CHAPTER 3
Move East to go South

A job offer of $10,510 was more than adequate. I was even a little embarrassed at such promised riches. No one in my family earned wages at that level. In Admiral Byrd's day men either paid to get on to an expedition to the Antarctic or were paid a token $1.00 plus provisions while in the Antarctic. This was a position of high privilege. This appointment was a gift of adventure. Few positions for a new graduate held so much promise of discovery. Without question I was the envy of all my classmates. Granted, with privilege, adventure, and discovery come uncertainty, risk, and fear. Suddenly my life was filled with preparations for the great trip South. First I would have to go east.

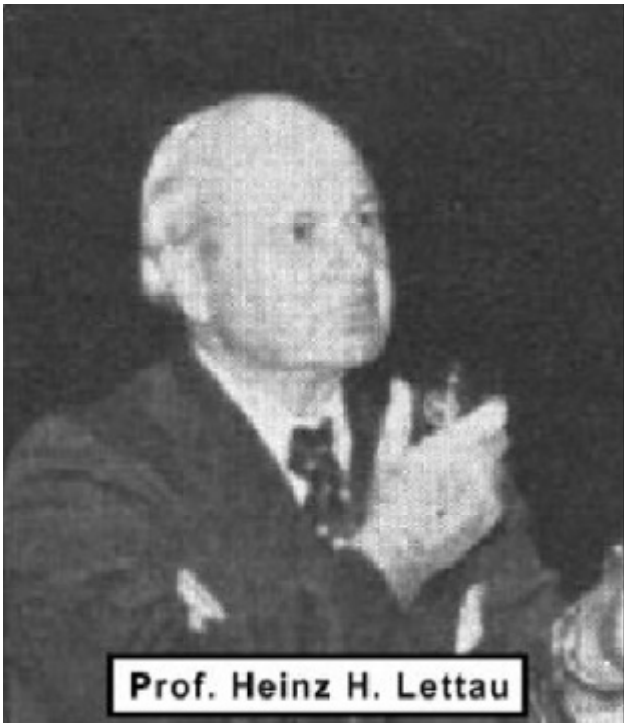
One trivial matter- I needed to finish my master's thesis in a hurry. "Wind Structure 50 to 150 Meters Above an Urban Area" was accepted and signed by Prof. Lettau. The conclusions, to me, were very exciting. I learned that the greatest loss of energy by the wind, when passing over the Twin Cities of Minnesota, occurred over the low residential area where most of the trees grew. The expected high friction regions over downtowns of St. Paul and Minneapolis turned out to have less friction. Many of the findings of the micro climatic changes over the urban area might have been a series of first findings but by taking two years at my research, many of our findings were published first by researches in other cities.

Graduating in June of 1965 with a Master's degree in meteorology was secondary to the need to plan for crash studies in polar meteorology. I did take one day off for that celebration. I felt the pride of reaching a great achievement. Tanna came to the ceremonies at Camp Randall Stadium. It was the only time she visited me at school and walked the paths of campus in the six years I attended the university. She raised me after I lost both parents in early childhood. She always encouraged me with my studies although she herself quit school in the fifth grade not seeing any value in it. It was Lettau who noticed her talking to me at the podium after the ceremonies and introduced himself to Tanna as my thesis adviser. I don't think she knew what a thesis adviser was, but the two of them talked for quite a while in German with me standing in my graduation gown with masters collar unable to understand what they were talking about. You tell me who was more educated? Tanna rarely spelled wrong, knew two languages, and provided for me without the benefit of a husband or provider. This was her gift to her dead sister. Whatever sacrifices she had made that I knew nothing about, she had raised me to this point of independence and now I was on my own with only a poor understanding of English. The master's degree was impossible without both of them- Tanna and Lettau.

In one meeting with Prof. Lettau, before I left for Washington D. C., he reviewed with me many of the things to look for in the Antarctic. In the anticipated extreme polar climate with snow surfaces very cold and with the sky very dark without a warming sun, stratified layers of air can produce

very complex temperature profiles. The introduction of instrument probes influences these delicate profiles denying the observer proper analysis. Subtle measurement methods needed to be invented. Lettau suggested to me that I dream up some kind of target for a camera to record mirage events photographically. These targets could be used to document visual mirages in many different stages. Photographic recordings could monitor the undisturbed passage of light. From the refraction of the light perhaps the temperature profile could be determined. Jim Sparkman, an older previous PhD candidate of Lettau's, did much pioneer work with this method photographing a boat house door through a few miles of air just above Lake Mendota. This was not part of any previous proposed project. Lettau just never stopped coming up with new ideas. This idea, one of many, I took to Antarctica.

Lettau also had a theory with which to predict the most probable lowest temperature of the austral winter on the High Plateau of Antarctica. A plot of the average daily temperature against the date for a full year at any place with normal sun rises and sets shows a cosine wave. In the interior of the Antarctic circle where the daily rising and setting of the sun are interrupted with periods of twenty-four hour sunshine defined as summer and a period of twenty-four hour darkness defined as winter, the temperature plot over a year's time displays a long flat winter curve. This truncated cosine wave was called a "kernlose" winter meaning that it was a winter without a cold core or that the seemingly lower and lower sweep of a cosine wave was cut off never getting to an expected minimum. At several interior stations in Antarctica the anticipated minimum never was reached. Many different theories emerged every year, some very simple, some incredibly complex. Lettau felt that the answer lay in the forcing function of the daily rising and falling of the sun in which its highest position in the sky mimicked the cosine wave. When the sun no longer was present the cosine wave was cut off. Once equilibrium was reached, perhaps after a few weeks of sunless days, further cooling should not be expected. That is exactly what a graph of the temperatures from a coreless winter displays. An answer about nature's puzzles should not be more complex than what nature displays, nor should the scientist look farther than the obvious.


Prof. Heinz H. Lettau

Lettau told me the normal methods of establishing the expected temperature range for this unexplored region. I would be on the earliest exploration team. Most likely we would be landing at the unexplored site in the warmest part of summer. The air surface temperatures taken the first several days would be very near the maximum temperature. Next, by drilling a deep hole into the snow and monitoring the temperature of each core of snow I extracted, I could get a view of past winters. By drilling deeper and deeper until I noticed that the temperature did not change any more, that temperature theoretically was expected to be the average temperature for the year. Normally the difference between the highest temperature and the average temperature is the same as the temperature change between the average temperature for the year and the lowest temperature. The normal method to predict the lowest temperature was as follows. If +10.0 ° F was the maximum temperature and -50.0 ° F was the unchanging temperature at the bottom

of a deep hole in the snow, then the temperature difference between the summer maximum and the predicted average annual temperature was 60.0 ° F. It simply follows that the coldest temperature would be 60.0 ° F lower than this predicted average of -50.0 ° F, giving -110.0 ° F. This type of prediction, experience showed, was repeatedly wrong. A kernlose winter for the same data I just used as an example would be closer to -90.0 ° F. Lettau wanted the opportunity to predict correctly the coldest temperature for Plateau Station. I promised to carry out these observations and send them to him.

I thought it odd that, as my teacher, he did not share the details of his theory for predicting. The essence of a teacher is to share everything and as my teacher, until this moment, Lettau did. I did not understand that now, as a professional meteorologist, particularly as a research meteorologist of the office of Meteorological Research (OMR) I was no longer a student of Lettau but a competitor. I never believed that! I don't think Lettau did either. When I finally made these temperature measurements somewhere between the unexplored High Plateau and the research offices of the warm university this promised communication failed to get through.

