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Military Operations Research Society (MORS) Oral History Interview

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Andrew W. Marshall Interview (MORS)

Marshall, Andrew W.

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INTRODUCTION

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.

Mr. Andrew W. "Andy" Marshall received the Vance R. Wanner Memorial Award in 2010. Mr. Marshall is the Director of Net Assessment in the Office of the Secretary of Defense, which he founded in 1973. (Editor's note: Mr. Marshall retired in January 2015 after serving over 40 years as the Director.) The interview was conducted on August 1, 2014 with Mr. Marshall and Mr. Jim Bexfield, FS, Commander Phil Pournelle, and Dr. Bob Sheldon, FS in the Office of Net Assessment in the Pentagon.

MORS ORAL HISTORY

Interview with Mr. Andrew W. Marshall, Mr. James Bexfield, FS, Commander Phil Pournelle, and Dr. Bob Sheldon, FS, Interviewers

Bob Sheldon: This is Friday, the first of August, and we're here at Andy Marshall's office in the Pentagon. Mr. Marshall, could you first of all tell us your parents' names and where you were born?

Andy Marshall: My father's name is John Pollack Mitchell Marshall. And my mother was Katherine Last Marshall. I was born in Detroit, Michigan.

Bob Sheldon: Tell us a little bit about how your parents influenced you.

Andy Marshall: My father was a reader, so we had a lot of books in the house. Other than that, they simply encouraged us, my brother and me, to do well at school and things of that sort.

Bob Sheldon: What did your dad do for a living?

Andy Marshall: He was a stonemason. He immigrated to this country in about 1910, and my mother emigrated from England in 1915.

Bob Sheldon: A stonemason? Did your father do any structures around here?

Andy Marshall: Not around here. Mainly the Detroit area.

Jim Bexfield: Did he emigrate from England, too?

Andy Marshall: Yes, he was a lowland Scot. He was born in Liverpool. His father, who I was named after, was the chief engineer

on a ship that went from Liverpool to Buenos Aires and back. He was killed at sea in an accident. Even though my father was born in Liverpool, at a quite young age, probably when he was two or three, along with his mother and some of the other children, they went back to Scotland to a town south of Glasgow named Carluke, which I've never visited.

Bob Sheldon: You mentioned your parents liked to read books. What kind of books did they read?

Andy Marshall: One of the things my father bought was a big multivolume collection of books on literature, and he had a lot of technical books connected with masonry and architecture and things of that sort.

Bob Sheldon: Tell us where you went to grade school, middle school, and high school.

Andy Marshall: I went to the Marxhausen Elementary School that was about four or five blocks from us. Then the intermediate school was the Barbour Middle School which also was five or six blocks from where I lived. And then I went to Cass Technical High School, which was in center of the town.

Bob Sheldon: These were all in Detroit?

Andy Marshall: Yes.

Bob Sheldon: What were your favorite subjects in school?

Andy Marshall: Mathematics, geometry, and this and that. Then in high school, algebra and trigonometry and the beginnings of calculus.

Bob Sheldon: Did you have a lot of college-level courses?

Andy Marshall: Yes, it was a science and technical high school.

Bob Sheldon: Where did you go to college? How did you choose your college?

Andy Marshall: I graduated in an important year in history. I graduated in June of 1939, and I had a scholarship to go to a school in the Upper Peninsula of Michigan, but I decided not to do that and to work for a year and then go to school. Then a year later, in the fall of 1940, I went to the University of Detroit with the intention of going into engineering. I found the courses disappointing. They weren't very much more than I had already had in high school; it was a very good high school. Heck, one of the oddities, Lindbergh's mother taught advanced chemistry courses there,

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and I remember him visiting the school at one point.

So I dropped out of college, got a job, and then came December the 7th. The job I had was in the Murray Body Company, which no longer exists. At that time in Detroit, in addition to the main automobile manufacturers, there were a bunch of other firms that were more specialized, and a number of them were making the bodies for cars. It had converted to producing parts of airplanes. I think initially it was the wings of one of the early Douglas bomber aircraft. In high school, I had followed a set of courses that were aimed at ending up as an engineer, but in the course of it I learned how to operate a lathe, milling machines, and a variety of things. In fact, my homeroom in the high school was the foundry that was on the top floor of the school. So these jobs I had were all as a machinist.

