

*Oral Histories represent the recollections and opinions of the person interviewed, and not the official position of MORS. Omissions and errors in fact are corrected when possible, but every effort is made to present the interviewee's own words.*

**BOB SHELDON:** This is a MORS Oral History Interview with Al Lieberman, FS. Al has worked in a range of analytic and research activities for various agencies of the Federal government for over 40 years. He is currently a senior researcher for the Arms Control and Disarmament Agency. Since 1992, Al has been a Fellow of the Military Operations Research Society. This is the 24th of July 2003, and we're here at the State Department Annex overlooking the Potomac River and the Kennedy Center. Let me get started—where were you born and raised?

**AL LIEBERMAN:** I was born in Frankfurt am Main, Germany, 30 March 1926. We lived there until I was the age of six, roughly. In late 1932 or early '33, we left Frankfurt am Main and went to Belgium, into France and then I lived in Paris from 1933 to 1940.

**BOB SHELDON:** Do you have recollections of living in Frankfurt?

**AL LIEBERMAN:** Yes, I have some recollections. I went to public school for a year or so. And I do remember when the Nazi Party started because they used to have parades. Kids usually go and watch parades; however when the Nazis paraded, nobody watched. Everybody rushed home because invariably there were great big fights with the Communists. There were a lot of Communists in Germany at that time. Invariably somebody would end up beat up or dead. I also remember walking by buildings where furniture had been thrown out the window because they were throwing someone out of their apartment; mostly it was Jews, but also the Communists.

Before the Nazi takeover, life in Germany was really great. I mean, when I was three, four and five years old, we had a very good life and happy times. My father, in partnership with my uncle, owned the largest wholesale egg dealership in Frankfurt and he made a good living. We had a very nice apartment and it was a good life until the Nazis came to power. I remember the school I went to; it was a Jewish school, and of course the Nazis closed it.

**BOB SHELDON:** Did your father travel around the rural parts of Germany working with the farmers to get the eggs?

**AL LIEBERMAN:** No, he was in a wholesale business. He bought the eggs

from various farms and then they packaged them in the shop, and then they delivered them to the local groceries around Frankfurt. He had a deliveryman, a young man who would drive a vehicle that was like a motorized tricycle with a very large carrier in front, and they would put the egg crates in the front of that vehicle and he would deliver all them to the customers. I remember this young fellow because I got to know him. He joined the Nazi Party like many others in Germany at the time. When things got bad, my father sent my sister and me and my mother to Saarbrücken; this was the home of my maternal grandparents. My father and uncle stayed in Frankfurt a little longer. Then one day they told this young fellow, the delivery boy, that they wouldn't be in for a week or so, but he should continue running the store while they were gone. They then left and joined us in Saarbrücken, but they didn't want to tell anybody that they would not return. My father owned an apartment with furniture and all that, and they just left.

**BOB SHELDON:** Left it all behind?

**AL LIEBERMAN:** Left it all behind. Then they went to Saarbrücken to pick us up and we all left Saarbrücken and went to Belgium and for a time we stayed in Blankenberg, a beach resort in Belgium.

**BOB SHELDON:** Saarbrücken was in between Germany and France?

**AL LIEBERMAN:** Right. And after World War I, [it] became independent of both Germany and France. It was in between the two. In 1935, I believe—we were in France at the time—they had a referendum to vote whether they wanted to go to Germany, to France, or stay independent. At that time, my mother went back, because she was born in Saarbrücken, to vote for continuing independence. But the Nazis had so infiltrated the Saar that the vote was to join Germany. So that was the end of the independence of Saarbrücken. But at the time we escaped, it was still an independent country.

**BOB SHELDON:** Did many of your friends or neighbors leave Germany about the same time you did?

**AL LIEBERMAN:** No, not many. Some left but many of them stayed on because they believed that the Nazi party was a passing trend. My father and my uncle had foresight and they saw the handwriting on the wall. A number of my other relatives also left at that time.

**BOB SHELDON:** Did your grandparents leave Saarbrücken at that time too?

**AL LIEBERMAN:** No, they did not. They left a little later after my grandfather

# Military Operations Research Society (MORS) Oral History Project Interview of Alfred Lieberman, FS

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had died. My grandmother went with an aunt and uncle and they moved to Copenhagen, Denmark, and the Danes treated them very well. I don't know if you recall but all of the Danish Jews were taken out one day by ship by the Danes, taken across to Sweden, and they spent the rest of the war in Sweden. Most of the Danish Jews were saved that way. And my grandmother was among them as well as my uncle, aunt and cousins.

**BOB SHELDON:** Was your family ever able to go back to Germany and recover any of your effects?

**AL LIEBERMAN:** My mother and father never went back to Germany. But yes, some recovery was made because after the war, the Germans had something called restitution and my father put in a claim for himself and me, as well. He received a pension from the German government to cover the loss of the apartment and the loss of the business. I got some money because they ruled that I had lost a year of schooling and therefore I was entitled to compensation. I recall that my father had me fill out these forms. I mailed them off and about two years later, I got a call from the Bank of Bethesda: "Can you come here? We have a check from the German government for you." So I did get something and he got a pension. He got that pension up until the day he died.

**BOB SHELDON:** Have you ever gone back to visit your family's neighborhood in Frankfurt or in Saarbrücken?

**AL LIEBERMAN:** No. I have been back to Frankfurt once on a business trip. I have also had business meetings in various other parts of Germany. The City of Frankfurt passed a law where they would invite all the people that were chased out by the Nazis, to spend two weeks in Frankfurt at their expense. And they would fly you over and put you up in a hotel. I was invited twice and I couldn't make it either time. But my sister who lives in San Francisco accepted this year and she did go to Frankfurt. She said it was a great trip. They took her out and showed her all of Frankfurt, took her back to her old neighborhood. They are making a real effort to show us the best side of Germany.

**BOB SHELDON:** Now we have you in Belgium; how long did you stay there?

**AL LIEBERMAN:** Six months. Six months in Belgium.

**BOB SHELDON:** Who were you staying with?

**AL LIEBERMAN:** We stayed in hotels. We were able to do this because my father had some money. Then from Belgium we moved to Paris. In Paris my father went into the dry goods business; he had a dry goods store for a while. Later he became a stockbroker and eventually that's what he did, worked for a brokerage house as a stockbroker. I went to public school and then to high school in Paris. There was an event that—when the war started—when France entered the war with Germany, I was called to the Principal's office at the high school, "You were born in Frankfurt, Germany and we're not going to have any Germans in our school while we're at war, so go home, good-bye." Well fortunately, I got home and my mother explained that we were Polish citizens because my father was born in Austria-Hungary, which after World War I became Poland, and we became Polish citizens. So even though I was born in Frankfurt, I was on his passport as a Polish citizen. So my mother took me back to school and said, "Wait a minute, we're Polish citizens and France is at war because of the German invasion of Poland. The Poles are our allies, how come you're throwing Poles out of school?" They said, "He can come right back to school." But one of my uncles had a different story. He was born in Germany. Since he was a German, the French put him in a detention camp. Of all the Germans in the camp, ninety-five percent of them were Jews. But it was one of the things they did.

**BOB SHELDON:** I never read about that before.

**AL LIEBERMAN:** Yes. A lot of people do dumb things at times. I think they were still worried about a German Fifth Column; something like that occurred during World War I. So anyway, I lived in Paris. I went to public school and high school, took two years of high school, until 1940. Around late May 1940, just before the Germans were approaching Paris, we took a train to southern France. The train was crowded with wounded soldiers and other people trying to get away. We went to Biarritz, a beach resort south of Bordeaux, not far from the Spanish border. We stayed there for several months. France was divided into two parts; one run by the Vichy Government and the other occupied by the Germans. The Germans sent their troops down on the coast; all the way down to the Spanish border. They took a thin slice of land on the coastline.