With weeks flying past, time in Madison was running out. Lettau continued to outline for me what type of wind profile to look for with my balloon launches. I remember Lettau emphasizing the need to look for and document the existence of "S" shaped wind profiles. What he meant can be described with little arrows. Let us imagine the wind is at our back as we face a particular direction, say north. Let me draw a little arrow, say one inch long for a ten mile per hour wind speed, and point the arrow in the same direction as the real wind is blowing toward the North. For an "S" shaped wind profile I looked for a series of winds increasing with speed and arrows drawn longer but sweeping to my right for the lowest part of the wind profile as well as the lowest part of the "S". The wind would sweep to my left and blow faster. The tip of my arrows, all drawn with their starting point or feathered end at the same point, would sweep out an "S" as the wind would slightly slow down at the higher levels and sweep back to the right. If such "S" shapes could be documented, a true discovery for meteorology would be made.

Many of these meetings Schwerdtfeger also attended. He insisted on the need to make the balloon ascents as slow as possible. The great temperature inversion was expected to be of a very large temperature difference, but only if the balloon ascents were in the inversion long enough could enough detail be achieved. If a thermistor, the device that recorded temperature, was moving too fast, it might still be cooling when it hit the warmer air above and give a false height for the inversion. Likewise, if moving too fast, it would not record the warmest and most important top of the inversion. A long acclimatizing of the instrument package on the ground would also be necessary to make sure the instrument recorded the true coldest temperature at the bottom of the inversion. Schwerdtfeger also stressed the need to take as many balloon soundings during the temperature inversion as possible. Since the inversion dominated the long polar night, the maximum useful data might be during the time of inversion changes while it is forming or while it is coming apart by some atmospheric mixing process. Kirby Hanson expected several storms to pass over the interior of Antarctica and disturb the inversion. Predicting these weather changes was nearly impossible without cooperation with other stations and communication with the weather center at McMurdo Station or the Russians at Mirny or Molodezhnaya.

Here both German professors enjoyed reminiscing about trying to predict the weather for the war effort in Europe for Hitler's army when the English and French falsified the data as much as possible. They gave me a crash course in predicting the weather for a single station using weather data only from that same single station. Although we all knew Germany was not Plateau Station and no means of forecasting had been established for the High Plateau, nevertheless pressure changes, wind shear, cloud directions and types, and behavior of smoke plumes all revealed useful knowledge

about the detailed workings of the atmosphere. She was a friend but one needed to wait and watch her.

At one of my last meetings with Prof. Schwerdtfeger, he requested a favor of adding one more little thing to look for while I was on the High Plateau of Antarctica. Schwerdtfeger, struggling with the age-old dilemma of how did the icecap of the Antarctic get there in the first place, proposed, in addition to the thermal wind with the inversion, that ice crystals fell from a clear sky. Many explorers reported ice crystals continually in the air. Humidity measurements were worthy of taking, but Schwerdtfeger was not sure the Weather Bureau program included them. Certainly sinking cold air, if saturated and sinking into still colder air, would become super saturated with a strong probability of forming precipitation. Without clouds? Maybe. I promised to watch.

I still had to say good-bye to friends and relatives in Milwaukee. My friends, the Beertown Boosters, arranged a barbecue and beer party in my back yard at 2535 North Second Street. What once was a German lily white neighborhood when I was a toddler, changed into a multiracial neighborhood of both good and bad neighbors. A lady next door shot her husband eleven times for which two of the bullets entered the hall wall of my house. At times I needed to step over a neighbor passed out on alcohol or drugs lying between the ash box and the garage as I walked home from the Third Street bus stop through the alley and into our back yard. Mr. Stinger, a black man who was a renter living downstairs in Tanna's double flat, was a Muslim priest and took very good care of the near neighbors and especially Tanna herself.

All these friends of mine, mostly white and well educated, found it uncomfortable to visit me at my house but anything for beer and brats. We played badminton, sang a lot of songs, argued a lot and generally made a drunken scene and thereby attracted many lookers hanging over the fence. I never did much with my college friends at my home in Milwaukee. As I said, most were uncomfortable in my neighborhood, except of course Leon Todd who was also black and from the neighborhood. Gradually the catcalling from across the fences from the many black kids turned into ugly harassment. I became concerned but Mr. Stinger solved it all. He suddenly appeared on the back porch and raised his hand and without a word the neighborhood kids disappeared as suddenly. We had no further trouble. Our barbecue and beer party continued uninterrupted on into the night until all was consumed. Each said their good-bye without comprehension of where I would be going. Most said "see-you" as though we would. Many of them I never saw again.

2 July 1965. "Rather, I think we should think in terms of the 44-battalion buildup by the end of 1965, with added forces—as required and as our capabilities permit—in 1966." (Memorandum from Assistant Secretary McNaughton to Lieut. Gen. Andrew J. Goodpaster, assistant to the Chairman of the Joint Chiefs of Staff.)

My brother Ray was driving me to the airport for my flight to Washington D. C. Tanna came along. With two suit cases, one large and one small, I walked down the steps of Tanna's house and ran into Mr. Stinger on the porch. I thanked him for keeping the peace. He understood and assured me that Tanna was in good care. She would have no problems while he rented the downstairs flat. His promise could be counted on. Tanna was safe in an unsafe neighborhood. Our Lord truly provides and in this case He sent a black Muslim to be her guard. I believe it. Her angel had black skin.

The neighbor to the north recognized me and hollered over, "Hey Slug, where you been?" It was an old childhood playmate, Larry. His brother, Charlie, was in and out of jail. Larry was on military leave. He was in the Army and about to be shipped out for Vietnam, so I asked, "What are you going to do over there?" He answered, "Give a little black advice!" We said little else. We had little in common other than the street on which we lived and the ability to make zip guns for killing rats in the alley. Military duty in Vietnam struck me as strange. What commitment did we have there?

Ray sped off to the airport. Conversation on the way to the airport was nil. Even at the airport we said little to each other. Good-byes were not in our tradition. Tanna moved once from 5th and Hadley to our present home at 2nd and Wright but that was in 1919. Ray remembered his departure with Dick, his twin brother, for their service in the U. S. Navy, and I think he understood my adventure in conjunction with the Navy's Operation Deep Freeze. At the airport I wanted to stop in at the U. S. Weather Bureau's Airport Station where I spent my traineeship but as time ran out on us, it seemed inappropriate. I felt bad that one more time I could not function without help from Tanna. Here I was about to start a job earning more than ten thousand dollars and I needed money from her for an apartment. She "loaned" me $300.00 and as time would tell she never let me pay it back. This departure gave me the real insight that she indeed was the mother who raised me although I never called her that. True parents never stop trying to provide and that was true of Tanna. I never gave nor received much affection from her but at this good-bye I was shocked by her tears which I had never seen her shed before. From Ray and Trudy came huge bear hugs and kisses and of course I had tears of a fountain.

The flight to Washington D. C., 8 July 1965, was uneventful. I landed at Washington National Airport and surprised at the crowds and the grime all around collected my luggage. National was an old airport. Always there was repair, new access roads, a new lounge. I learned some time later that although Dulles International Airport was a model airport of the future with plenty of room and comfort, National was in immediate downtown Washington. It was just across the Potomac River from the White House. That convenience made it popular no matter how crowded or outdated.