I had a heart defect, which I still have. I've lived a very long life, but I was rejected by the military. So I spent the war in this company in various aviation things, making tools and devices that were used in the manufacturing process. In the fall of 1943, I began going in the evenings to Wayne University. It hadn't become Wayne State University yet. I took French classes, took some philosophy courses and some mathematics courses. Then as it became clear that the war was coming to an end, I applied to the University of Chicago.

They sent a test that I got one of the professors at the school to administer. The result of it was they put me directly into the graduate school. So I've never had an undergraduate degree. Also at that point I didn't think that one could make a living as a mathematician. I had no image of what was possible in the world, so I decided I would go into economics, as it was the more mathematical of the social sciences. I entered Chicago in September 1945 and started in economics. But in the course of the economics I discovered there existed this field of mathematical statistics. So while I completed a master's degree there, largely in connection with the Cowles Commission (Cowles Commission for Research in Economics) which was then still at Chicago, in econometrics. Larry Klein, the economist, had developed this 12-equation model for the economy, and used

it—the parameters were fitted on the data up to the beginning of the war and at that point in 1947–1948 there were a couple of postwar years. So what I did was take the data and see how good it was doing in predicting and fitting things.

Bob Sheldon: Was that a regression model?

Andy Marshall: It was a multiple regression-type model. Well, it's really a set of simultaneous equations. So that was my master's.

Jim Bexfield: Did you meet Clayton Thomas (MORS Fellow and Chief Scientist of the Air Force Studies and Analyses Agency) at Chicago? He was there at roughly the same time.

Andy Marshall: No, I didn't.

I began pursuing all of the courses in statistics that were there, Jimmie Savage in particular, but I also got to know Allen Wallis and took a course with him. It was called readings or something, but what it turned out to be was he and I would meet and talk, and then he got a lot of mail questions, so a part of this course turned into preparing his answers to many of the letters. He would give me a bunch of letters to write the response to. At the time, Chicago did not have a doctoral degree in mathematical statistics, so I asked him, "Where might I get a job for a couple of years until I decided where I could go to pursue that."

He came up with two possibilities. One was some US governmental office in Chicago and the other was the RAND Corporation. There was a man at Chicago who was going to RAND, Herbert Goldhamer, and he had as part of his agreement to go, there was a project he wanted to do. He was basically a sociologist, but he wanted someone to help him with the statistical analysis, so he interviewed me and I went to RAND. So just by happenstance, it changed the whole rest of my life.

Jim Bexfield: Did you move to RAND in California?

Andy Marshall: No, he was in the social sciences department which was mainly in Washington. I came initially to Washington. I joined RAND on January 5, 1949.

Bob Sheldon: Was most of your statistical training in Chicago on classical statistics or Bayesian statistics?

Andy Marshall: Most of it was the more traditional statistics, but clearly Savage, who I got

to know very well over the years, was already moving down the line of Bayesian statistics.

Jim Bexfield: Did you have a favorite hobby when you were growing up? Was there something you really liked to do?

Andy Marshall: Sports.

Jim Bexfield: What kind of sports?

Andy Marshall: Baseball, football.

Jim Bexfield: So you played those?

Andy Marshall: Yes.

Jim Bexfield: In high school?

Andy Marshall: No, the high school I went to—well, they did have a baseball team but it was not a big in sports. It was a little bit like the University of Chicago [*laughs*] in that sense.

Jim Bexfield: Yes, they were not noted for their athletics.

Andy Marshall: That's right, yes.

Jim Bexfield: What position did you play in baseball?

Andy Marshall: Catcher.

Jim Bexfield: And your brother; was he older or younger?

Andy Marshall: A year and a half younger.

Jim Bexfield: And he went off to school in a totally different direction than you did?

Andy Marshall: Yes. He also went to Cass Technical High School, but he went into the curriculum that was connected with electronics, electrical things of various sorts. When he initially left school, he worked for a little bit in GE, and there was an x-ray machine they were making at the time. He served in the Air Force in World War II.

Bob Sheldon: Getting back to statistics, in some parts of the statistics community, there's a feud between the Bayesian statisticians and the classical statisticians. Did you encounter that feud in Chicago?

Andy Marshall: It hadn't really erupted. Later, yes, because after I'd been at RAND for a while I decided I would go back and finish the work for a doctorate. But then again plans don't ever work out in some way. So when I decided to do that, I went there in September 1953. I had made that decision, but then Wallis asked me to teach his courses. He had been selected by the Ford Foundation to do a survey of universities and the teaching of the social sciences. He was the head of that and he was going to spend the year running this examination. So at the last moment he asked me to teach his courses.