So we left again. My father hired a guy with a truck and we all rode in the back of the truck and went to the Spanish border. There a train took us across Spain into Portugal. When we arrived at the Spanish border, the Germans were already there. Advanced motorcycle troops were already there, but they didn't pay much attention to us. At the border, the French had inspectors. There were a number of things that we were not permitted to take out of France. Some of my relatives that were with us had jewelry and cash, and some were afraid to go across so they didn't go. One of my uncles that did not come with us eventually died in a concentration camp. But some of us went across. I remember seeing people handing the French border guards piles of money to not look at certain bags.

In Spain, we were not allowed to leave the train. The train traveled through Spain to Portugal. Every time we got to a station where they had soldiers, Spanish soldiers outside, nobody could leave the train. We could get off at the stations to buy something to drink, but got right back on the train. At that time I was fourteen. I got off at one station and bought something and the train started moving, and I couldn't get back to the car I was in. I ran like hell and I got to another car, but I couldn't go from one car to the next one. Well, you can imagine how my parents were reacting to that; they did not know that I got on another car. I was in the other car, and when we stopped at the next station, I was able to run up and get back in the car with my parents. That was quite an adventure because if they lost me there, God knows what would have happened.

So we got to Portugal and the Portuguese sent all of us to a place called Curia. Curia is a small resort town. It is known for its well water; people vacation there and drink the waters. It is a very nice place in the country. We were kind of interned there, but in a golden manner, restricted to stay in a fancy hotel in Curia. There were several hotels in this resort. We stayed in a hotel called the Grand Hotel because the people who ran the hotel spoke German. We didn't speak Portuguese, and they didn't speak French, so they spoke German, and that worked for us. I think we stayed there for four or five months.

**BOB SHELDON:** Did you learn French while you were in Paris?

**AL LIEBERMAN:** Yes. I learned French while I was in Paris.

**BOB SHELDON:** But you weren't in Portugal long enough to learn Portuguese?

**AL LIEBERMAN:** No, I learned some words but not enough to understand. We wanted to get out of Portugal, because everybody was afraid the Germans would eventually move into Spain and Portugal; nobody knew what they were going to do next. Fortunately, it turned out that in 1938, my father and my uncle one day were walking in Paris and passed by the American Embassy, and in the spirit of the moment decided to drop in and apply for a visa. They never thought that they would actually go, but they went in and applied. So by the time we got to Portugal, we went to the American Consulate in Porto and I went with my father because I was the only one that spoke some English. I had two years of high school English in Paris, so I was the translator. I went because at the Embassy, they spoke Portuguese and English, but not French or German. So we came in and explained that we have been waiting for two years, we're on the list. They looked it up and sure enough, we're on a list and our name came up. We were on a Polish quota; there were quotas for each country. They asked my father what he was going to do when he came to America, and I had to tell them that we would raise chickens on a farm. He was an expert in eggs. Somehow my father thought a chicken farm was what would be acceptable. So with my two years of high school English, I translated all of this and sure enough, we got our entry visa to the United States. My father had friends in New York and my mother had an aunt who lived in New York; they vouched for us.

**BOB SHELDON:** In Portugal, were there concerns about Franco being the Dictator of Spain and his relationship with the Germans?

**AL LIEBERMAN:** Yes, there were some concerns, however the main worry was that the Germans would enter Spain and Portugal. A dictator, Salazar, also ran Portugal, but he was a benevolent dictator. Salazar was a Professor of economics who became President of Portugal. He was a dictator, but not like Franco and certainly not like Hitler. Anyway, we got on the list to come to the United States. We traveled on a Portuguese ship that went from Lisbon to New York.

**BOB SHELDON:** Was this in 1940 or forty-one?

**AL LIEBERMAN:** This was in December 1940. We arrived in January of '41. At that time,

there were a lot of U-boats around and there was always this fear, but we were on a Portuguese ship and they were neutral. So we arrived in New York. We arrived at Ellis Island and my mother's aunt who lived in the Bronx got us an apartment, or rather we sub-leased one and that got us started in the United States. When I arrived I first went to a public middle school. I could only speak a little English so I spent two months in middle school, and then once I started speaking the language, skipped to the middle of high school.

**BOB SHELDON:** What did your dad do for a living when you were in the Bronx?

**AL LIEBERMAN:** He became a stockbroker and he did that the rest of his life. He tried several businesses and they were moderately successful. In 1944 I was drafted into the Army, and I became a citizen while in basic training. They sent me Camp Blanding in Florida for basic training, and then I went to Fort Knox and Camp Campbell.

**BOB SHELDON:** What was your skill area in the Army?

**AL LIEBERMAN:** I became a tank mechanic; they sent me to tank mechanic school. When I first was drafted I was sent to infantry basic training. When I got through with basic training, they sent me to the ASTP [Army Specialized Training Program]. I was sent to the University of Connecticut and I spent several months there. Then they sent me to the University of Maine where they gave us engineering courses. After I got finished with that training, they sent me to Fort Knox to tank mechanic school. This happened in a strange way. One day in basic I was called in to the First Sergeant who said, "You have the highest IQ in our battalion, so you have a choice. Want to go to cook's school?" "Not really" "How about tank mechanic school?" "Yes, I'll take it, I'll take it." So I went to tank mechanic school and I graduated, I believe, second or third in the class. So I did very well at tank mechanic school. However once it came to fixing a problem with a tank, I really wasn't very good at it. So that's what I remember from then. In 1946 I was discharged from the Army.

I had started at the City College of New York studying engineering. When I came back I decided I didn't want that. I decided to go into statistics. Statistics was taught in the business school at City College. So I took courses in statistics and graduated with a degree.

**BOB SHELDON:** What motivated you toward statistics?

**AL LIEBERMAN:** I like numbers, I play with numbers, I'm good at numbers, you know. Originally, I thought engineering but I lost my interest.

**BOB SHELDON:** Any notable professors that you remember?

**AL LIEBERMAN:** There was a professor of statistics at the City College who really enhanced my interest. Then in 1950 I got married and decided to move to California. My sister and her husband had moved to California, so my wife and I decided to go there. We got in an old beat-up car and we drove to California. The car died somewhere near Albuquerque out in the desert; the car broke down. Fortunately a couple of guys working in Los Alamos came driving by and stopped, "What's the problem?" They were able to fix that engine and get us started. So we got through and we eventually did get to California; we moved to Los Angeles.

**BOB SHELDON:** So you couldn't fix tanks and you couldn't fix cars.

**AL LIEBERMAN:** That's right. In Los Angeles, we lived there for about two years. I had a number of jobs. I worked at the Bank of America for a little while, but my main job was with the Regional Planning Commission, which conducted city and town planning, zoning and things like that. I worked there for a couple of years, and then we decided to move back East. When I came back East, we couldn't find an apartment and I couldn't find a job.

**BOB SHELDON:** Back in the Bronx again or New York City?

**AL LIEBERMAN:** We came back to New York, the Bronx; I couldn't find anything in New York. So I decided to come down to Washington. I found a job at Fort Detrick in Frederick, Maryland. It was in biological warfare, working for a contractor. I got a job there as a statistician. At the time, I was the first statistician they hired to help with the analysis. When I first came in, they didn't have any special office for me to work in, so I worked with the bacteriologists and they were inside a "hot" area where you had to take showers when you came out.