I hailed a cab and was proud that I learned quickly or at least whatever I did seemed correct. The cab driver grabbed my two suitcases, threw them into the trunk and did some low level flying on the way out of National before he asked, "Where you headed?" I said proudly, "The Weather Bureau." "Suitland?" was the return response, but I had no idea what he was talking about. We were moving so fast in what seemed to be four or more lanes of traffic that by the time I dug out an address, 24th and M Street, Northwest, we were headed in the wrong direction. Without emotion the cabby jumped four lanes, started along one exit ramp and then without warning jumped a traffic control island and caused me to duck behind the seat as we rolled over what I thought were steel yellow and black posts. We were on the George Washington Memorial Parkway, squealed around a hair pin curve to cross 14th Street Bridge to Pennsylvania Ave., passed the White House, buzzed around Washington Circle, and came to a screeching halt in front of a very old fortress building (he said it was the old Mexican Embassy) that had a sign claiming it was the U. S. Weather Bureau.

The views were barely noticeable at the speed we were driving. I was in sheer panic over the intense driving, in and out of traffic lines, jumping lanes, slamming on the brakes on the congested streets, and roaring forward as soon as the light changed only to slam on them again in only a few car lengths of forward progress. Raised in Milwaukee and working in Chicago I should have been prepared for city traffic, but my first impressions of DC driving were filled with terror. I was glad that I neither owned a car nor had a driver's license.

The sights of our nation's Capitol were spectacular. How could one speed past it all? I learned the business of the nation had no time for sight seeing. Though I ended up living there for four years, there were only two occasions I took time off to see what there was to see. I was not a tourist but even though I wanted to study this fabulous city I was a resident with work to do. Indeed, the work started almost immediately when I entered the door of the old Mexican Embassy.

Ann Darby, the secretary of the Polar Meteorology Research Group offices, was my first contact with this new research place I would be calling home and pouring out my intellectual energies for. She gave a kind smile, found a place for my old scuffed outdated, non-stylish suitcases, and took me

to the inner offices and the inner inner office of the Chief of Polar Research, William S. Weyant. Ann was a true dedicated civil servant and served her office well. There was no part of Polar Met that she did not know about. I learned very quickly, if you needed the name of someone in the government, anywhere in the government, Ann would have it. She would have the phone number, office hours, hours when that person really was prepared to take phone calls and even enough about that person to give you a needed advantage in conversation to achieve your purposes. Before any conference that I attended, she supplied me with a correct agenda, a list of important participants, and most important, the backgrounds of the individuals I needed to see, talk to, exchange information with, ask favors of, and play politics with. The more I would learn about the inadequacies of the professional research men as well as my own inadequacies, it became apparent that this office had its high reputation as a research office because of Ann Darby.

Meeting Bill Weyant was for me an extremely nervous moment filled with awe and the culminations of all of my childhood dreams of Antarctic exploration. For a trained meteorologist or atmospheric physicist, which I was, Bill Weyant was the leader and the living embodiment of polar discovery. Without a doubt he was a veteran of the Antarctic; his weather beaten face testified to that. He wore a penguin tie clasp. He was very friendly, but intense about his research and the research of the entire office. The only thing that had close to an equal captivation of his attention was the card game of bridge. I didn't play bridge. I sensed he felt that was a failure on my part. I should learn. Bill Weyant eventually retired early from government civil service and became head of running bridge tournaments up and down the east coast.

Bill Weyant was a frequent writer with the great Harry Wexler of IGY fame. Wexler and Weyant formulated the first complete and comprehensive model of the general circulation of air over the high ice dome of the Antarctic. From radiosondes launched daily for more than eight continuous years at the many IGY Stations now made permanent all around the Antarctic coast, as well as several interior stations such as Byrd Station, Amundsen-Scott Station, and Vostok, Wexler and Weyant discovered above the great polar ice dome a strong clockwise wind system in the troposphere.

This was a strong cold core low centered over the ice dome of the Antarctic and flowed exactly opposite the direction given in all the college geography textbooks. These winds were the strong winds from the west, and were very different from the supposed polar easterlies currently taught. In fact these west winds increased to form the very rapid moving polar vortex of the south polar stratosphere. This contradiction between the science of the "library", knowledge invented behind a desk, and what really happens in nature is quite common in science. Only when the scientist is willing to go out into nature and look to compare ideas with what really exists, can meaningful surprises occur. Oddly, polar easterlies are still (1993) being taught.

Further analysis of weather data by Wexler and Weyant showed, as expected, that the warm tropical troposphere (the layer of common weather changes and storms) was considerably thicker than the troposphere over the poles. The mid-latitude jet stream lies in that band of discontinuity where the tropical troposphere rides higher but not connected to the lower polar troposphere. The ozone, concentrated in the stratosphere (the layer of thin air over the troposphere, where the temperature of the air is either isothermal or rising with height), sinks into the troposphere through the discontinuity of the tropopause, and by the converging tropospheric westerly winds of Antarctica, concentrates over the ice dome. Weyant and Wexler reasoned that somehow the stratified air closest to the ice dome played a role in the surface concentration of ozone. Long before the modern concern over the ozone hole of today, Weyant and Wexler saw these global complex interactions and recognized the serious interplay of these atmospheric chemicals that are vital for the survival of life on this planet. Since Wexler's death, only a short time before my coming to Polar Met, Weyant discovered that ozone concentrations changed rapidly with seasons and that seemed to be a result of horizontal

advection (wind acting as the carrier) and not so much by vertical advection.

Where Harry Wexler had been a dynamic human force in the Weather Bureau, establishing the American role for weather research in IGY in Antarctica and building the Polar Research Group as a special task force for struggling with the basic research of the fundamental problems of the atmosphere, now his research companion, Bill Weyant was chief of this special group and I was shaking

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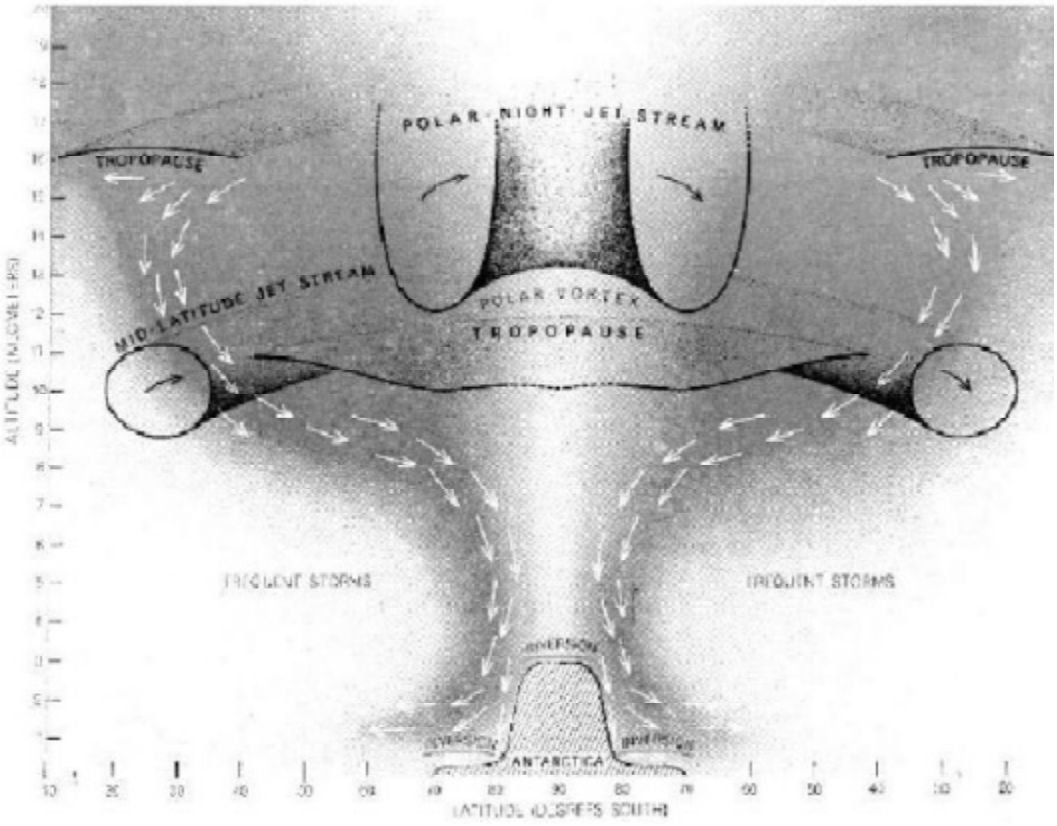

