in aerological observations. Didn't they do some aerologic work in east…

Heinz Lettau: Say it again?

Sharon Nicholson: I think the German aerologic work went back to the 1890's, the 1900's.

Heinz Lettau: Oh yes, sure. But this was mountain top observatory, like the Zugspitze in the Bavarian Alps, and the snow cover near Breslau, in southeastern Germany, and then the Hamburg "seewarte" was their captive balloon and kite observations, and at Zerbopen in the middle, at the Harz Mountains.

Sharon Nicholson: They had also made some observations in East Africa around the turn of the century.

Heinz Lettau: Oh well sure, there were. In our country, here, the best known, and longest operating aerological stations using kites, most of the time kites, was on Blue Hill, near Boston. But really this chain of stations, in Humphreys' "Physics of the Air" it's very well documented. Humphries introduced at this time, not the term boundary layer, this only appears in the meteorological literature, in my book in 1938. But Humphries clearly recognized, what do you call it, the thousand meter minimum, and 500 meter maximum of wind distribution. That means that the Ekman spiral.

End of Tape 6 Side B (only 38 of 45 minutes used) End of Track

1 Album 8

Tape 7 Side A Album 8

Track 2

Sharon Nicholson: This is Tape 7 in the interview with Heinz Lettau, this is the first side. One thing that we had wanted to come back to, in chronological order, was your first position in here in the United States. And the was what I believe later was called the Air Force Cambridge Geophysical Research Center. I think you have another term that you used for it. GRD is that what you referred to it as?

Heinz Lettau: When I joining this outfit, they were called the Geophysical Research Directorate of the Air Force. But before, during wartime, the installation in Cambridge, Massachusetts was called simply, Cambridge Laboratories, and this was the place where quite a number of eminent scientists, physicists, engineers were collected for developing and improving military equipment like… The civil engineering professor in Madison, with whom I very often worked together, he had been working at Cambridge for the development of the acoustic system to locate undersea boats, "U-boats". All the weaponry, and so and so on, not along the lines of the conventional development of military equipment, was concentrated in Cambridge, in connection with the MIT. So, I am not really qualified to say anything about that time, it was beyond my grade, my "need to know."

Sharon Nicholson: When did you arrive there?

Heinz Lettau: The thing began, of course, with the widening out, and let's say, except of course, the development of the atomic weaponry, which was a different branch of the development. But everything that was not directly related to the atomic bomb was then concentrated in this Air Force group called the Geophysical Research Directorate. The Army also had tried for a while, apparently, and beginning with their…

Sharon Nicholson: OK, I'm sorry for the interruption, please continue.

Heinz Lettau: There were of course people with the Army, partly at the Natick Labs, where they were developing clothes being used for the tropic warfare, or arctic warfare, etc. etc. Then there was the Signal Corps, which had research headquarters at Fort Huachuca,in Arizona, near the Mexican border. At that place, Fort Huachuca, where for

instance, they were first getting successful radar echoes from the lunar surface, etc. etc. But, by and large, the efforts by the Army, as far as I can say, to support basic sciences were decreasing and finally it really stopped. In fact we had to suffer in Madison about it because a major portion of our development experiments on the ice at Lake Mendota were supported by funding by the Signal Corps, and the Fort Huachuca group of the Army. Still I had a very good contact, in fact indirect support by the engineering group… Not the Signal Corps, but the group in, near Boston.

Sharon Nicholson: The Cold Regions Research Lab?

Heinz Lettau: No, the people who were developing the clothing and so forth, for tropical and arctic warfare, the Natick Lab, in Natick.

Sharon Nicholson: At one point it was called the Cold Regions Research Lab.