**BOB SHELDON:** Is that near the big "Eight Ball"? [According to Fort Detrick visitor's information, "... 40-foot-high stainless steel sphere that everyone on base calls the 'Eight Ball' ... a one million liter test sphere

built for aerobiological studies of agents highly pathogenic to man and animals . . .”]

**AL LIEBERMAN:** Yes, by the Eight Ball, right. I did a lot of work with the Eight Ball. So it meant I had to shower twice a day, come out for lunch and shower and in the evening, shower. The most interesting story about this occurred when a bachelor friend who worked there had rented a room upstairs in somebody’s house and the room came with a shower, but he never took a shower because he was taking two a day at work. But he was so worried about what the people downstairs would think that he let the shower run every morning for a while even though he did not step into it. Eventually they built offices outside the hot area and hired a whole staff. I became the deputy of that shop in charge of the design of experiments and analysis, and the man in charge was Jay Leary, who was an experienced statistician.

**BOB SHELDON:** How many statisticians did you have there?

**AL LIEBERMAN:** Eventually we built up to at least ten and then there were a lot of people working on calculators. That was before the age of big computers and we had a lot of calculators; people who do analysis of variances. We did a lot of analysis of variance, regression analysis, probit analysis, etc. In the Eight Ball, we ran experiments where they would either explode the munitions or disseminate them by spray procedures. Then we would pick up samples to see what portion of the bacteria survived. We performed tests on animals, monkeys and mice that would be exposed through holes in the Eight Ball.

**BOB SHELDON:** Since a lot of our readers probably have never even seen the Eight Ball, can you describe it?

**AL LIEBERMAN:** The Eight Ball was a huge sphere. By huge, I mean, I don’t remember exactly the size, but a couple of stories high. It was enclosed and it permitted the control of the humidity and temperature inside of this sphere. There were holes on various sides where they could stick monkeys’ heads in, or mice. Then they would explode or disseminate munitions in the middle of this ball. And then we had petri dishes all around to pick up samples of what survived. Usually it was just a small percentage because one of the things with bacteria, a large portion would not survive the explosion of the munitions. We would calculate the proportion of the bacteria that would survive and the lethality of these doses. I think

anthrax was one of the main agents that were being studied, there were some others, too. We would run these experiments both with animals and with petri dishes, and calculate the effectiveness of various combinations of munitions.

**BOB SHELDON:** What kind of an explosive did they use to set those off?

**AL LIEBERMAN:** I am not sure about the type of munitions used. The test weapon was in the middle of the Eight Ball where it was suspended and blown up. These were munitions that would be dropped from airplanes.

**BOB SHELDON:** What years was this?

**AL LIEBERMAN:** We’re talking the 50’s. I worked there from October ’52 to October ’55.

**BOB SHELDON:** What kind of experimental designs did you use?

**AL LIEBERMAN:** Latin squares and fractional factorials were the ones used more than anything else.

**BOB SHELDON:** How many variables would you typically play around with in your experiments?

**AL LIEBERMAN:** It was quite a few, for example, the size of the dose, the humidity and temperature. I’d say there were four or five variables. And we did mostly the analysis of variance and regressions in order to determine the critical variables and their interactions. We also did probit analysis to find the LD50 and compared the dose sizes required for various agents.

**BOB SHELDON:** What is LD50?

**AL LIEBERMAN:** Lethal dose fifty. That is where fifty percent of the animals would die.

**BOB SHELDON:** That’s similar to circular error probable (CEP) where fifty percent of the kills are within a given radius.

**AL LIEBERMAN:** This is the dose that kills fifty percent of the animals.

**BOB SHELDON:** Did they have a comparative approach to determine what the dose was for an animal compared to a human?

**AL LIEBERMAN:** There was work on that, but I never worked on it.

**BOB SHELDON:** Did you try to emulate foreign weapon systems or were you trying to emulate U.S. weapon systems?

**AL LIEBERMAN:** Just U.S. weapons as far as I knew.

**BOB SHELDON:** What was the level of security classification of your experiments?

**AL LIEBERMAN:** Secret. I am sure that there was some work at higher security levels

but I worked mostly at the Secret level. We also got a lot of shots. I don't know what all the shots were for. I'm not certain that they didn't conduct experiments on us, but I don't know for sure.

**BOB SHELDON:** Was your statistical training at CCNY adequate for the statistics you were using or did you take some more advanced courses?

**AL LIEBERMAN:** I went to the University of Southern California. They didn't have a statistics department, but they had an economics department and statistics was taught in the economics department. So I took some courses there. Then I went back to school when I was working in Frederick. Two or three times a week I drove to Washington and went to night school. I went first to George Washington then to American University, and I took all advanced courses in mathematical statistics. One of my teachers was Professor Sam Greenhouse. There were several others that were really good.

**BOB SHELDON:** We have software nowadays that does all these statistical tests. How were you doing it then?

**AL LIEBERMAN:** We didn't have a computer. Everything was done by a bunch of people working on Frieden and Marchant calculators and we did it step by step. I also remember we had a sorting process, we used something called McBee cards [also called Hollerith (or IBM) punch cards]—there were big cards and the top of the cards had holes in them and then you punched out a hole. So if you were searching for some document with some combination of key words, you would put these needles in these holes and you'd shake and out would drop the one that you searched for. It was a manual computer. And then we did many experiments and we'd write up reports on each of these experiments and send them out to the chain of command.

**BOB SHELDON:** The chain of command, do you know where they went?

**AL LIEBERMAN:** I think they mostly stayed at Detrick; it was part of the continuous research going on biological warfare. But I do remember this story. We had no air conditioning and it was hot. In the summertime when it would reach a certain heat and humidity level, we were sent home. Well, we were in this building up on the second floor and on the floor below us were the monkeys. They had air conditioning because the monkeys couldn't sur-

vive without the air conditioning. So one day we made a request to use the backup air conditioner that they had for the monkeys. Our request was turned down.

**BOB SHELDON:** The monkeys were more important than you were?

**AL LIEBERMAN:** The monkeys were more important, that's right. It was so hot one day, I remember, we had this elderly lady and in every hallway there was a shower in case of a biological accident, you could wash yourself. But it was so hot one day; she was fully dressed and pulled that shower.

**BOB SHELDON:** Did you study any biology of the process while you were there?

**AL LIEBERMAN:** I learned a little bit, just what I could learn from talking to the biologists. It wasn't really important for us because we were looking at A versus B, and we didn't really care what it was. We didn't have to know that much about it. We did have to learn how to design and analyze experiments. Our boss, Jay Leary, had six large notebooks; I mean thousands of pages. They not only contained copies of parts of various books, but articles from statistical journals, anything of pertinence to the job, he would copy. He gave each of us some of these homemade books and he kept up with the literature all the time. So for the three years I was there, I really kept up with every article that was published dealing with the kind of work we were doing. Then in 1955, the Parson Company that I was working for at the time lost this contract. They had sent two people from their main office to set up this branch and those two people quit, closed shop, good-bye. I was fortunate enough that they held onto me for seven or eight weeks, maybe ten weeks, before I had to go. So I looked for work elsewhere, and I got an offer from a company, AVCO. The work was in Bridgeport, Connecticut. The work involved reliability analysis of the TITAN missile system. Unfortunately my wife got sick from the humidity in Bridgeport and we had to leave.