Weyant's hand and more, I would be doing this very special research work of polar studies. WOW!

Bill took me to meet Herb Viebrock, the second in command at Polar Met. Viebrock was intensely interested for many years in theories of energy exchanges between the air and the ocean, pioneering these thoughts before others. Making his research interesting and complex were all the energy exchanges with the many phase changes of liquid water, ice, and vapor. The size of the Antarctic doubles in surface area during the winter when the surrounding ocean freezes. This changes the albedo or reflectivity of the entire planet, reflecting away at times as much as ninety percent of the solar energy reaching the ice and snow of the earth's surface. This sea-air-ice interaction in the polar regions was central to understanding the weather all over the globe, and Herb Viebrock was an intense researcher for the task.

Herb Viebrock also was jointly working with Ed Flowers studying an anomalous decrease in direct solar radiation due to influx of volcanic dust from Mt. Agung, Bali. They traced wind streams of the stratosphere from Bali to the Antarctic and confirmed such sensitive changes most prevalent in

the pristine Antarctic air. Herb also developed national climatological maps of the polar regions putting together the research work of many researchers, not only from Polar Met but of scientists all over the world. This tended to be unsung heroic duty as much government research was. So many of these general, but massive projects, were published under the name of the Secretary of Commerce, or the cabinet post under whose office the work was funded.

The dust of Mt. Agung, having such a major influence on global weather and being part of the most up-to-date research that this office was doing, reminds me of ignorant denials by people of little or no understanding who refuse to honor knowledge and understanding that others may have. As a professor, the very first evening I moved to Dr. Martin Luther College with the moving vans still being emptied, I remember commenting to a new neighbor about the unusually brilliant sunset to the west on the flat prairie land. I quoted some of Viebrock's findings about the influence of volcanoes on the fundamental light rays reaching the earth. Mind you, it was not long since my research days with this top front line research office and I knew my subject. "Oh no. Definitely not! Volcanoes would not influence us here in New Ulm." I suppose! Truth you don't have to believe. If The Wisconsin Evangelical Lutheran Synod's worker training schools did not teach it in the past, such knowledge must either be wrong or simply nonexistent.

Bill and Herb took me around to meet all the professional scientists. First was my immediate office mate. Bob Becker, a connoisseur of pizza, was the resident synoptic meteorology expert. His immediate interest was concerned with the study of blocking highs in the South Pacific Ocean. High pressure weather systems became stagnant over the immense ocean. As tropical or sub tropical air expanded by solar energy over the warm and moist ocean, it formed a stationary air mass. Bob was looking for trigger events coming from the Antarctic that either would begin the movement or breakup the formation of such high pressure systems. His source of data was intensive case studies using data collected by people on research ships such as the *USNS Eltanin*. Bob eventually got married, helped his wife run a catering service in Washington D. C. and opened a pizza shop, all perhaps to avoid becoming sea sick on a polar tub.

Herb introduced me to Ed Flowers, his co-author on the Mt. Agung dust study. I recognized Ed Flowers as a veteran of the first winter at the South Pole under the leadership of Paul Siple from my high school readings on IGY. He also had a special interest in micrometeorology and turbulence. I had hoped to be able to grow professionally with an expert such as Flowers but he soon would join the research staff of the National Center for Air Pollution Control in Cincinnati, Ohio. He surprised me by quoting to me some of my own research on wind fetch over the Twin Cities of Minneapolis and St. Paul, the heat island I measured over Milwaukee, and the lake breeze studies for Milwaukee and Chicago I published in obscure government manuals.

Martin Predoehl performed pioneer work with the great technological advance of the age, the weather satellites. ESSA Three and ESSA Five data permitted Martin Predoehl to determine for the first time the mean cloud cover over the Antarctic region and the seasonal changes of the pack ice on the surrounding seas. The breakthrough for these studies came when Martin discovered ways to distinguish between ice and clouds.

These five men and I made up the research team called the Polar Meteorology Group. A seventh professional scientist, Janice Robinson joined our team about a month later. Janice was a pure mathematician. She was a new graduate as myself. Much of the work of the other researchers was becoming more and more mathematical. Energy balances, statistics governing three dimensional vectors, computer analysis of vast amounts of satellite data, all were demanding a greater more complex mathematical interpretation of nature. Janice would serve as a check on our mathematical work as well as do research projects of a more theoretical kind of her own. In addition, as the polar specific studies

became known with more certainty, the demand to inculcate these theories into the working models of the Weather Bureau's global forecasts increased. Such linkage demanded much mathematical treatment.

Janice was married to a Marine serving our country in South Vietnam and, in fact, he served more than one tour. She understandably was very critical of my attitude toward the war in Vietnam. Actually in July or August of 1965 I had no opinion. It was my association with the University of Wisconsin at Madison, which was notably "pink" or of communistic leanings according to this mathematician from a southern university, that made her suspicious. That suspicion turned out to be prophetic but in summer of 1965 very few citizens knew the extent of the U. S. involvement in Vietnam. My neighbor in Milwaukee, Janice's husband, and a few former ROTC (Reserve Officers Training Corps) classmates from college were involved and this did begin to puzzle me. Why were so many of my acquaintances associated with Vietnam?

To round out the professional picture, while I was in the Antarctic, Ed Flowers left for Cincinnati. Replacing him was Professor Lettau's son, Bernard Lettau. His research interests included ice-air interface energy exchanges. He took hour by hour heat flux measurements going into the ice at the South Pole and found them to generally balance very close to convective heat loses of the air above and conductive heat losses given up by the snow. He wrote in the *Antarctic Journal of the United States*, "The sensible heat given up by the snow made up an appreciable fraction of the radiative heat loss at the surface." (Jan.-Feb.'67)

Remembering the lunch-interview I had with Prof. Lettau, Prof. Schwerdtfeger, Kirby Hanson, Paul Dalrymple, and Mort Rubin, I asked, "Where is Mort Rubin?" thinking he was part of Polar Met. I learned that he was president of the International Commission on Polar Meteorology in Geneva, Switzerland. He served the United Nations through the World Meteorological Organization and had an office in the main administrative center of The Environmental Science Services Administration (ESSA) in Rockville, Maryland.