Jim Bexfield: What were the subjects?

Andy Marshall: It was beginning classical statistics. He may have published it later, but he had a set of course directions. So I ended up the year doing that. I'd already gotten to know Savage better because he came out to RAND in the summers. I had already transferred within RAND in the beginning in the summer of 1950, more or less moved to California and had also been recruited by Charlie Hitch (who later was the Assistant Secretary of Defense from 1961–1965) to spend initially half my time in the economics department and half my time in social science. But then a year later, the summer of 1951, I was spending all my time in the economics department.

Jim Bexfield: At RAND?

Andy Marshall: At RAND, yes.

Jim Bexfield: And Charlie Hitch was in charge of that department?

Andy Marshall: Yes.

Jim Bexfield: What was it like to work for him?

Andy Marshall: He was terrific and very important in terms of where I've ended up.

Jim Bexfield: Hitch and McKean's *The Economics of Defense in the Nuclear Age* was written roughly around that time.

Andy Marshall: It came out in 1960.

Jim Bexfield: That was one of the bibles, and still is.

Andy Marshall: And that was in part a compendium of the state of the art at RAND in the late 1950s.

Jim Bexfield: Of the work that you were doing and he was doing?

Andy Marshall: Yes, right.

Bob Sheldon: Can you talk about some of your early projects at RAND?

Andy Marshall: The first one was the project with Herbert Goldhamer. In World War II, a much larger portion of the people coming up in the draft was rejected for psychological reasons as compared with World War I. So this project was an attempt to address the question of, "If we ever have to mobilize again, will the rejection rate be even higher or not?" So the project involved digging back in the history of treatment of mental disease in the United States. I ended up initially spending a lot of time in the Library of Congress because there had been

early censuses that had included data on the number of people in the population with serious mental disease. Some of the standard ones in Iowa, Massachusetts, Pennsylvania, and so on.

But then, someone discovered there was a hospital outside Boston, McLean Psychiatric Hospital. There was a man there, Edward Jarvis, who turned out to be one of the early American statisticians. In fact, this man was the President of the American Statistical Society for 30 years. In fact, the book that Goldhamer and I wrote at the end of the study, called *Psychosis and Civilization* (it was mainly Goldhamer wrote it; I did all of the statistical things), is dedicated to this man. Beginning about 1833, Massachusetts became very concerned about the treatment of mental disease so they began keeping data. This man, when he was connected with McLean Hospital, had done a kind of census and then the reports of all of the particular insane asylums, just a lot of digging back and we were able to reconstruct 100 years of pretty good data. What it showed was there was no increase, at least of the serious classical mental diseases. That's why Herb called the book *Psychosis and Civilization* because there was a lot of belief that civilized societies were more stressful and more people were ...

Not true. At least for the classical psychiatric disorders. Also a lot of the increase in the modern period was a changed practice in what to do with senile people. In the old days, they were kept at home and then they got unloaded on various institutions.

Jim Bexfield: What was your next big project at RAND?

Andy Marshall: I was invited by Hitch in the summer of 1950 to come to RAND, and there was a special study effort that summer at RAND on the lessons from World War II, on the conduct of strategic bombing campaigns, from more of the economics of the damage, how effective they were. Hitch was there; while he'd been recruited much earlier, he was only able to finally take his position there in the spring of 1950. He, himself, had been involved in a group that was evaluating the effectiveness of the bombing in England, and he knew all the other people that had been involved, people like Carl Kaysen and Harold Barnett and Sydney Alexander. These were all the economists

who'd been involved as the bombing survey was being conducted, not just the afterwards evaluation.

That led to, as I was doing things for the economics department, it was a continuation of that. I ended up spending a lot of time on the Soviet economy, from the point of view of if you're trying to knock out its core industrial strengths, what, in fact, were the targets, and looking at a damage effects of nuclear weapons delivered on them. In fact, a lot of the early RAND studies were predicated on the notion that if a war starts and the Soviets invade Europe, basically what's going to happen is that hopefully we hold on at the Pyrenees or have some foothold, that we have nuclear weapons and they don't, or we have a lot more or we have means of delivering them. We carry out a strategic bombing campaign and greatly reduce their economic capabilities. We remobilize and eventually push them back.