I then got a job at the Bureau of Ships working for Bessie Day. Bessie Day was in charge of the statistical group of the Bureau of Ships. She wanted me to work for her when I left Detrick, but I took the job in Bridgeport. So when my wife got sick, I went back and contacted her and she said, "You've got a job." So I came and worked for the government. She put me in charge of the experimental design division of the group. I then started designing ex-

periments on all kinds of projects for the Navy. Most of the work was for the Underwater Sound Laboratory in New London, Connecticut. I set up a whole series of experiments on submarine noises. I still remember one of these experiments. I went out in a submarine and I told the submarine commander, "Go down to a hundred feet. Go down to three hundred and come back up to hundred. Go down to four hundred." I had it all randomized. He said, "Can't we just do one hundred, then two, then three?" "No, follow my plan." He couldn't figure out why I made him go up and down but he did it. The idea was to test at various speeds, at various depths, the sound of the submarine. We would turn off various pieces of equipment in order to determine where the noises were originating. The purpose was to make the submarine as silent as possible. I ran these experiments and we analyzed the results, and then reported them. The engineers at the lab would then work on the equipment that created the most noise in order to reduce the sound.

**BOB SHELDON:** Were the statistical designs similar to the ones used at Fort Detrick?

**AL LIEBERMAN:** They were similar; they were the same kind of design. Essentially we were testing the depth of the submarine, the speed of the submarine, which motors were running on the submarine and what equipment was turned off. There were no probit analyses however.

**BOB SHELDON:** Did you do screening experiments to narrow it down to a couple of variables for more detailed experiments, or did you usually quit after the first set of experiments?

**AL LIEBERMAN:** No, we went on. We did more and more until we found exactly where the noise came from. Then when we found the source of the noise, there were engineers over there that would see how they could dampen down that noise, do something about it and make it as low as possible. But we did other experiments too. I remember I did some work for Admiral Rickover. I remember being sent out to set up some experiment in Columbus, Ohio. I don't remember much of the details of the experiment, but I do remember the event because the Admiral insisted that when we traveled for him, we'd leave that same day, not the day before, and arrive to work at 8:00 A.M. in the morning and return that same evening. So we had to get up at an unearthly hour to make that flight. But he said, "You're not going

to waste money having to spend the night somewhere."

**BOB SHELDON:** Did you meet him personally?

**AL LIEBERMAN:** Yes. He was quite a guy, a very bright man.

**BOB SHELDON:** The Smithsonian American History museum recently had an exhibit on submarines. They had headsets you could put on and listen to what the acoustics sounded like underwater. Did you actually listen to it yourself or use acoustical measuring devices?

**AL LIEBERMAN:** We had a measuring device and I may have heard some of the recordings. I did mainly the experimental design analysis and then we had engineers that would do the technical work.

**BOB SHELDON:** When you were doing your measurements, did you convert to decibels or use other transformations?

**AL LIEBERMAN:** Yes. I think we did logarithmic and other transformations.

**BOB SHELDON:** Where were the offices located?

**AL LIEBERMAN:** They were located in Washington in the main Navy building, which was on Constitution Avenue. I don't know if you remember, there were two of them. Two large buildings connected by bridges. They were temporary World War I buildings. And that's where we worked. It was on Constitution and Eighteenth or Nineteenth Street. Anyway, I worked at the Bureau of Ships from '55 to '58. One of the most memorable events that occurred to me during that period of time was the day my boss said, "Al, I have a job for you this morning. Sir Ronald Fisher is coming to visit us and your job for one week is to take care of him." I said, "Yes, Ma'am." She knew Ronald Fisher very well. So Ronald Fisher arrived and my job for a week was to take him around Washington. I took him to various museums and all that, but there was another major issue. That was at the time when—I don't know if you recall the Suez Canal crisis, when the Israelis, the French and the Brits took over the Suez Canal and Eisenhower told them, "Get out of there and go back." It had just happened and Ronald Fisher was so mad at Eisenhower, for the whole week he complained to me about it.

**BOB SHELDON:** This is the Fisher we call R.A. Fisher?

**AL LIEBERMAN:** R.A. Fisher, that's the Fisher, often considered the father of statistics.

My proudest moment was that when he gave several lectures, and in one of them I was on the podium with him. It was Fisher and Lieberman. He gave a talk and I gave a talk, and somewhere at home I still have the agenda of the two of us speaking.

**BOB SHELDON:** What were the topics of the talks?

**AL LIEBERMAN:** I remember the topic of his talk because in those days, Fisher made a big mistake. He maintained that lung cancer and smoking were not related.

**BOB SHELDON:** Was he a smoker?

**AL LIEBERMAN:** I don't think so.

**BOB SHELDON:** And this was in the late 1950's?

**AL LIEBERMAN:** It was while I was at the Bureau of Ships, so it would have been between '55 and '58.

**BOB SHELDON:** Did he have statistical evidence?

**AL LIEBERMAN:** Oh, yes. He brought a lot of it up. It had something to do with the fact that there were other factors involved. He felt that people that were prone to lung cancer also were prone to smoking, something like that. I should go back home and see if I can find the program. I think my talk had to deal with sequential analysis.

The other interesting thing was about that time my second daughter was born, so Fisher announced the birth of my second daughter. So that was Ronald Fisher.

**BOB SHELDON:** What audiences was he speaking to?

**AL LIEBERMAN:** Statisticians. I don't remember exactly where we were, maybe it was at the Bureau of Standards or at NIH. He was here for a little over a week and then he went on to Australia.

**BOB SHELDON:** Was his visit sponsored by the Navy?

**AL LIEBERMAN:** No, it was not. Some Australian university hired him to teach there for a while. On his way from Britain to Australia, he passed by the United States. He came here because he knew Bessie Day; he knew a bunch of people. In 1958 I left the Bureau of Ships and that brings us to Jack Youden. Jack Youden was one of the statisticians that worked at the Bureau of Standards.

**BOB SHELDON:** Didn't he work for the war department during World War II as a statistician?

**AL LIEBERMAN:** He did. He worked on the submarine detection problem and stuff like that during World War II.

**BOB SHELDON:** Did you work with him on projects or just meet him?

**AL LIEBERMAN:** We were together at statistical lectures. At that time I was deeply involved in the American Statistical Association. In fact I was on the council for a year. We went to a lot of meetings and Youden would be there and he was very friendly with my boss, Bessie Day. So I got to see him quite often. There were others in those days, such as John Tukey. I got to know him. He was a very bright man. There was also Marvin Zelen, another good statistician from the Bureau of Standards and of course, Phil Desind, a very good statistician who worked at the Navy Department. So I got to know a lot of statisticians. Then in '55, Youden recommended me to the Institute for Defense Analyses (IDA). IDA was looking for somebody to do experimental designs. They were going to run a series of field tests and they needed an expert in experimental design. Apparently they went to Hugh Miser, who at that time was head of the Air Force OR group. They asked Hugh if he could recommend somebody. Miser asked Youden and Youden recommended me. So I got a call to come over. I went for an interview and got the job. IDA had about six or seven people interview me, all of them were very nice except for one, Koopman.

**BOB SHELDON:** Bernard Koopman?

**AL LIEBERMAN:** Bernard Koopman, I'll never forget him. Bernard Koopman—I'm sitting in his room waiting for him to come and interview me. Koopman comes in and said, "Did you take any math courses?" I said, "Yes" and I listed 15 to 20 courses that I had taken. He then asked me, "What about this course?" I said, "No." "What about that course?" I said, "No." And he went through about ten courses that I didn't take. He said, "Well, it looks like you're not interested in math at all." Two weeks later they offered me a job.

**BOB SHELDON:** In spite of Bernie Koopman.

**AL LIEBERMAN:** Yes, I was hired in spite of him. So they offered me a job, and then I went to work for IDA. I was assigned to a group that ran a large series of tests on electronic countermeasures (ECM). I designed the field tests and did much of the analysis. We also did computer simulations. The tests were quite interesting. We did one test with the Navy out

at sea in a naval task force with air defenses. The Air Force would then attack the task force with various levels of ECM. We would evaluate the effectiveness of the ECM.