I was beginning to learn the alphabet soup of the Federal Government. Every new politician, every new political appointee to head a government office, every new administrator automatically felt the need to make him or herself look important by restructuring all the offices below them. That meant new chains of command, new flow charts of office structure and of course, new names. New names meant new letters of the alphabet soup. Nothing new happened to productivity with such manipulations. Productivity had nothing to do with administration but with the hearts and love for work of the people doing the work. They needed to see a sense of purpose. Most administrators saw only their own need for power and to exercise that power they ordered change, many times without forethought or study and always without input from the workers.

The Chief of the Weather Bureau, F. W. Reichelderfer, retired and Robert M. White was appointed by President Johnson through the recommendation of the Secretary of Commerce. There was an incredible flurry of activity in the Weather Bureau as I entered it as a professional research scientist but it did little to improve the forecasts of the weather, or improve commerce, or increase safety of air traffic. These things did in fact improve, but they did because individual forecasters continued to study and analyze the duties for the sake of the men and women they served. The U. S. Coast and Geodetic Survey merged with the U. S. Weather Bureau and became USCGS and USWB as parts of ESSA. White's administrative offices greatly expanded and new coordinating offices were also added. Here my new office, headed by Weyant was the Polar Meteorology Group (PMG). We became part of the Air Resources Laboratory (ARL). ARL became only one of many laboratories all of which were headed by a cover group called the ESSA Research Laboratories. These served and were served by the Environmental Data Service (EDS) and the National Environmental Satellite Center (NESC). These

rectangles on the Government flow chart were the all important real stuff of administration and changed very frequently in my short tenure of government service. Some times these changes had an effect on the work down below; most of the time these changes had no effect at all.

The outstanding people below the research staff of Polar Met I was introduced to next. They occupied the outer office. They were the ones who did all the statistical work we ordered. Sometimes they knew the value of their work but most of the time the professional researcher never shared his goals or objectives with the technicians below him. I was complimented by Gertrude Sohns, who did most of the statistical work on my research projects, for keeping her informed of what my projects were supposed to prove or, even if I had no idea where it was going, she always was informed of that.

Sy Roman was a good confidant for me. I know he felt strange having me share troubles of the professionals above his rank. But for me, I never seemed to understand rank. Besides, Sy had a sharp eye for changes in the data and many times saw correlations the research staff missed. It was always worth sharing ideas. Sy knew every traffic light within the beltway and gave excellent advice on how to commute without stopping both in the morning and the afternoon. When our office was moved to the Grammax Building in Silver Spring, Maryland, Sy's advice was to race up Georgia Avenue 33 mph from Rhode Island Avenue to New Hampshire Avenue, slow to 21 mph until Kansas Avenue, then travel as fast as the traffic flow would bear, usually near 40 mph past the intersection with Piney Bridge Road and glide into Silver Spring at the posted speed limit of 25 mph. It worked. We'd even keep score on how many stops a person got stuck at.

The rest of the support staff was equally important but time and circumstance did not permit a comfortable growing together. I wish we had all realized how nevertheless we did grow together. Jim Monahan was the at the office earliest, first to make coffee, and in true government fashion, used his afternoon break to move his car closer to the front entrance of the office building for a quick getaway at quitting time. Mabel, concerned for all listened to everyone's problems and always had comforting things to say for all situations.

Sam, a dedicated federal worker, I got close to on only one event. When D. C. burned in the aftermath of the senseless killing of the American servant of peace in troubled times, Martin Luther King Jr., it was difficult to move around in the District. Sam needed to travel to see his wife and family every weekend and took a Greyhound bus. During the military occupation of D. C., access to the bus terminal became difficult. Sam and I tried to drive to the terminal after curfew and were chased by siren screeching jeeps and after we escaped the military I simply drove him home to Harrisburg, Pennsylvania. The deep feelings and the struggles of this young man to provide for his family "up north" added meaning to the needed struggle I was watching our nation work through.

Lanny Dimmick was a fast rising young man who started with educational disadvantages but seemed to overcome them. After a time with our office he moved on to another research office, Geophysical Fluid Dynamics Lab, and had strong ambitions to study and to achieve the professional level. Thinking I came from simple and poor roots, I had difficulty in accepting these strata in my work place and I never understood the privileged position I found myself in as a professional research meteorologist here at the Polar Meteorology Research Group.

That just about covers the introductions to the people of Polar Met. I was also taken to a different office building where I was introduced to Weyant's boss and to still another building across town to shake hands with Weyant's boss's boss and began to ponder the huge endless structure of the federal bureaucracy. This structure would change many times during my tenure in Washington D. C., sometimes for the better, sometimes for worse, and most of the time for politics. Dr. Lester Machta remained for the most part of my time with Polar Met as an overseer above Bill Weyant. Yet, because

of our dependency on National Science Foundation grants, we maintained our independence.

Dr. Machta was an outstanding workaholic role model for the devoted scientist. He kept a sleeping cot in his inner office for the big research pushes that seemed to occur just before budget times. Nothing was better for research outfits as Polar Met than to make a discovery just before it was time to ask for more money. As Director of the Air Resources Laboratory he led all research teams with his publication pace. His most famous work was probably "Global Scale Dispersion by the Atmosphere", that he developed using knowledge measured in earlier works like, "Meteorological Factors Affecting Spread of Radioactivity from Nuclear Bombs." It was Machta's research leadership that showed the politicians of the world that we all were on the road to global suicide trying to build bigger and more deadly nuclear weapons and by testing them in the atmosphere. As a family of nations we were beginning to kill more by cancer through radiation and fallout than by any bomb dropped in anger. Yet it was Machta and his deputy, Donald Pack, whom I remember venting considerable verbal anger when a nuclear test ban treaty was signed because it meant an end to their ability to study global air circulation by means of nuclear trace material.

Sidney Teweles was another government leader who seemed to have influence over Polar Met even above Machta. He was Chief of the Data Acquisition Division of the Weather Bureau, and although his office did not remain in a direct line in the government organizational chart above us, working in the polar regions simply could not be done without a global data acquisition system and all the international diplomacy requirements behind such a system. When Lester Machta established a global air pollution monitoring station at the South Pole, it required every human effort for people down at our Polar Met level and the same effort all the way up to Teweles' office and much more over at the State Department. These little things that sent great vortexes of political turbulence throughout many government agencies made life on a simple polar meteorological problem exciting without end and required an understanding of the government structure for its proper manipulation.

Amazed at the special interest Sidney took in my appointment, I learned of the need for diversity. More than once he expressed gratitude that I was a graduate of the University of Wisconsin. It was a concern of his that the research sections were becoming too dominated by graduates of the eastern schools. He knew that coming from a Midwestern school my research ideas, most certainly following training from men as Lettau and Schwerdtfeger, would soon clash with the teachings of Ben Davidson of New York University and Hans Panofsky of Penn. State. This was the essence of science - debate. Ideas of imaginative thinkers were put into imaginative models and tested in the field of nature. More than one system of thought could always be "force-fit" onto nature. The contest of debate and necessary clash of ideas led to the best understanding and for the Weather Bureau, the best predictions. I couldn't wait!

It took several days for me to notice but then it dawned on me, there was an older guy sitting behind a desk off to the side in Polar Met that I never was introduced to. When I finally felt at home enough to ask "Who is that man over there?", I got the reply "that's Fred." Fred Fopay was a kind gentleman behind a large desk piled high with maps and thousands of microfilms. He eternally toted up statistics, relabeled the microfilms, cut some of the microfilm apart and spliced them back together again. For what reason and project I could never find out. Even during the few years when budgets were drastically cut, Fred's position seemed protected. The best answer I got was that he was associated with one of the last of Admiral Byrd's expeditions and somehow his position as a civil servant, not special service as all of our research positions were, was permanent. Until his retirement he went about his business of averaging data and classifying maps that were never used. He never spoke much and obviously ignored introductions.