Bob Sheldon: Was this study being done during the Korean War?

Andy Marshall: We had just started, yes.

Bob Sheldon: Did that influence your study?

Andy Marshall: No, it didn't. It was solely on, what if you learned we have to conduct a strategic bombing campaign against the Soviet Union, how would we do it? What have we learned about what are the best targets?

Jim Bexfield: I assume you dealt some with SAC, Strategic Air Command, because they would probably be one of your customers?

Andy Marshall: I suppose so, but it was more just collecting the knowledge and notions of how you ought to really do this. There was a lot of criticism about how the bombing campaign had been conducted in World War II, that they hadn't gotten on to the right targets and they had quarrels with the British. There was a whole set of issues about it.

Jim Bexfield: Were these studies classified or unclassified?

Andy Marshall: They were classified.

Bob Sheldon: So who were your customers for the studies? Was there a particular agency at the Pentagon?

Andy Marshall: To some extent the things that I did were really inputs to other studies, more or less at RAND. I didn't have personally much concern about who the ultimate customer

was. I spent a lot of time talking to other people in the government because they were working on similar problems, particularly the Air Force Intelligence people. So, I was more connected with Washington than with SAC where these were concerned.

Jim Bexfield: And you moved out to California at some point?

Andy Marshall: I had moved. I went there and stayed there. I remember going more or less the day after the Korean War began and I was there the whole summer. I went back around September just to pick up my things and go back again to California in October.

Jim Bexfield: So you stayed for quite a while in California?

Andy Marshall: Yes.

Jim Bexfield: What year did you move back to Washington, DC?

Andy Marshall: I didn't think that I was moving to [laughs] DC. I had a house in California in Brentwood near Santa Monica until December 2006. I came back here, I thought temporarily, to do some work for Henry Kissinger in the White House in the fall of 1969.

Bob Sheldon: Let's back up to you finishing up at RAND and going to teach courses. What year did you go back to teach courses for Wallis?

Andy Marshall: September 1953 through March/April 1954, and then I went back to RAND. In the meantime, I had decided I didn't really need a doctorate.

Bob Sheldon: Did you see a lot of GI bill students in Chicago?

Andy Marshall: When I first went there, yes, but by the time I went back, no.

Jim Bexfield: You've now gone through all that nuclear work at RAND, and then you transitioned into some new fields at that point?

Andy Marshall: What had happened was, and this again happened because of this early assignment by Hitch to work on this problem of the appropriate targets in the Soviet Union, that I got more and more connected with people in the intelligence world. Then in the summer of 1952, Hitch made a trip to Europe to visit the Air Force headquarters which was in Wiesbaden, Germany.

The general who was in charge of intelligence there asked Hitch for help on two or three problems. When he came back to RAND, Hitch

asked me and Jim Digby, to go to Wiesbaden to work on the strategic warning problem. There was some resistance from the Air Force Intelligence in Washington, so we had to write some preliminary papers. I don't know what the issue really was or whether this made any sense, what kind of disagreement it was. But anyway, in August of 1952, Digby and I went to Wiesbaden and spent the next five months or so. In fact, we came back finally in December just before Christmas. I was working on how to improve the strategic warning analysis.

Bob Sheldon: What kind of factors did you look at for the strategic warning? Were they economic factors or were they military mobilization factors?

Andy Marshall: Mostly mobilization factors. We tried to think of things that were last-minute preparations that they would have to make; collecting blood and other things. Then we tried to work, provide some ideas on how to weigh out the various things into some overall index. We also were asked to look at, once we were there, at the kind of emergency evacuations that would be triggered by a real decision, and we made some suggestions about how to improve that. The plan basically was that all of the lawyers and the other nonfighting parts of the headquarters, the officers, would be organized and lead the evacuation of the families by everybody driving in their cars from Wiesbaden to Bordeaux, a pretty long distance.

Jim Bexfield: Are there other memories you have during your early years at RAND that you'd like to talk about?

Andy Marshall: Hitch was very interested in the whole development of the Operations Research Society of America (ORSA) and was an early person involved in a variety of ways (he was the eighth president of ORSA in 1959), and he gave a number of talks. He would often have me look at those and supply some ideas, but it led to several of us going with Hitch to what might have been the first of the meetings of the International Federation of Operational Research Societies (IFORS) in Aix-En-Provence, France. The 1950s were a time of a fair amount of flying back and forth to Europe to visit the SHAPE (Supreme Headquarters Allied Powers Europe) headquarters in France and to take the results of studies.