Heinz Lettau: Right, now I made a for a while, at least, a blunder, at least with no far reaching consequences. In preparation for the International Year, there was an effort to maintain a station at the South Pole. I was asked, while managing the micro-met program for the Air Force, I was asked if the Air Force should go into micro-meteorology at the pole. I said, well not immediately, because you have to establish good conditions for doing this, because micro-meteorology is work with very delicate instrumentation, and if you have cold fingers, it will not be very successful. But fortunately, the Natick Group was not handicapped by this, they went immediately and sent, later my friend, Paul Dalrymple. First with the expedition to Little America, and then Paul was one of the few who wanted to stay for two years there, for a second wintering, and for the second winter he went to the pole. And when he came back, he had gone to Washington and shown his results, very carefully on very large, safety-lock papers, his results of wind profiles, several hundred of them, partly from Little America, and half of it from the pole. Harry Wexler called me and said we are here in Chicago, at a special meeting, and I just have beside me Dr. Dalrymple from the Natick Labs, and he had done very interesting, and apparently very good looking micro-met work at Little America and the pole, at the South Pole, and if I would be interested in looking at it. Oh yes, send him over. And he came the next morning to Madison, the red building, when I was not any more with GRD, in my first year in Madison. The Quartermaster Corps, at Natick, the Quartermaster Corps it was called. He was a little bit unhappy that I noticed a few of the temperature profiles, showed an

elevated minimum. I said Paul, this is very interesting but we have to put this aside. He wanted to protest a bit, I don't know, wait a minute, we will come back to that later, but first let's look at the ordinary profile. It was really a special problem to find why, so often, at Little America, which is of course, quite different, it is on sea ice, on top of a glacier which underlain by the ocean so there is a continuous heat flux coming up. Of course, the rest was quite intriguing, he had snow temperature profiles down to 8 or 10 meters, and this was fantastic. I said Paul, you have a treasure here, and so he went immediately into a session and he said he will arrange for me coming to Natick to do the work, the analytical work, together with him. So this was for me, only a chance to get into this really intriguing data material. It became a very nice cooperation, especially because it turned out that, especially at the pole, the radiosonde data, together with the micro-met data were a treasure of information. We coined later the term, inversion winds. Now with the latest development here, we have a new term, inversion winds was also one of the ideas which came out of Werner Schwerdtfeger's and my work on Arctic and Antarctic, partly in Greenland, and partly in the Antarctic. I also had some words to say about sending a group from the Quartermaster to the extreme, the so-called, three winterings at the highest point of the Antarctic. I forgot the name at the present time. But the first man there was a Master's student by Werner Schwerdtfeger. He was not very broad-based in science, but the second man, was the man from Austria, Mike Kuhn, you may have… He was professor at Innsbruck… He was just having his degree from, and immediately suggested that at this station they should try the optical system of temperature gradient determination, because they were still puzzled by, not puzzled, but really intrigued by the calibrated minimum, and other, let's say, really vehement distortions of temperature profiles in the polar night, when there is really no other reason than internal convection, or something like this. This played very, very nicely with the distortions shown by the idea, which had been developed when Sparkman came to Madison as a student. I gave him the idea. His task was to study distortion over the lake. He followed this up by making distortions in hot air weather, with the time and distance bar varied, the height of the camera varied. We made quite a lot of these things and apparently later he was paid back. Chuck's told me that these investigations were helpful for the range finding to be used for an artillery barrage in the gulf war. So this was way beyond me, I am not any more interested in wartime application of anything, but other people are. Anyways, out of this, more or less, accidental meeting, Dalrymple

came to me with his material, and there was quite a successful episode later.

Sharon Nicholson: How did he measure temperatures to a depth of 10 meters in the ice?

Heinz Lettau: Well you dig a deep pit and put that, in the side wall, the thermometer and fill the snow back in again.

Sharon Nicholson: Ah, OK.