[There was] one interesting event that I remember. The test was set up where the task force would face the US coast and defend a 90-degree pie sector. We were out at sea one day, and the combat air patrol aircraft (CAPs) were out forward to intercept any incoming aircraft, when all of a sudden coming from Cuba are a dozen B-47's. And by that time the CAPs were way out front. They were running low on gas and they couldn't go back to intercept the B-47's. Well the Navy was really upset and said, "This test is supposed to be of a 90-degree pie sector in the front." We had a meeting where this was discussed. The senior Air Force Colonel after lunch comes in with a big box and he opens the box, "To my Navy friends I give this pie. You can see that a pie is three hundred and sixty degrees." And he presented the pie. Anyway, the Air Force ended up saying, "Look, we don't know whose B-47's they were, but they're not ours. We don't know who sent them, but it won't happen again."

There was a lot of inter-service rivalry, but still everyone in the end worked together to improve our forces. Anyway, we ran a number of these tests, and I remember one that we ran in the Chicago area. Chicago was the target and was defended by fighter aircraft and Nike missiles. The bombers would come from Canada and they would use chaff and ECM while defense was controlled by the SAGE system. SAGE was a huge complex of IBM computers, I mean, you can't believe how many. It was like—you'd have this whole floor full of computers.

**BOB SHELDON:** What does SAGE stand for?

**AL LIEBERMAN:** It stood for Semi-Automatic Ground Environment. Our tests in Chicago dealt with B-47 aircraft, using a variety of ECM techniques, penetrating at various altitudes. Fighter aircraft and Nike missiles defended the Chicago area. Well General LeMay was the Air Force Chief of Staff at the time, and he wanted the Air Force to win no matter what. So one day in the middle of the night, we had those B-47's come in over Chicago at about one hundred and fifty feet. We had numerous complaints about the noise these aircraft made over the city. In addition, they dropped so much chaff over Canada that they shorted power

lines. Furthermore, a number of cows got sick from eating the chaff. Anyway, we ran these tests and they helped in improving both our electronic countermeasures as well as our defensive systems.

**BOB SHELDON:** Was IDA doing this for one of the services?

**AL LIEBERMAN:** IDA was doing this for the JCS, the Joint Chiefs of Staff. We had two bosses, JCS and DDR&E; Harold Brown headed DDR&E at that time.

**BOB SHELDON:** What year were you doing these studies?

**AL LIEBERMAN:** At IDA, I worked there from February of '58 to October of '63, so it was sometime in that period.

**BOB SHELDON:** Was there an impetus for these studies from the Cuban missile crisis?

**AL LIEBERMAN:** The impetus for these tests was to see how our air defense systems would work in an ECM environment in defending against penetrating Soviet bombers. At the same time, we also examined what the impact of jamming and the use of chaff was on the capability of our bombers in penetrating the Soviet Union.

**BOB SHELDON:** Did we try to mimic the Soviet radar capabilities or did we just use our own?

**AL LIEBERMAN:** We used our own radars. After this series of field tests, we built a simulation model. The model had two major components: one was a simulation of interceptor fighters, and the other was of surface to air missiles. We would take some of the data that we got from the tests to calibrate the model. We then used the model to examine a number of other situations.

**BOB SHELDON:** What types of variables did you play around with? Was radar cross-section a factor?

**AL LIEBERMAN:** Yes, radar cross-section was a factor, jamming was a factor, and the use of chaff, the altitude of the bombers. They mostly came in very low. I remember one case where one fighter locked onto a boat on Lake Michigan. So those were my years at IDA until sometime in October of '63. At that time there was a fellow at the Arms Control & Disarmament Agency (ACDA) by the name of Les Kahn. He was running a joint project between ACDA and the Department of Defense called Project Cloud Gap. Project Cloud Gap dealt with the field-testing of on-site inspection techniques for inspecting arms control agreements.

He was looking for someone with experience in field test design and analysis. So since he had been working at IDA in the past, he went to IDA to find out if someone was there, and they pointed him to me. He talked to me and he asked me what did I think about working with him. I told him that I would be interested. So the next thing that happened was a letter from the Director of the Arms Control Agency, at the time William Foster, to McNamara, who was Secretary of Defense, saying they would like to borrow Al Lieberman who works at IDA to help them out with some of these tests. McNamara sent the request to IDA and asked if we could do this? And, of course, coming from McNamara, they said, "Sure." So I was on loan to ACDA for six months.

**BOB SHELDON:** Where was ACDA located?

**AL LIEBERMAN:** ACDA was located in the State Department Building. Project Cloud Gap, however, was at that time in offices right next to the White House. It was in one of those little buildings by Lafayette Square. It was before they put up the large building that is now there. In fact, my office looked into the bedroom of the Blair House. So I was put on loan to ACDA and worked on Project Cloud Gap. There were a number of other civilians working there as well as military officers. We started designing some field tests dealing with on-site inspection of Soviet military facilities. Of course in those days, everybody thought that was a pipe dream to think that the Soviet Union would let us inspect their facilities. But nevertheless, the decision was made to do some experiments. It was interesting work. There were many bureaucratic problems, however. Project Cloud Gap was responsible to a review board which set policy and approved our test. The review board was composed of a representative from ACDA, the Defense Department, the State Department, CIA, and the Atomic Energy Commission. They each had a senior representative. We would brief this board as to what our plans were and they would have lengthy debates on each of our proposals. Eventually we'd get approval and we started running, first small experiments, and then larger ones.

**BOB SHELDON:** What did you experiment on? Live atomic explosions?

**AL LIEBERMAN:** Oh, no. We did on-site inspections. For example, we had an experiment to determine the type of inspection that would be required to determine the military

equipment at an Army base. What we did was to put together a group of inspection teams of various sizes—mostly military officers—to count how many tanks were at Fort Hood in Texas. We had various size teams, some of two inspectors, some of four, and so on. The teams had varying degree of access. Some could only go by certain areas of the place to look, others could go in deeper. Some had equipment with them, like cameras, seismographs and other equipment. So the variables were various degrees of penetration, various type of equipment, various sizes of teams. Of course, we also collected the "ground truth" against which we could compare the results of the test.

**BOB SHELDON:** Were these classified secret?

**AL LIEBERMAN:** Yes. Classified secret, but some of them are unclassified now. We also ran a whole series dealing with nuclear weapons. One of them dealt with a proposal made by President Eisenhower. Under this proposal, we stated that we would get rid of fifty thousand kilograms of weapons grade uranium if the Soviets would get rid of thirty thousand kilograms. The Soviets said, "Well, that's just propaganda because you'll just produce additional uranium and it would have no impact on our weapons program." We replied by stating that we would actually take the nuclear material out of some of our weapons systems. And in order to verify this fact, we would have on-site inspections. We ran a test to see how such an inspection would be performed. Keep in mind that we are dealing with highly classified material, and we had to set up an inspection scheme which could do this verification without compromising security. We again set up various inspection teams, various amounts of penetration. The essence of the inspection plan was that the weapons would be dismantled inside a sealed laboratory. The inspectors would inspect the lab before the weapon entered the lab to make sure that no nuclear material was stored there. The inspectors would then be posted at the entrance of the building, and they would observe the weapon being brought into the building. The inspectors would look at it and be able to check on certain parts of it and in some cases make measurements (such as Geiger counters). No inspector could go inside the laboratory while the weapon was being taken apart. Then it would come out in pieces and we would have inspectors look at these pieces and see that indeed,

that nuclear material came from the nuclear weapon.