Actually, before my research days came to an end, it was some of Fred's maps on microfilm that

were beneficial and I don't want to leave the burden of bureaucracy all on Fred's desk. I eventually learned to respect him as a person. Unending projects were normal for the federal government. At one point of my stay in Washington D. C., to further my own position I became a self-taught student of the government's structure and stumbled onto a civil service position with the title of Director for the Interoceanic Canal Project. It was more than fifty years since the building of the Panama Canal and there really still existed an office where dedicated people still collected data and still planned alternative routes across Central America. I'm not making this up. I saw the offices with project maps from the floor to the ceiling showing canal routes across Nicaragua, Costa Rica, Panama, and Columbia. The project Director was Robert J. List who had his office on the third floor of the Grammax Building in Silver Spring, Maryland. Oddly enough it even became attached to Lester Machta's Air Resources Laboratory because during the Eisenhower Atoms for Peace Plan the "canal researchers" did many studies of turbulence and dispersion of nuclear fallout problems if a "clean" nuclear bomb was used to dig the new canal. That's our government.

My first rented apartment in this fabulous federal city of the District of Columbia was in the artistic, expensive, and prestigious Georgetown. I rented an efficiency apartment from Mrs. John Stahl at 3009 Que Street Northwest for $110.00 per month. It was very comfortable. Several other young people lived in the building adding to the enjoyment of apartment living, making it a touch of dormitory with the independent responsibilities of house keeping. For me keeping one room was more than enough.

Mrs. Stahl was a very interesting person. At one time I'm sure she used this fabulous building as her own townhouse. After the loss of her husband, she probably started to subdivide the building into its separate parts. Weird ideas filled the mind of this delightfully talkative old woman. She let me in on a secret since she knew I was a government man. She knew the earth was hollow. Inside the earth existed a vastly superior race of people and only government agents knew of it. These advanced people flew out of the center of the earth with flying saucers though a great gate at the Poles and Admiral Byrd was the first to discover these openings.

During my stay in her building I tried many times to assure her that no such gate to the center of the earth existed. I even brought to her documents and plans of the Amundsen-Scott Station at the South Pole. Then accidentally she saw a picture of a locked door at the South Pole Station that led to the snow mine. Paul Siple, the scientific leader at the South Pole Station the first winterover year started the snow mine for clean snow for drinking water as well as snow samples for glaciological studies. Ed Flowers, Paul Dalrymple, Kirby Hanson, and Mario Giovinetto, all close scientific acquaintances of mine had worked the snow mine as their diggings penetrated several hundred feet under the snow surface. The padlocked door was placed over the mine entrance to keep drunken scientists and Navy men out. Mrs. Stahl was convinced by this time that I had joined the government agency that was keeping the gateway to the hollow earth a secret.

The first days on the job my immediate task was to nearly memorize my job description and the grants covering my research work. These are now given in full:

COVER LETTER TO THE NATIONAL SCIENCE FOUNDATION

MR-4.2
Dr. T. O. Jones, Head
Office of Antarctic Programs
National Science Foundation
1800 G Street, N. W.
Washington, D. C., 20006

Dear Dr. Jones:

We are submitting herewith ten (10) copies of a proposal for a grant in the amount of $50,910 for fiscal year 1966 from the National Science Foundation entitled "Study of the Lower Atmosphere above the High Antarctic Plateau." This proposal is for the support of a study, including field investigations, to be conducted by the Polar Meteorology Branch of the Atmospheric Analysis laboratory, U. S. Weather Bureau. The Polar Meteorology Branch is under the direct supervision of Mr. William S. Weyant, Head of the Branch, and under the overall direction of the Director, Meteorological Research. Dr. Sidney Teweles, Director, Atmospheric Analysis Laboratory, has been designated Principle Investigator. An estimate of the possible cost of the program beyond fiscal year 1966 is also included with the proposal.

Sincerely yours,
Jerome Spar, Director
Meteorological Research

cc: Dr. Crary, Dr. Teweles, Mr. Weyant

Draft Proposal for Grant from the National Science Foundation

A Name and Address of Institution

Office of Meteorological Research
U. S. Weather Bureau
Washington, D. C., 20025

Principal Investigator:
Dr. Sidney J. Teweles, Director
Atmospheric Analysis Laboratory

B Title of Proposed Research
Study of the Lower Atmosphere above the High Antarctic Plateau.

C. Desired Starting Date of the Research
1 July 1965

D. Time Period for which Support is Requested
1 July 1965 to 30 June 1969 (Two Operational Years)

E. Description of Proposed Research

1. The proposed research program encompasses two intimately related major investigations designed to provide detailed information on the vertical structure of the fields of wind, temperature and radiation flux in the first three kilometers of the atmosphere at the projected high plateau site at 80 ° S., 25 ° E. One portion of the program is an investigation of the "great Antarctic inversion" as suggested by Drs. Lettau and Schwerdtfeger of the University of Wisconsin. The purpose of this portion of the study is to

delineate the detailed structure of the inversion and its temporal and spatial variations in order to examine and outline the various causative factors and their relationships. This will involve sounding the first three kilometers of the atmosphere during the dark period using slowly rising balloons instrumented to obtain temperatures, radiative fluxes and, if possible, humidities from the levels through which they rise and, by theodolite tracking, winds from these levels. The other major portion of the program is a micrometeorological study to provide continuous information on winds, temperatures, and incoming and outgoing radiation, both long- and shortwave, from several levels on a suitably instrumented 100-ft. tower. A study will be made of the temperature and wind profiles in continuation of a study previously made at Little America V and Amundsen-Scott Station. This will be supplemented by a determination of the surface and low level radiation budgets. Besides carrying out these two major programs, the meteorological personnel would: take and record synoptic surface observations at six-hourly intervals, and transmit these observations for operational use: measure subsurface snow temperatures to obtain the amplitude, damping and phase shift with depth of the annual temperature wave in the upper layers of the snow and the magnitude of the heat storage term in the seasonal heat budget; and, if feasible, carry out a suitably designed experiment to determine evaporation (sublimation) rates from the snow surface at this unique site.

2. The "great Antarctic inversion" study. This study is based on suggestions contained in a memorandum from Drs. Lettau and Schwerdtfeger of the University of Wisconsin to Dr. Crary of the National Science Foundation. The field program consists of a series of 10 to 12 multiple balloon ascents at intervals through the dark season. Each group of soundings will cover a period of 12 hours, with five or six balloons released serially at intervals of about two hours. Each helium-filled balloon will bear aloft a radiometersonde-radiosonde instrument, requiring about 45 minutes to traverse the lower three kilometers of the atmosphere. Double-theodolite tracking of the balloons will provide information on the winds in this atmospheric layer, while temperature, pressure, radiative flux and possibly humidity will be transmitted to a surface recorder by the balloon-borne instrument.

3. The micrometeorological program. Data will be continuously recorded from wind, temperature and radiation sensors mounted at specific levels on a mast about 100 feet high. The temperature will be measured by shielded thermohms or thermocouples; the wind by vane-mounted anemometers; total global and net radiation by Funk radiometers; direct and reflected solar radiation, during the sunlit period only, by Kipp instruments (including filters). The Weather Bureau will furnish a meteorologist to carry out the field portion of this program during the first year only (1966).