Jim Bexfield: Now, at that time did you have a family?

Andy Marshall: I got married in 1953, just before I went off to Chicago.

Jim Bexfield: And kids?

Andy Marshall: No, no children.

Jim Bexfield: And your wife, did she work outside the home?

Andy Marshall: She had been a secretary at RAND and for a while she worked there during the summer. RAND had this practice during the summer of inviting a lot of people who are usually on special studies of one sort or another. For several summers after we were married she did that, but then dropped that. She got involved in some other activities.

Jim Bexfield: What are some of those other activities?

Andy Marshall: One of the things she got involved in, there was a group of women that every two years ran a—it was called a thieves market. They collected furniture and all kinds of materials from everywhere, sitting in the middle of Bel Air and Hollywood. One of the stores, Robinson's in Beverly Hills, would turn over its parking garage for three days, and they all collected the stuff and the money went to support of the art students at UCLA. The State of California built buildings and but they wouldn't buy any objects of art. I don't know whether you've been to UCLA, but there's a big area with all these modern sculptures. There's a little museum and they have paintings and so on, also provided scholarships for students to go abroad. And they made an amazing amount of money for the time.

Bob Sheldon: Getting back to Hitch, Hitch drew together a lot of the newly formed experts in operations research and systems analysis and all those papers. Did you get to meet a lot of those early experts in systems analysis?

Andy Marshall: Yes.

Bob Sheldon: Can you name any in particular that impressed you?

Andy Marshall: There were a lot of people. One of the critical people was Albert Wohlstetter in a way, not so much for the things that have attracted more attention, but he changed the whole approach to the process of doing studies. In fact, one of the reasons the economists got so involved in the whole systems analysis business

was that ... originally the idea was, "Okay, we're in the strategic warfare business and you need economists because of design of targets, evaluation of effects. You also need them because you want to look at the economics on our side, the costs of things." But, early on the economists noticed that the larger RAND-wide studies that were being undertaken were not being done very well. The engineers who were principally running them were making what essentially were mistakes in what they maximized or minimized. Several of the early studies were, "What should the next bomber look like? What design should it be?"

They had so many targets they thought they had to destroy and the targets were going to be defended. It was also from the beginning assumed at RAND that you wanted these strikes to be intercontinental. They were not based on forward bases, even though SAC itself was at the time planning to fight mainly from forward bases. They would put together some criteria or measure of goodness and then look at many, many designs of airplanes and weed out certain ones. Wohlstetter, when he was asked in the early 1950s to look at the basing problem, took a very different approach. In the first place, in this case there already was an approach that existed, so you wanted to come up with something that was better and did better against a wide variety of counteractions an opponent might take. So you didn't pick just one criteria at the beginning. You evolved a set of tests for the systems and consistently looked at how you could build something, put something together that was superior to what was already being proposed as the direction to go. So as you learned more about the problem, the tests got better and more complicated.

Jim Bexfield: RAND at that time was a hub for operations research, and you had Danzig (linear programming), Bellman and Dryfus (dynamic programming) and Dresher (game theory).

Andy Marshall: Right, a lot of that.

Jim Bexfield: Did you work with any of those people?

Andy Marshall: Oh, yes.

Jim Bexfield: I bet that was absolutely fascinating.

Andy Marshall: Yes, well at the beginning, the mathematics department was a really terrific

place, and in the summer you had these really good people came in addition.

Jim Bexfield: Is there one person in particular that stands out as one of the people that came for a summer activity?

Andy Marshall: That's one of the reasons I got to know Jimmie Savage so well. Some of the other obviously very prestigious mathematicians I didn't have much connection with. There were other good people like Ted Harris (stochastic processes). A lot of the people were connected with Princeton; we had Alex Mood (statistician) and George Brown (who worked as computer expert).

Bob Sheldon: Did you have to do a lot of your own numerical calculations by hand for your economics work?

Andy Marshall: At the time everyone had your own desk computer, but there were people around who you could give calculation problems to. For myself personally, thinking of that, Herman Kahn was a very good friend of mine. We were both about the same age; he was about six months younger than me. There were long periods when we would go out together every night. We were both unmarried; we had this experience of going from graduate school to being very well paid at the time. [*laughs*] It was through him I got interested in the details of what was happening in the design of nuclear weapons and the use of large computers. He was one of the early big users of computers, doing Monte Carlo calculations—some of it related to shielding problems, but others to bomb design. He would disappear for weeks at a time when some new computer came online and go there and try to work on it. I spent some time assisting him a couple of times using a new UCLA computer.