**BOB SHELDON:** Was that test also at Fort Hood?

**AL LIEBERMAN:** No, Fort Hood was the test to count the tanks. This test was at Oak Ridge National Laboratory. We had another test of conventional forces at Fort Lewis in the state of Washington. Our biggest test was run in the U.K. We had a group of British officers working with us. The purpose of the test was to inspect all the military installations in a part of Great Britain. The British military were the object of inspection and American military were the arms control inspectors. This was a joint test with Great Britain, and the British appointed a brigadier to be test director, and one of the fellows working for me was appointed technical director. This field test ran over a period of six months. It was a very interesting and useful test. The British brigadier was very good and quite a showman. He invited people from NATO who came to view the test. He also invited the Russians as well as some of the Eastern Europeans, but none of them showed up. However, we got a good deal of publicity.

**BOB SHELDON:** What kind of variables did you exercise on that test?

**AL LIEBERMAN:** Team size was one variable. The degree of access was another—some of the inspectors were just outside the camps and had to keep track of things from there, others could actually go in and count things. Equipment was another factor—some inspectors could use cameras, some were able to install unattended seismometers as well as other equipment. The test area was very large and required substantial travel by the inspectors. And finally, the area was overflowed by a U2 aircraft. I didn't know about these overflights when we started the test. I did not have the necessary clearance for the U2 program. I did get that clearance after the test for the analysis. When we designed the test, however, we did not include the U2 overflights into the test design. Also noteworthy was the fact that we had an agreement with the British that no U2 aircraft would overfly Great Britain. A special waiver was worked out for this test with British officials, since it was a joint program with the U.K.

**BOB SHELDON:** Studying all these variables, you must have an appreciation for how difficult it is to find WMD in Iraq?

**AL LIEBERMAN:** Yes, it can be very difficult, very difficult. But, of course, we were looking at conventional forces that we were trying to count.

**BOB SHELDON:** Tanks?

**AL LIEBERMAN:** Yes, and estimates of personnel manpower, keeping track of helicopters and military aircraft, as well as other military equipment. They were all fairly large pieces of equipment, and manpower. And, of course, one of the big things in all these tests was to generate the "ground truth," that is, what really is in the area. We found that nobody really knew exactly how many tanks and other pieces of equipment they really had. We found that at Fort Hood and again here.

**BOB SHELDON:** Whom did you report to when the test was done?

**AL LIEBERMAN:** We reported to our review board, the reports went to ACDA, Defense, CIA, State and the AEC. A report also went to the U.K. The results were preparations, so if we ever reached some agreement on on-site inspections, these tests produced some guideline as to what kind of on-site inspection we should have.

**BOB SHELDON:** Did you run any other kind of test?

**AL LIEBERMAN:** We also ran a test on the detection of underground nuclear detonations for the test ban treaty. We ran that in Nevada. We had teams planting various evidence of underground nuclear tests in some hidden areas in the desert. We had various inspection teams driving around, trying to look for the evidence. The inspectors covered large areas in the Nevada desert. Again the variables were team size and equipment availability. We conducted all these tests, and we did have some guidelines for when the time came when agreement was reached on on-site inspections. Eventually, the time did come and I think that some of our findings were useful.

**BOB SHELDON:** Did they share that with the U.N. too?

**AL LIEBERMAN:** We did not share with the U.N. at the time. Now later on, we may have. I know when the test reports were first written, they were classified. We also, in many cases, had an unclassified version of some of these tests. But the results did go to all the government agencies that were involved in the arms control process.

**BOB SHELDON:** What happened to Project Cloud Gap?

**AL LIEBERMAN:** The project lasted for a number of years and somewhere along the line the project was abolished because of two factors: 1) It was a pretty expensive project. It was jointly funded by ACDA and the Defense Department, and each of them put in three or four million dollars every year; and 2) There was a feeling that we would never get agreement from the Soviet Union for on-site inspection. So it was disbanded, but the Arms Control Agency then transformed its part of the contribution to what we called the Field Office. We continued running tests, but it was no longer with the Defense Department. We mostly ran a lot of simulations and stuff like that. And then eventually that office was abolished all together. Then we were put into the Operations Analysis Office, which was just being created.

**BOB SHELDON:** How large was that?

**AL LIEBERMAN:** At the beginning it was very small, and then I took it over and I built it up to about twenty-three, of which about five or six were military officers. In the early days, I had at least one from each service, one Army, one Navy, one Air Force, sometimes more than that. I had some very good people working for me.

**BOB SHELDON:** What kind of issues did you tackle?

**AL LIEBERMAN:** We had a large model of a nuclear exchange which we used to examine various arms control agreements to determine whether or not certain provisions were advantageous to the U.S. And we looked at nuclear exchanges and we looked at strategic force reductions of various kinds. We calculated results showing how various arms limitation provisions would affect us. We finished these reports and those reports helped formulate the position of the Arms Control Agency on a number of issues. One of the key issues was whether or not we should abolish the MIRVing of ballistic missiles. We did several studies on whether it would be advantageous to the U.S. This issue was one of the big questions, and that was before us. The problem was that at the time we were way ahead of the Russians in MIRV technology.

Some of our studies warned that they had larger missiles and some day might load more MIRVs on them than we had. We also showed that MIRVs created a destabilizing situation since one attacking missile could destroy several missiles silos. It was however not possible at that time to convince the inter-agency that

MIRVs should be limited because we were so far ahead of the Soviets. In the end the Soviets caught up and loaded many more MIRVs on their missiles than we did on ours. It was not a smart decision to forgo MIRV limits, but maybe it couldn't be helped.

**BOB SHELDON:** What other strategic studies did you do?

**AL LIEBERMAN:** We did many studies on the survivability of ICBMs. We calculated the survivability of the Minuteman silos to a variety of attacks from the Soviet Union. We performed many studies on strategic stability. These were essentially examinations of the advantage of a first strike and to see how such advantages could be minimized or eliminated. Numerous studies were performed on a variety of ICBM deployments. We examined mobile missiles, very deep silos, digging out mountains for ICBM deployment etc. We also did a very large study of civil defense. Did you ever hear of T.K. Jones?

**BOB SHELDON:** No.

**AL LIEBERMAN:** T.K. Jones worked for Boeing, and then he got a job with the Defense Department and he came out with statements that the Russians had built such a great civil defense system that they could withstand nuclear war while we could do nothing. So we did a very large study which showed that the Russian's civil defense would not save them from disaster in a nuclear war.

**BOB SHELDON:** Did you get your data from the CIA or other folks?

**AL LIEBERMAN:** We got some data from the CIA; we also got a lot of data from the Defense Department and the Services. But the essence was that we ran our nuclear exchange model with many variables and showed what would occur under a variety of different conditions. Our studies showed what disasters would occur in case of nuclear war even with the most sophisticated civil defense. We did the civil defense study, and that study became very important because I testified at some congressional hearings about the results of our study. The results were clear that while a good civil defense program was useful, it in no way undermined our deterrence capabilities. The study showed that our offensive forces would create horrendous damage against even the most advanced civil defense program. Senator Ted Kennedy put an unclassified version of our study into the congressional record.

**BOB SHELDON:** What year was that?

**AL LIEBERMAN:** It must have been in the Seventies.

**BOB SHELDON:** What kinds of questions did they ask you as an expert witness?

**AL LIEBERMAN:** Essentially, the question with Soviet Civil Defense System and the issue was, "Do we need to build a big civil defense system in the U.S.?" "Did we need to add more to our offensive capability to offset the Soviet civil defense?" "Are we really at a disadvantage because of the Soviet civil defense program?" As well as other issues related to civil defense. We had many discussions at MORS on the Soviet civil defense program. It went on for several symposia and was hotly debated.