4. Supplementary Programs. Snow temperature profiles to a depth of about 12 meters will be obtained from buried, continuously-recording thermocouples. These data will be used to determine the change with depth of the amplitude and phase of the annual temperature wave in the upper layers of the snow, and the seasonal heat storage in those layers.

By measurement of the diminution (or augmentation) of mass with time of carefully weighed surface snow samples exposed to ambient conditions, an assessment of the amount of sublimation (or deposition) occurring at this site will be made.

F. Personnel

1. Field Staff

Position	Grade	1966	1967	1968	Total
Meteorologist	12	1	--	--	1
Meteorologist	9	1	1	—	2

2. Research Staff (Data Analysis)

Meteorologist	9	--	1	1	2
Totals		2	2	1	5

The overall control of the program will be vested in the Office of Meteorological Research, U. S. Weather Bureau. In 1966, one field meteorologist will have primary responsibility for the micrometeorology program; the second meteorologist will have primary responsibility for the inversion study, and conduct the supplementary studies. Both men will share the taking of the synoptic surface observations. Because of the small scientific staff winteringover at the station, it will be necessary for the meteorological personnel to assist in the work of other disciplines at times; by the same token, scientists from other disciplines will be called upon to help with the meteorology program when necessary.

G. Budget

Summary of Costs

Note 1: The budget does not include any expenditures for equipment or supplies in connection with the micrometeorological program.

Note 2: Costs listed under 1966 are those required for the first year's work; those listed under 1967 are funds required for expenditures during the second year and succeeding years.

a. Salaries - includes government contribution and allowances.

Field Staff	1966	1967	Total
1 GS-12 Meteorologist	$17,627	—	$17,627
1 GS-9 Meteorologist	13,592	—	13,592
1 GS-9 Meteorologist	—	13,592	13,592
Total	$31,219	13,592	44,811

Research Staff			
2 GS-9 Meteorologists	$—	16,626	16,626
Total salaries	$31,219	30,218	61,437
b. Permanent Equipment			
2 Theodolites	$2,000	—	2,000
1 R/S receiver - recorder	2,800	—	2,800
Thermocouples and cable	1,000	—	1,000
Surface observational equipment not available as spares in Antarctica	250	—	250
Total equipment	$6,050	—	$6,050
c. Supplies and expendable			
180 R/S including modification	$4,050	4,050	9,100
90 tanks helium (includes $20 per tank deposit)	1,575	1,575	3,150
180 600-gm. balloons	288	288	576
Balloon lights, chart paper, ink, etc.	300	300	300
Total expendable	$6,213	6,213	12,426
d. Data reduction and publication			
	$—	5,000	5,000
e. Travel - includes per diem			
training, indoctrination, etc.	2,800	1,870	4,670
f. Total direct costs	46,282	43,301	89,583
g. Indirect costs			
Support services	4,628	4,330	8,958
Instrument inspection fee	43	43	86
h. Total costs	$50,953	47,674	98,627

End of NSF grant proposal from OMR.

The micrometeorology program was designed and directed by Paul Dalrymple. From Washington D. C. and in the field I would serve him for the establishment of his program on the high plateau of Antarctica. His grant proposal follows.

NAME AND ADDRESS OF INSTITUTION

U. S. Army Natick Laboratories
Natick, Massachusetts

NAME AND DEPARTMENT OF PRINCIPAL INVESTIGATOR

Paul C. Dalrymple
Head, Polar and Mountain Laboratory
Earth Sciences Division
U. S. Army Natick Laboratories
Natick, Massachusetts

ENDORSEMENTS [signed]

PAUL C. DALRYMPLE, Principal Investigator

PEVERIL MEIGS, Chief, Earth Sciences Division

WILLIAM C. F. MULLEN, Lt. Col., QMC, Comptroller

TITLE OF PROPOSED RESEARCH

East Antarctic Radiation Climatology

DESIRED STARTING DATE OF RESEARCH

1 October 1965

TIME PERIOD FOR WHICH SUPPORT IS REQUESTED

1 October 1965 - 30 September 1966

DESCRIPTION OF PROPOSED RESEARCH

Abstract

It is proposed that a radiation program be conducted on the austral summer traverse in East Antarctica from November 1965 through February 1966. This program will include measurements of direct solar, global short-wave, net, and total global radiation to be made on these days when the traverse has stopped for scientific measurements. The Chief Scientist, Office of Antarctic Programs, National Science Foundation, has indicated that approximately 25 such days will occur on the traverse. At the end of this traverse, the instrumentation used will be installed at the to-be-constructed camp in East Antarctica and will be left there for the duration of the camp. The principal investigator plans to conduct the radiation program on the traverse, return to the United States to analyze the summer data, and then make plans for a micrometeorological program at the new station for 1967.

Plan of the Work

The direct solar radiation (solar intensity) will be taken with a portable potentiometer and filters will be used to separate the radiant energy into reasonably well-

defined spectral bands. The measurement of the solar intensity is well suited for instantaneous readings; all other measurements will be continuously recording. The instrumentation will be set up as soon as possible at each stop, and the data will be self-recording on three potentiometers equipped with mechanical integrators and readout tapes that will materially speed the data reduction program. The power for the instruments will be supplied by a portable generator. The portable generator proposed for use has a greater power output than is required by the instrumentation, but it is the smallest generator that has the characteristics (relatively stable cycling and good maintenance record) required for such a program.

Objective

Basically the main objective is to learn something about the summertime radiation climatology at the high elevations in East Antarctica. The proposed traverse is scheduled at the period of the year when the sun is at perihelion, and it is closer to the Antarctic at this time than to any other region. The route of the traverse is in the region of high elevation, and solar angles higher than those at the South Pole will be encountered at times. The insolation at the top of the atmosphere can be calculated, but the intensity at the surface of the earth has to be measured. Because of the large number of cloudless days expected in this "fair-weather" region, it is anticipated that there will be good opportunities to make detailed measurements of the turbidity of the atmosphere. It is possible that some solar constant work might be made.

The measurement of incoming solar radiation which is most generally useful is that of the total energy falling on a unit area of a horizontal surface. These measurements have been taken with some degree of accuracy in the Antarctic since the beginning of the IGY. However, the same cannot be said for measurements of net radiation. It is only in recent years that improved instrumentation for measuring net radiation has become available and has been tested satisfactorily in the polar regions. This instrumentation can also be adapted for measurements of the total global radiation. The measurements of these elements will aid in future computations of the heat budget of interior Antarctica and should help in the understanding of the energy exchanges at the snow-air interface. The computation of the albedo of the snow surfaces along the traverse will be computed for different meteorological conditions as well as for different solar angles. Comparison of these data will be made with measurements recently taken in a high mountainous region (Himalayas).

One of the overall objectives of the summer traverse program is to determine the feasibility of conducting a radiation program on an oversnow traverse. All indications are that it can be done, and the results should show whether these measurements should be considered as standard measurements on future traverses.