Jim Bexfield: As I recall, he was pretty controversial with some of his views.

Andy Marshall: Well, later. He had several careers in his life. When I met him initially in the spring of 1951, he was in the physics department connected with these Monte Carlo calculations of a variety of things. In the middle 1950s, he became interested in what the rest of RAND was doing in these kind of systems. He heard about some of it through me. And then there was a course that Quade (an expert in systems analysis) put together. I think the second time

it was given, Herman asked to give a lecture and that led to his second career as a showman critic and author of the *Ten Common Pitfalls*, and various other lectures.

Then he thought that RAND ought to be doing more on civil defense. So he then ran in the later 1950s a study connected with civil defense of what you could do. And then he went off to Princeton, and wrote on thermonuclear war. Then he came back briefly, but then left to form the Hudson Institute.

Jim Bexfield: Did you deal with him when he was at the Hudson Institute?

Andy Marshall: A little. He kept trying to recruit me to go there. [*Laughter*] But I didn't want to go. We remained very good friends, but I didn't see as much of him. Then he became a much more public figure.

Jim Bexfield: Let's get into your transition from RAND. When did you leave RAND to come to DoD (Department of Defense)?

Andy Marshall: I went from RAND in the fall of 1969 to do two studies for Kissinger, whom I had met once or twice. He called me up and asked me to come see him when I was next in Washington, and I did so in September of 1969. I was on my way to Europe, to France, with my wife for about three weeks. So I went to see him and he told me that Nixon and he were very disappointed in the performance of the Intelligence Community, and Nixon had felt that when he'd previously been in the White House as Vice President it had been better. For Henry Kissinger—I don't know what his comparison was. So he wanted me to come and do two studies for him. One was to look at the whole process by which intelligence came to the White House, how it was decided, what to send, et cetera, and what could be done to improve it. The second was to pick a topic that I would look at and provide an assessment of how good it was as a product. And he said, "I don't want you to look at political intelligence; I can judge that myself, I know that is not so good." So we talked a little while and decided that I would look at the Soviet strategic missile programs. So I came after I returned, about Thanksgiving time I finally got there, and undertook these studies.

Jim Bexfield: So you were in the government at the time?

Andy Marshall: No, I was at RAND.

Jim Bexfield: So, you were hired as a RAND researcher to work in the White House to do these studies?

Andy Marshall: Yes.

Jim Bexfield: Wow! How did Kissinger know you?

Andy Marshall: I don't know. I had met him a couple of times. My guess is, and this is only a guess, that he asked some people, very possibly Fred Iklé (Under Secretary of Defense for Policy from 1981–1988), "Who is it that knows something about intelligence and would be a person who could do this?" and Fred mentioned me. That's my guess. Because by that time I had been spending time on various intelligence problems, particularly up through 1963–1964 along with Joe Loftus, who came to RAND in the spring/summer of 1954. He had been in Air Force Intelligence. In fact, for a while he had run the group within Air Force Intelligence that focused on the Soviet nuclear programs. Anyway, because I had this earlier connection with intelligence, we became very good friends and we then undertook a variety of studies and efforts to address the question, "How could you make better projections of Soviet military forces?"

Bob Sheldon: Did you do the study in Santa Monica or here in DC?

Andy Marshall: I came to a little office in the Old Executive Office Building. I completed them, the second one on the missile programs, in the middle of May of 1970. And then I returned to RAND. But then Kissinger kept asking me to do things. In the summer of 1970 I came back, he put together a panel of people who he wanted some advice from. Then at RAND for several months then in December of 1970, Nixon directed Kissinger and George Shultz to do a study of the reorganization of the Intelligence Community. While nominally someone on Kissinger's staff was his person, in fact, even though I was still at RAND and I became his—Jim Schlesinger was at OMB (Office of Management and Budget) and he was in charge of the study under Shultz.

Bob Sheldon: That nuclear study you that you did for Kissinger, did you give him any counter-intuitive results or any results that were contrary to the schoolhouse solutions at the time?