**BOB SHELDON:** How were your answers received by the Senators?

**AL LIEBERMAN:** They were received very well, in particular by Senator John Warner from Virginia. He was worried about it. Defense was coming up with a proposal where we had a big civil defense program and we would evacuate cities like Washington. The people would go out in the countryside with no clear plan as to what would be done next. In general, our study illustrated what would really happen in a major nuclear war. Not just the human casualties but also the massive destruction of the infrastructure of both the U.S. and the Soviet Union.

**BOB SHELDON:** Did you do any other studies related to the effects of nuclear war?

**AL LIEBERMAN:** Yes, we published a series of maps of just about every city in the United States and many cities in Europe and in the Soviet Union showing what would happen to the city if weapons of various sizes were dropped on it. We calculated fatalities and other damages that would come from radiation, fallout and other nuclear effects. We must have mailed out thousands of those maps to people who requested them. I don't know how they found out but some publications noted that we had these maps. We mailed out these maps all over the place showing the danger of nuclear war and what would happen. We had maps of the United States showing how a major Soviet attack would create fallout over most of the country. These maps would show fallout all over the U.S. Here and there, however, there would be some small area where the maps indicated that there was little or no fallout. So I'd get phone calls asking me if these were safe areas. I got calls from a bank out west. They said, "We want to bury our records in some place that is safe. Tell us where the safest place

is so we can dig down there and bury our records underground, so if there is a nuclear war, we can recover our records later." I told them, "Look, these are simulations and fallout varies depending on winds and other factors. You can't find safe areas from these maps. The best I can tell you is to stay away from big military installations."

**BOB SHELDON:** What other nuclear studies did you do?

**AL LIEBERMAN:** We did a lot of work related to the detection and identification of underground nuclear tests. This work was in support of the Comprehensive Test Ban Treaty and Limited Test Ban Treaty. These studies dealt mostly with seismic detection and statistical analysis to determine our capability in detecting underground nuclear tests at various locations and using various seismic networks as well as other means. One of the key problems was to distinguish between earthquakes and explosions. Another problem was to examine detection capability against potential evasion techniques. On the Limited Test Ban Treaty that prohibited testing over a hundred and fifty kilotons, our studies dealt with our capability to determine that the hundred and fifty-kiloton threshold was not exceeded.

**BOB SHELDON:** Did they study things like that by doing live tests or by simulations?

**AL LIEBERMAN:** I think the Atomic Energy Commission ran a few tests in which they decoupled the explosive from the ground by putting it in a large cavity. A number of tests were also run on softer material, such as alluvium, which tended to muffle the seismic signal. We also spent a good deal of time on some of the Soviet capabilities in evading our detection. The Soviet Union has a number of areas with large salt mines where they could test.

**BOB SHELDON:** Did they do tests on a smaller scale and then scale up the results?

**AL LIEBERMAN:** Yes, we did that too.

**BOB SHELDON:** Scalability is always a problem. Did you have statistical ways of addressing that?

**AL LIEBERMAN:** Yes there's pretty good data on the weapons effect of a nuclear weapon and how to relate smaller ones to larger ones. We also did some work on chemical and biological weapons, on verifying compliance and destruction of chemical weapons. I mean, we can't inspect every chemical weapon, but we developed sampling plans to assure that de-

struction of chemical weapons was done as specified by treaty.

**BOB SHELDON:** What about the reduction of strategic forces?

**AL LIEBERMAN:** Yes. We did some work on the verification of the destruction of missile systems. There is a treaty which eliminates intermediate range ballistic missiles. On the Soviet side this meant the elimination of the SS-20 IRBM. The SS-20 was produced at a facility in Votkinsk. The Soviets also produce other missiles at this facility. In order to assure that they would not produce any more SS-20s, we had an inspection team at the exit from this facility. The missiles would leave the facility on railroad cars. We had a big machine that X-rayed the railcars that came out and we would then try to ensure that the missiles were not the banned SS-20s. We built a computer model to analyze this data and give us assurance that the missiles were indeed not the SS-20s.

There were so many different things that we did. Matter of fact, during the heydays of our operations analysis office, we put out almost two reports a week. We had more than twenty people in our shop. So we put out roughly two papers a week dealing with all kinds of issues. Now some of them were just minor issues, like specific provisions of certain proposed treaties. Others were major studies that required complex models and substantial analysis.

**BOB SHELDON:** Were there any other famous analysts that worked for you at that time?

**AL LIEBERMAN:** We had a number of very good analysts. Jim Hartzler who came from CNA and Glen Johnson. Glen Johnson was a MORS Director at one time. Carl Thorne was and still is a very good analyst. He came to our group as a military officer, and then he retired and I hired him. Later he went to work for the Atomic Energy Commission. He attended many MORS symposia. Of course, Walt Deemer, FS [former Deputy Assistant Director, ACDA] was a consultant for years. He was a consultant until the age of 81 or 82. I'm trying to beat his record.

**BOB SHELDON:** What kind of skills did you look for in the people you hired for your operations analysis group?

**AL LIEBERMAN:** I looked for a mix. We had experts in mathematics, physics, and statistics primarily, but then I looked for some people that were just bright and good at analysis. I think we had a pretty good mix.

**BOB SHELDON:** Did you look for military experience?

**AL LIEBERMAN:** Yes. For one thing, we had some standard military officers so I always requested operations analysts that had either attended the Naval Postgraduate School or any of the other military schools. I usually asked for someone who had a background in operations research and the services usually supplied very good people. I also tried to get people that worked in Air Force Studies and Analyses. I tried to get people that had worked for General Glenn Kent when he headed Studies and Analyses. After he retired Glenn Kent went to work for RAND and we had a series of round table discussions where he kept us honest. I did a little work with Greg Parnell, FS. When he was at Air Force Studies and Analyses, some of the analysts working for him did an interesting study on the value of ICBM reduction.

**BOB SHELDON:** Were you a member of the American Statistical Association when you were working nuclear issues?

**AL LIEBERMAN:** No—I did give a couple of talks at the American Statistical Association a long time ago and I don't recall if they included these tests. But at that time, I was already at IDA where I kind of switched from statistics to operations research even though I worked on statistical problems. This was in the late 50's. I was at IDA between '58 and '63. So I was already getting more interested in OR.

**BOB SHELDON:** Before MORS was a society?

**AL LIEBERMAN:** There were some meetings on the West Coast as early as 1957. In 1962 the first national symposium occurred but MORS did not become an organized society until 1966.

**BOB SHELDON:** What was the first MORS function you attended?

**AL LIEBERMAN:** I can't be exactly sure which was the first symposium that I attended. I know I went to at least one or two while I was working at IDA.

**BOB SHELDON:** Who recruited you to MORS?

**AL LIEBERMAN:** A number of people from IDA went to the MORS symposia. Eventually I asked to go and went with them. I really started attending MORS meetings once I was working at ACDA, the U.S. Arms Control and Disarmament Agency. It was created in 1961 and it ended in 1997 or '98, at which time it was incorporated into the Department of State.