Heinz Lettau: Well, well, this is the usual technique. I think for the great plains turbulence heat program, we only had two groups were doing such things. But they had only to go one meter deep, because this was the farthest the diurnal wave can go, but the annual wave can go up to 10 meters. The real point, what flabbergasted good old Siple, when he came to the pole, he had been with the early Byrd expedition, not an "early bird" but the early expedition by Byrd, Admiral Byrd, to Little America One, before World War I. And he knew that Little America One, or Two, you are not too far from the Arctic Circle, so the tautochrones are really quite symmetric. But if you are going to the pole, where you do have the coreless winter, that means there is a very good half a cosine function for the insolation, but from then on the nocturnal radiation is flat. You must expect the lowest temperature at the beginning of the winter, because the temperature at the surface is still very high and the loss of radiation is not. But the loss of radiation decreases, so we get, not only a coreless winter, the minimum practically at the beginning. This was not known to Siple, so when he started, arriving at the summer, the half year long summer at the pole, he began to dig. And dug deeper and deeper and found a bulge in the temperature, and found that the temperature down there was still, let's say that, so that when he used his experience from Little America One, he predicted a negative temperature of 120° below zero. This was of course wrong, because he assumed also that the curve would dip down to the end of winter. He was not aware that at the beginning of the winter it is already at the minimum. So he extrapolated and said there was still the deep bulge coming, and made a wrong prediction and he was never really clear in his mind, about what caused it A very nice old man but he was exactly selected by Byrd as a member of his first Little America One expedition as a Boy Scout, who came fresh from the land and had only some ideas on surviving techniques in the cold climate, but not scientifically important…

Sharon Nicholson: But isn't he the one who developed the wind chill index?

Heinz Lettau: The what, please?

Sharon Nicholson: I think Siple is the one who developed the wind chill index, isn't he?

Heinz Lettau: That could very well be.

Sharon Nicholson: Yes, he developed the wind chill index for his doctoral dissertation.

Heinz Lettau: But what they now call the true feeling is a little bit more sophisticated. But of course, these ideas were not very new, because Linke told us about, he was interested in all aspects of bio-climate. He said there was a thermometer called a "Cata" thermometer, which had only two marks on the capillary, you exposed it and just stopped the time it would take for the capillary to reach from one, to the other mark. The time was the measure of the field, "feld" temperature.

Sharon Nicholson: Ah, you mentioned that Paul Siple's prediction was minus 120°, what was the actual minimum, do you remember?

Heinz Lettau: Well, I should…

Sharon Nicholson: That's OK if you don't remember, that's OK.

Heinz Lettau: No, and I don't dare to pull something… I had reported about this in a paper by the Academy of Science, now this which is the one apparently not read by climatologists, because someone later discovered the same feature. But I called this, this is my paper called the "Antarctic Atmosphere as a Test Tube for Theories." Because you are getting all things which you know from the diurnal variation, and need some kind of another projection, some things taken apart, some things condensing, so I call this a test tube, and I think this is still alright. We are still planning, together, after we are done with the Pleistocene glaciations, the Greenland as a test tube, because Greenland is better the Antarctica, because it is closer, has still a well defined winter, sunless winter period. But it has a more compact structure with one peak. It is a little bit unhappily elongated to the south at Breespitze, like a tire, but otherwise it is also a good test tube for boundary layer theories.

Sharon Nicholson: Well, we got on to this discussion when we were talking about Air Force Cambridge. I was wondering if you could tell me more about

some of the other eminent people that passed through there during your time there. Who was the director, when you arrived there?