Relation to Present State of Knowledge and Previous Work in the Field

There have been no known radiation measurements made between the Pole of Inaccessibility and the proposed site of the new station. Detailed observations have been taken over the past eight years at the South Pole station, which is approximately 1000 meters lower in elevation than most of the proposed traverse route. Additional radiation measurements have been taken at the U. S. S. R. stations of Vostok and Sovietskaya. However, these stations are several hundred miles from

the closest point on the proposed traverse. The instrumentation proposed for use is considered to be not only good to excellent, but has also proven satisfactory in the Arctic. It is felt that this program will thus be a continuation of much of the fine work which the Weather Bureau, and particularly Mr. Kirby Hanson, has already initiated on the South Polar Plateau. The program has been modeled after one conducted at the Arctic Research Laboratory, Point Barrow, Alaska, by the University of Washington under Project HUSKY. The proposed instrumentation, for the most part, is an exact duplicate of that used so successfully by the University of Washington in its 1964 program.

FACILITIES

Modern electronic facilities, including a GE-225 digital computer and its peripheral equipment, are available in the Data Analysis office, U. S. Army Natick Laboratories (NLABS), where a complement of 15 people, including 5 mathematical programmers, provide data processing services and statistical advice. A broad program of environmental research is underway within the Earth Sciences Division by a 37-member staff which includes 19 physical geographers and 6 meteorologists. Polar studies in meteorology-micrometeorology and climatology are conducted by members of its Polar & Mountain Laboratory, of which the undersigned serves as head. Excellent facilities are available within the ESD Cartographic Laboratory for the preparation of maps and graphic material; reports are published in an NLABS reproduction unit using up-to-date photographic and printing techniques.

PERSONNEL

Dr. Paul C. Dalrymple, Meteorologist, Principal Investigator
Miss Sarah H. Wollaston, Micrometeorologist, Research Assistant
Mrs. Leonora Kundla, Statistical Clerk
Dr. Heinz H. Lettau, Micrometeorologist, Expert (consultant) to NLABS
Mr. A. J. Drummond, Radiation Specialist (NLABS contractor)

Biographical Sketches

The Principal Investigator, Dr. Paul C. Dalrymple, is Head, Polar and Mountain Laboratory, Earth Sciences Division, U. S. Army Natick Laboratories, Natick Massachusetts. He conducted micrometeorological programs of temperature and wind profiles at Little America V in 1957 and at the South Pole in 1958. In the fall of 1962 he was on the Greenland Icecap at Dye 2 where he conducted a program relating types of snow surfaces to different meteorological parameters. The summer of 1964 was spent on the airborne phase of the International Indian Ocean Expedition working in marine meteorology. He was formerly employed at Blue Hill Observatory, Mt. Washington Observatory, Woods Hole Oceanographic Institution, and by the U. S. Weather Bureau. He has a bachelor's degree from Clark University, a master's degree from Syracuse University, and a doctoral degree from Boston University; all degree work is in physical geography. He also studied meteorology and climatology at M. I. T.

Miss Sarah Wollaston has been associated with the Polar and Mountain Laboratory since 1960. She has worked on the analysis of the Little America V and South Pole micrometeorological data under the guidance of Dr. Heinz H. Lettau. Miss

Wollaston formerly worked for Harvard University at Blue Hill Observatory for 16 years. Upon the death of its director, Dr. Charles F. Brooks, she returned to school and obtained her master's degree at Penn State University. Her thesis was on the nocturnal temperature inversions at the Brookhaven national laboratories in Upton Long Island.

Dr. Heinz H. Lettau is one of the world's leading micrometeorologists, and has become interested in polar meteorology-micrometeorology through his work on the IGY data. He has over one hundred publications in meteorology to his credit and has served recently as Chairman of the Meteorology Department, University of Wisconsin.

BUDGET

Salaries	
Paul C. Dalrymple, Principle Investigator, GS-13,	
9 months at $1111 per month	$9999
Sarah H. Wollaston, Research Assistant, GS-11,	
4 months at $795 per month	3180
Leonora Kundla, Statistical Clerk, GS-5,	
2 months at $430 per month	860
Heinz H. Lettau, Micrometeorological Expert,	
20 days at $75.00 per day	1500
Total Salaries	$15539
Permanent Equipment	
Kipp Actinometer	$1250
Kipp Solarimeter	260
SCIRO (Funk) Radiometer	750
SCIRO (Funk) Radiometer	750
Georgi Radiometer	1562
L&N Speedomax H Recording Potentiometer,	
Range -25 to +25 mv	1210
Range 0 to 10 mv	1210
Range -10 to +30 mv	1273
3 Mechanical GE Integrators for	
L&N Recorders ($414)	1242
Mervyn Recorder	983
Recording Millivoltmeter	745
Total	$11235
Expendable Equipment	
3 KW Generator	705
Spare parts for L&N's	315
L&N Charts (2-year supply for 3 recorders)	120
GE Charts (2-year supply for 3 integrators)	46
Total	$1186

Total Equipment	12421
Travel	
One round-trip, Madison, Wisc., to Natick, Mass	$175
One round-trip, Natick, Mass., to Skyview, Va (per diem included in above)	100
Total Travel	275
Publication Costs	0
Other Direct Costs	0
Indirect Costs (20% of Total Salaries)	3108
TOTAL COSTS	$31343

Other Sponsors - None

The budget submitted is for the radiation instrumentation for the 65-66 summer traverse program as well as for the 1966 and 1967 winters. Analysis time is submitted for the summer traverse program. Because of the uncertainty as to who will conduct the 1966 winteringover program, the budget for the analyses of these data is omitted from this proposal. It is anticipated that the principal investigator on this proposal may submit another proposal for a winteringover program in micrometeorology for 1967; at that time, any data analysis required for the 1966 data will be included.

End of NSF grant proposal from NLABS.

More personal, my job description:

Position Description - Research Meteorologist, GS-9

Research situation or assignment:

The incumbent conducts meteorological research on the causes, structure and variations of the temperature inversion in the lower three kilometers of the atmosphere over the central Antarctic plateau. This will include a minimum of twelve months with the observational field program in Antarctica to obtain the basic data required for the study. After the incumbent's return to the U. S. he will use this data and additional data from the U. S. Plateau Station as it becomes available. He may be required to assist other professional research meteorologists in the Polar Meteorology Group or perform other specific assigned tasks related to research investigations of the Antarctic atmosphere and its behavior. While in Antarctica he may be required to assist the senior research meteorologist and other research scientists at the station in the performance of their programs.

Supervision received:

The incumbent will be under the direct supervision of the Supervisory Research Meteorologist and the general supervision of the Chief of the Polar Meteorology Research Group. In Antarctica he will be under the direct temporary supervision of the senior research meteorologist at the station. His work will be subject to review by senior research meteorologists of the Group in order to provide guidance and suggestions to further his research objectives and personal professional development.

Guidelines and Originality:

The incumbent must be capable of understanding and using the results of other research on or relating to his problem. He will be required to prepare a complete research plan which, in fulfillment, will lead to publication of the results of his investigations as a professional paper in a recognized professional journal.

Qualifications:

The incumbent performs responsible professional work of moderate difficulty requiring a thorough general knowledge of meteorology. He must be familiar with past work on the lower atmosphere in polar regions and have first-hand experience in obtaining data necessary for his research problem through conducting a field research program. He must have a Master's degree in meteorology and at least one year of experience.

Supervision over the work of others:

The incumbent will normally work alone or in cooperation with a meteorological technician assigned to assist him in his research work by the Supervising Meteorologist.

End of Job Description

A tavern near the corner of Wisconsin Avenue and "M" Street Northwest and the Bavarian Caverns- the soul home of soul jazz- on 13 th Street N. W. rounded out an initiation into a hectic and yet genteel and leisurely life of research.

Washington Monument, Washington D.C.