From 1961 to 1998 it was an independent agency and my whole analytic career was spent there. While I was working there I started getting much more interested in MORS. I was particularly interested in arms control and the strategic working groups. After attending a number of meetings I was anxious to become a member of the Board of Directors. I felt that there should be one director representing the arms control area. One of my consultants as well as a good friend was Walt Deemer, FS. Deemer had been a President of MORS. He told me to talk to Clay Thomas, FS. Deemer and Thomas had worked together for years in the Air Force Studies and Analyses shop. So I went and talked to Clay at one of the MORS meetings and I told him, "I'm interested in representing the arms control community on the Board." I told him that there were quite a few MORS members interested in arms control. He told me that in order to get on the Board I had to do some work and make some contributions to MORS. So I started presenting papers. I don't recall the first paper I gave but I know definitely that I attended the 33rd MORS in 1973 and presented a paper. At the 35th MORS, I organized and became chair of the Arms Control Working Group. Most of the members of this group came from the Strategic Working Group, which at that time was very large. At the 39th MORS, I became Working Group Coordinator.

**BOB SHELDON:** As a working group chair, where did you look for people to present papers?

**AL LIEBERMAN:** I looked first of all at the various government agencies working in the arms control field. I got some of people from the Services, the Department of Energy, the CIA. There were also a number of contractors working in the arms control area and I recruited some of them. So we had quite a large arms control group at that time. We had some very interesting meetings, big battles going on, because arms control was and still is a very sensitive area. There's much opposition, and at MORS, it was reflected in our discussions. We had tremendous arguments going on, but it was exciting and interesting and I could always get an argument going. At the 39<sup>th</sup> MORS in 1977 I became Working Group coordinator. At that MORS, I was also elected to the Board of Directors. At the 41st MORS, I gave a special topic presentation entitled "Is the Strategic Triad Necessary." At the 42nd MORS, I was

Program Chairman. Then while I was on the Board, I was Vice President for Symposium Operations and was in charge of the committee that formulated guidance for the establishment and disestablishment of working groups. MORS needed a process to create new working groups and to disestablish such groups when the attendance was too low. We also established the Working Group Advisory Committee; no such committee existed until then. I became the advisor to the Arms Control Working Group. Then in '80 and '81, I was Vice President of Professional Affairs. And I ran to be President of MORS, but I was defeated by Amie Hoeber.

**BOB SHELDON:** During your year as VP for Professional Affairs, did anything significant happen?

**AL LIEBERMAN:** I wrote a staff paper on the value of having two MORS meetings each year. But I don't know if it was then; I was on the Board twice and I don't know if it was then or later that some of the services objected to having two meetings per year. My paper tried to justify two meetings. The decision however was made to have only one per year. I don't know whatever happened to that paper, and exactly when I wrote it since I was on the Board a second time from '88 to '92.

**BOB SHELDON:** We refer to directors who serve more than one term as retreads? Did they use that expression?

**AL LIEBERMAN:** Retreads, that's correct. I was a retread. That is true.

**BOB SHELDON:** What motivated you to join the Board again?

**AL LIEBERMAN:** I don't remember who nominated me. I think that one of the things I had done that people liked when I was on the Board was that I brought people that had never been on the Board before and many of them had only barely gone to MORS. I brought in people from CIA, the Department of Energy, and a number of our contractors and of course staff members from ACDA. Some of these people made valuable contributions to MORS: Derk Swain, Sydell Gold and Hank Cooper. In my second term, I made a major contribution. I was chair of the Membership Committee and we established [the current rules for] MORS membership. Before that they didn't exist; there were no MORS members except for the Directors. We established the scheme of having Directors, Fellows and Members.

**BOB SHELDON:** How come they decided on the three running years of membership?

**AL LIEBERMAN:** I'm not clear exactly how we decided, but it was clear that we didn't want people to be on it forever. I think we came up with it, because somebody might miss one or even two meetings. But if you miss three in a row, then you're off the membership. I think that's kind of the way it was done.

The other major issue was whether or not we should charge a fee for membership. We decided against that. The reason was if you're paying twenty-five dollars a year and then you change jobs and lose your security clearance, now we can't invite you to the MORS symposium and you might argue, "Well, wait a minute, I'm paying my dues. How can you deprive me from going to the symposium?" To avoid that problem, we decided that there would be no dues.

**BOB SHELDON:** That was quite a contribution to the Society.

**AL LIEBERMAN:** Yes. I always felt that was one of the most valuable contributions I made to MORS—the creation of membership.

**BOB SHELDON:** How was the decision on the fellowship made?

**AL LIEBERMAN:** I don't know who suggested it or exactly where it came from, but someone suggested other societies had fellows; we should have Fellows at MORS. There was the need of recognition for some of the old timers. There was some discussion about how they should be selected and we looked at what some other societies did. We collected information from other societies, how they set up fellowships and eventually we came up with our Fellow's procedure. We established two basic rules for the selection of Fellows: A) we should not have too many Fellows—I think the maximum number of five new Fellows per year; and: B) that we would also in the early days have a special provision to pick up some of the old timers that were no longer attending MORS until we caught up and include those that had made contributions to the Society. So then we presented our results to the Board, and the Board voted to accept our proposal. A plan was then formulated to select our first group of Fellows, and the first five Fellows were selected. That was the beginning. And later, they added the fact that retired Fellows can attend the symposium without paying the registration fee.

One more contribution I made to MORS, I wrote chapter 10 of the MORS publication *Military Modeling for Decision Making*, edited by Wayne Hughes, FS.

**BOB SHELDON:** Did you write that solo?

**AL LIEBERMAN:** I had other people contribute. I wrote most of it, but there's one section that I don't know anything about; that section dealt with urban warfare. I didn't know anything about urban warfare. Wayne asked someone to write that part. I also got some help on the Soviet costing issue. But I wrote everything else.

**BOB SHELDON:** Since you saw MORS over the course of several of years, what's your impression of how MORS evolved?

**AL LIEBERMAN:** I have always liked MORS and I think it has evolved very well. My primary areas of interest were arms control and strategic analysis. Those were the two fields I generally concentrated on. And I would say recently, there is less work in those areas than there was in the past. This is principally due to the fact that we are no longer facing the Soviet Union as an adversary. There are new problems today but they are very different and appear much more complicated. With the Soviet Union, we had a rational adversary. Now, who the heck is the adversary? Certainly, there's no rational one. So how do you set up an analysis against people when we really don't even know who they are? I am sure that in due time we will develop analytical procedures to attack these new problems and MORS will be in the forefront of these developments.

North Korea is a very dangerous situation. We are dealing with a dictatorship of a country that is in dire need of help with people close to starvation and at the same time maintaining a very large armed force. Perhaps some analytical procedures can be developed to examine this situation. But it will require the inclusion of political and psychological issues as well as military. Then there is the issue of terrorism. What do you do about guys that would come and blow themselves up in your face? How are you going to deter them? With what are you going to deter them? And who are they? And why are they doing it? We don't know the answer to many of those questions.

I mean, you can understand the Palestinians and you can understand the Chechens a little bit, but who understands al Qaeda? Anyway, that's been one of the problems, defining the enemy and finding his purpose, and then

figuring out what to do about it. I think we have a problem right now and from an operations analysis point of view—how does one study this problem? It's a hard problem to study because it is so hard to define what the problem is.

**BOB SHELDON:** In closing, what advice would you give to young MORS directors, since you served two terms on the Board?

**AL LIEBERMAN:** A lot of thought should be given to keeping MORS—and by that I mean not just MORS, but operations analysis in general—pertinent to the problems of the day. That goes back again to what I mentioned earlier about who's the enemy. Military operations re-

search is set up to study problems as to how the military should operate and keep us going, keep the United States strong and safe. The real problem is to figure out what the problem is, and that's not easy right now. Another issue for Directors is to make sure that they keep a balance on the Board, to keep the government involved, keep contractors involved and to spread it among the various government agencies. Defense, of course, is the principal one, but keep the nuclear people involved and keep the CIA involved and keep the State Department involved. Homeland Security now is another one that should have some involvement. And so keep a balance on the Board.