Heinz Lettau: Well I had at least four different directors. To begin with it was an officer, I cannot recall his name. But there was always the Chief Administrator, Mr. Greenberg. And there was the second man, I remember definitely, when we had made the move to the Army base near Boston, in Watertown, the Watertown Arsenal. The first one there was Thompson, Phil Thompson, and he was then… Thompson I believe went to EDCAR, which meant the end as a director. The next one was Helmut Landsberg, but he was there only for a very short time. But really, the man who was staying all the time was Greenberg, the administrator, and he later became director as well. I'm a little bit hazy on the administrator of things. Of course I know more about the German scientists, who were hired, first together with me, this was Rudolph Pendorff, as an expert on ozone measurements in the upper atmosphere, and then Dieb, Max Dieb, he was professor at Karlsruhe, and like most of the people who were ready to accept a year on probation, for coming as scientist to the outfit here in America, they returned after one year. Their position still existed and began to build up again, so Dieb returned to Karlsruhe. Then we had a few physicists, being the nucleus of our GDR at Fort Monmouth, New Jersey. There was one theoretical physicist from Darmstadt, one from practical physicist from Munich, who had been… Everyone one of these had specialties not directly related to atom physics, to molecular physics. We had two or more who I had little contact with at Fort Monmouth. All of the went back to Germany except for Pendorff. Pendorff and I stayed on and remained with GRD, Pendorff really up until he died, I believe. In between, came Wahl, Eberhard Wahl, as a scientist with the interest in orbital rocket work. Of course there was one group of German scientists, under Werner von Braun, who were the rocket people…

Sharon Nicholson: And they were there?

Heinz Lettau: Ja. Who were also introduced by the Army. Then of course, there was the other group with Helmut Weickmann and Offenkamp, who were originally specialists in glider flying, especially in the use the mountain waves, the lee waves. And Butner really had been quite successful in reaching very high altitudes, but he gave up the job… He was also with GDR in Boston, and later on he became a bureaucrat with the WMO.

Sharon Nicholson: Well I think he was also very instrumental in a lot of science endeavors…

Heinz Lettau: Right, now if you want to ask me about the other scientists there.

Sharon Nicholson: I was thinking about some of the eminent visitors you had mentioned. You started telling me that Phil Thompson was responsible for the O'Neill experiment going through, despite the fact that a visitor suggested…

Heinz Lettau: Well, my agreement was really that payback from all of the instrumental development made for different groups did different aspects of the problem. The people in Texas were more or less only interested in soil physics. At that time, Butner was there too, and he changed later on to California, and later to Seattle. At the time when I was managing this program, on micro-meteorology, he was with the Texas people in Austin. Then we had Texas A&M, and we had as a mainstay the Thornswaite group, which at that time was working in connection with the Johns Hopkins University. Then there were… We had… I was looking around at this time, for some group or university who was interested in doing work on atmospheric chemistry, especially I was looking for the CO_2 measurements. Which were very successfully done in Bavaria, but I had found no taker for that. But unexpectedly, Professor Regner, from Albuquerque came to see me. He had developed a trailer for ozone measurements, and could come to O'Neill and make ozone measurements. He was interested the surface of the earth as a "sink" for ozone, which of course is always generated at the lower stratosphere, or the upper stratosphere and coming down, which of course destroys it, as a natural thing by the ground. Then we had the MIT group, which MIT maintained for a while a ground station near the bay of Massachusetts, Buzzards Bay. This was two people at that time, working there were only supported by this program. This was the instrumentalist and the head… Who went later to Oregon.

Sharon Nicholson: To Oregon, was it Gates?

Heinz Lettau: Really, this was only a group at MIT which was supported by GRD, and important for our work. They had equipment for a tower, up to 40 meters.

Sharon Nicholson: It may come to me, but I can't remember his name.

Heinz Lettau: So, I said here, they are interested in various aspects of micro-meteorology, the only real payback will be when we can connect them a one point and support it again. This I had later also learned from the boundary layer research in Antarctica, when we can support it by aerological measurements up to the top of the boundary layer. This was easy for the Air Force, they could immediately relay, or send there one of their radiosonde stations mounted on a trailer. The Air Force, of course, could also supply a generator station for the site because there was no electricity, even on a really ideal piece of land. I had sent out twice people possible zones between North Dakota and Nebraska. They found this O'Neill site as the best one. Then we had this group in California who had developed an improved system of the drag plate, the Shepard's drag plate, which was developed in England. They had improved it, so my point was let's take them all together for a limited time, when the university system permits it. The end of the summer, before the winter, or fall semester begins is really very favorable. I had one boy doing… First of all, using again this network of radio tied and captive balloons, they had one in Nebraska. This showed there is a very good chance of a low level jet stream development at nighttime. And with a climate of this type, which part of the year has the best chance for uniform, southerly wind currents. We had to think of arranging all of these studies along one line, and it was desired to be perpendicular to the wind. So there were 10 or 11 people contributing to it. Well, Thompson was clear, he had seen the advantage of it. And Batchelor said, oh I think it is better to spend this million dollars on research and projects. He stayed with me

Sharon Nicholson: Good for him. So if it was a million dollars then in1960 or '61 is that…

Heinz Lettau: Well, actually we carried out the program in '53.

Sharon Nicholson: In '53? So a million dollars in '53…

Heinz Lettau: One of the fortunate things was that I had that man, Günter Loeser, had come from Germany too. I had not mentioned… But he had been with working with the German Army, and especially the Artillery, as a meteorologist. When I told him, what I need is a system by which you can measure wind speed and direction simultaneously, at least 6 or 7 levels. I was really looking for something getting free, from either the sounding up and down or release of a balloon which travels away and so and so on. And he

designed two methods which were extremely interesting in their application. First of all, for daytime measurements, smoke puffs, a chain of smoke puffs, created by one rack, which had 10 cartridges on it, which was brought up by a helicopter, and fell down, detonated just by timing until it reached the ground. The Air Force had, of course, also crews for double theodolite measurements, which were on the site too. And at nighttime, he proposed a system where a dozen or so pilot balloons carrying lamps, were prepared and hand-carried upwind, and released in set temporary timely sequence so they arrived at the point, common point of view of the two photo-theodolites at primary vertical line. Now, our military commander loved, of course, this method, to having balloons marching up in line. We were all a little dismayed, it really didn't work well enough, but fact, it worked well enough. Because we had to rely on the one balloon carried away, establish distance, time out, and then project this, the upwind, and this took time, and in the meantime the low-level jet stream developed a little bit more. So the balloons marched up in one vertical line but they were all distorted. But anyways, this is not a problem. In fact the discovery of the low-level jet stream in the Great Plains, led some people wrong. Because, I also had the idea that maybe it's just a disturbance due to convection at daytime. But it was possible to explain that, because the maximum at O'Neill at some time was at 300 meters, wind speed of 24 meters per second, while at daytime, the profile had hardly more than 11 or 12 meters per second. So more or less doubling the speed at 300 meters. What Blackadar apparently forgot completely, that originally the jet stream was discovered in Africa, by this Britisher, who discovered the low-level jet stream at the Somali coast.

Sharon Nicholson: Oh, Findlander.

Heinz Lettau: Finlander, yes. And Finlander said this was a daytime phenomenon, and so how can one say at O'Neill, the low-level jet stream is the consequence of having the restraint of the vertical profile during convection and that this is released at sunset and begins to pick up and overshoot by inertia movement. Two reasons for this being wrong, first of all inertia motion is without force, but the jet stream, low-level jet stream is still a force, a reaction to force function, put it this way. And when you explain this low-level jet stream as a nocturnal reaction to release of the convection, then why can't Finlander define the low-level jet stream at daytime?

Sharon Nicholson: I don't think that's the current explanation for it, but I can't quite put it into words.

Heinz Lettau: As long as you can have low-level jet streams, even at Greenland, even at nighttime…

Sharon Nicholson: OK, I think if there's any other questions of those days, can think of any other eminent visitors, you might want to mention that came to Cambridge?

Heinz Lettau: At Cambridge?

Sharon Nicholson: Yes.

Heinz Lettau: Well, I should say there may have been one, the only one that really came to visit the GRD was Thornswaite. But in preparation for the O'Neill program, I had gotten the permission that the MIT could sponsor a symposium of very well renowned scientists who would be discussing the problem. And I made really dependent a little bit, on the outcome of the symposium, that we should go ahead with the expenses of the field test or not. And among the people was Shepard from England. There was Thornswaite, there was, of course, Suomi, and where do I have the…. I have, of course a photograph taken of the group, and there were also a few of the GRD people in there. But this is the best I can say to answer you information.

Sharon Nicholson: The expedition, you mentioned, was about a million dollars, the field experiment was about a million dollars, that would be about 5 million dollars in today's dollars.

Heinz Lettau: You are talking about the O'Neill program?

Sharon Nicholson: The O'Neill program, right. How was it funded? Did each person have to submit a proposal for their individual funding, or did you get a million dollars and you chose people to work with you?

Heinz Lettau: No, this of course, came out of the general funding of the GRD. It was GRD who paid the bill, but unfortunately, it became much more expensive than planned, because we lost one helicopter and 5 people, among these was Loeser.

Sharon Nicholson: Was who?

Heinz Lettau: Loeser, died. When I arrived at O'Neill, I think it was the 31st of July, I met Loeser, who had been there in preparation, and of course, all the other ones. We had agreed that the 1st of August would be the day we were prepared. The arrangement was with the weather bureau in Kansas, the weather center in Kansas, to give us forewarning of at least 10 hours before, or 12 hours before, a period for which we could expect a southerly wind current at O'Neill, lasting for at least 24 hours, or 20 hours. After I arrived, after having paid a visit to Kansas City, and came up by car, I met Loeser on the street…

Sharon Nicholson: OK, go on.

Heinz Lettau: Well, I met Loeser, here is a picture of that meeting, beside the big paperclip. And he told me, well I would love to report to you today that we are ready. But I cannot say that but the helicopter which is here has problems with safety. I said, well, they will know what to do, but don't worry, we cannot really absolutely insist that you should be ready by the 1st of August. But he apparently persuaded the pilot and the people, all the other three people who were scheduled to handle the racks the cartridges and the powder. They went up and the helicopter really crashed down and 5 were dead. This was a very, very bad beginning, I really didn't recover from this during practically the whole field test. Even though all the other people, except Suomi, said it was really a wonderful time to be able to talk to people because, after all, the schedule was for all the participants only to be active and doing their work, only when there was a general observation day, when all of them were ready. So in between they had time to do their own thing. Especially the Iowa group, Casanda and the other boy, who killed himself later, Casanda, well anyway, they were talking about all the new developments of electronics and so and so on. They were at the beginning this time, there was with the Iowa group this time…

End of Tape 7 -- Side A End of Track 2 Album 8

Tape 7 Side B Album 9 Track 1

Sharon Nicholson: This is the continuation of the interview with Heinz Lettau. Is there anything else that you want to mention?

Heinz Lettau: The worst thing was I had Ben Davidson there too, at the unfortunate incident, we had to take care of the bodies. Loeser had brought his youngest, his oldest boy with him there. He had to be flown back to Boston. The Air Force could do all of this, of course, they were prepared for such emergencies, I was not. And Eberhard Wahl was a little bit unhappy, that it was up to him to talk to go to Mrs. Loeser in Boston where they were living, and inform her about it. It was really a very, very bad beginning, and again I could enjoy it only, finally, after we were beginning the evaluation of the data.

Sharon Nicholson: So it was a, pardon me, it was also a major triumph in terms of micro-meteorological data, wasn't it? Do you feel the experiment was overall a big success? Despite the very sad…

Heinz Lettau: Oh well, there was in no time, there was a replacement helicopter, and two more Air Force personnel to handle the smoke racks. The other Air Force personnel, the generator for electricity, and the personnel with the double theodolites. These were still optical ones, I mean there was always something, I really was a victim of the end of one period where you had recorders, which were electrified and optical. But nowadays everything is going silica, digital. The same is true on my double pendulum, a very sensitive instrument, but purely mechanical. But nowadays this is not a problem anymore.

Sharon Nicholson: Well I think I've finished my questions. Is there anything else you'd like to talk about in the interview?

Heinz Lettau: About what?

Sharon Nicholson: Oh, I've finished my questions, is there anything else you would like to talk about for the interview?

Heinz Lettau: No, I think you gave me a chance to unload my soul. You see, I can only say that this highly valuable material, nearly two years of data…

Sharon Nicholson: You're referring to the work in Greenland by the French?

Heinz Lettau: Because, it was published in French.

Sharon Nicholson: Yes.

Heinz Lettau: That is practically taboo for any American.

Sharon Nicholson: Yes, we've seen that all too much, haven't we?

Heinz Lettau: Even then, this "cente cousime"…

Sharon Nicholson: Yes I can read French.

Heinz Lettau: You better read it.

Sharon Nicholson: I not so sure we need this in the interview. (French audio.)

i.e. turning from H to H is come so anti-cyclonal about 45°.

Heinz Lettau: Well, you see this was unfortunately the only statements which were general. He, the man who did it, Mr. Videl, Messieurs Videl, was simply again an observer. He made beautiful observations, and good statistics, but he had little knowledge of what really could be done.

Sharon Nicholson: Again, now let me summarize, what I think this is showing. I think you were basically explaining that this was an example of where the Atkins spiral doesn't work.

Heinz Lettau: Where it looks like the theoretical spiral developed by…

Sharon Nicholson: And it appears that a jet stream, a low-level jet stream, formed here in Greenland, is somewhat analogous to…

Heinz Lettau: This is here, this is only when the wind is from the southwest. You see, this station is only at 2000, well practically at 3000 meters. The peak is at 3200, so it's 200 meters lower than the peak, but nearly 200 kilometers away. And anything which goes there by geostrophical balance, can produce, and this would be a wind which runs anti-cyclonically around the peak. But these winds here, where you do have the turning to the left, or the low-level jet stream, they are really defying the geostrophical equilibrium which Ekman assumed as the main starting body.

Sharon Nicholson: So these were made in September of 1949 through August of 1951, so this pre-dated the O'Neill experiment. So you are saying this is somewhat analogous to what you were seeing in O'Neill in the low-level jet plain, the low-level jet in the Great Plains.

Heinz Lettau: I had no knowledge of this, in fact I had no knowledge of the work by the French group, this goes by the name of "Victor Expedition" to

Greenland. When Dalrymple came to me with reports from the International Geophysical Year, this was even later. This was ’49 to ’51, O”Neill ’53, the geophysical year, 1957 to ’59, this was the timing. So, from them on, of course, the idea of having international experiments grew. What people told me was, the organization of experiments in Australia, the so-called… They had made two experiments, one in the southern part of the western zone, and one in, near Port Darwin in the eastern zone. They used native names for the two directions of the wind there.

Sharon Nicholson: Oh, yes…

Heinz Lettau: “Wingara” and… the other began with “O” in the east…

Sharon Nicholson: The Wingara experiments…

Heinz Lettau: These were designed really for synoptical meteorology. These were two to three weeks of observations, from day-to-day, always the same. O’Neill had a definite selective approach, which was only during southerly air currents, forget about north wind observations. This really paid back.

Sharon Nicholson: Was your former student, Turner, involved in those well know Australian experiments you mentioned, Wingara and the other one?

Heinz Lettau: Well the man who was responsible for these experiments… I met him, still he was suffering from cancer I believe, on my second visit to Australia, where I had been mostly in Adelaide. The reason for my second trip, my first trip was by invitation to a meeting, a symposium in connection with the establishment of a micro-met lab near the capital…

Sharon Nicholson: Canberra.

Heinz Lettau: Canberra. Phillips was among the people there. The second was more or less on my own to visit my son who was as an Air Force Major, in charge of a detachment of American people in Woomera. This is the rocket… the rocketry station, the field experiment station of the Australians.

Sharon Nicholson: Well, I’m going to say thank you very much for this interview. It’s been a real pleasure for me. It’s opened my eyes to so much meteorological history, and geophysical history, it’s just been

incredible. So, thank you very much for your participation in this project.