Andy Marshall: What it led to was another task. I had suggested that one of the things that might work would be to assign a topic to the intelligence people and give them a lot of direction, much more direction than usually takes place, about what are the questions that you really have that you want answered and to look at drafts, to monitor it, to try to make it an exemplar of the level of analysis you wanted. So a topic was picked; it was the SS-9 (a Soviet intercontinental ballistic missile). So they undertook to do that, but then I was asked to play this role of reviewing it as it came along and reminding them that we wanted to know more about this or that, so they finally produced this thing. I don't know that it was very effective in the long run.

Bob Sheldon: Did you behave like a red team looking at their stuff?

Andy Marshall: I don't know whether you'd call it a red team, it was more like a research director.

Jim Bexfield: So you had a lot of influence over how the effort took place?

Andy Marshall: Yes.

Jim Bexfield: So then Kissinger kept calling you back and eventually you took a different job?

Andy Marshall: What happened was that in terms of this reorganization of the Intelligence Community, there was an early report in March 1971 that laid out some alternatives and went to Nixon. He picked one of the alternatives and then through the summer and fall we were involved in fleshing that out. And then final directives had to be prepared, and by that time Schlesinger had left OMB, he'd gone to the Atomic Energy Commission. So I ended up writing the final directive that Nixon would sign and some other memos. I think that Alexander Haig and Wayne Smith, who was nominally Kissinger's person on the thing, brokered this deal around and they inserted the creation on the NSC (National Security Council) of a net assessment group that was on the one hand to initiate at the national level a net assessment process, but also this reorganization created an NSC committee that Kissinger was to chair that was to give direction to the Intelligence Community as to what the top-level organizations wanted as products and also to provide reviews

and evaluations of their performance. And then they offered me this job. I had not supposed—that was not part of my draft of the directive. [Laughter]

I was very reluctant to do that. I was quite happy at RAND, though not spending as much time as I should've been. Also, I had taken over from Schlesinger this newly created position at RAND of the Director of Strategic Studies. I was not spending enough time at it, and my wife was not anxious to come to Washington, either.

Bob Sheldon: Who coined the term “net assessment”?

Andy Marshall: Well, the term itself was coined in the aftermath of World War II. The people who wrote about intelligence set various levels of analysis and this would be the most comprehensive. But there had been some use of it. In fact, this group that I mentioned that'd been formed by Kissinger in summer of 1970; I was on it, Bill Kauffman, Wayne Smith, Charlie Herzfeld, former director of DARPA (Defense Advanced Research Projects Agency), and also Jim Schlesinger and Fred Hoffman. Herzfeld suggested that we need a kind of broad net assessment of where we stand with respect to the Soviets. So Schlesinger and I began to write a broad assessment, and then he got diverted and I finished it. So that may have led Kissinger or Haig to think that they wanted something more like that.

Jim Bexfield: So you did take the job?

Andy Marshall: Yes, I did. But with the idea that I was going to be there for a couple of years and that was it.

Jim Bexfield: Was it a political position or a regular civil service position?

Andy Marshall: It was a civil service position but it was ...

Jim Bexfield: PL-313 or something?

Andy Marshall: Something like that. I have no idea. All I know is that when I ended up here in DoD, I think Doc Cooke (Director of Administration and Management) was the one who made me—I'm really a noncareer civil servant. Whatever that category is [laughs].

Jim Bexfield: So you worked in the White House for a couple years in that position?

Andy Marshall: Right.

Jim Bexfield: And it was mostly associated with intelligence?

Andy Marshall: We had two tasks. One was to start this net assessment effort and the other was to play this role for Henry Kissinger—this committee. It met only a couple of times. State and Defense were the other big players, and I think Treasury.

But the big problem may have been that Melvin Laird (Secretary of Defense from 1969 to 1973) had been very interested in setting up a net assessment effort in DoD, and he felt this was another infringement of Kissinger on his territory. There were considerable negotiations back and forth as to how to set up this process. The first study that had been assigned to Defense had just started when I moved here, there was a deal between Kissinger and Schlesinger to move the whole office over here. Not just me. Schlesinger had wanted to recruit me to come as an individual and start an office here. Again, my wife and I had thought we wanted to get back to California, but this deal was made to just ship the whole office over.

Jim Bexfield: Over to the Pentagon?

Andy Marshall: Yes.

Jim Bexfield: Schlesinger was the Secretary of Defense at that time?

Andy Marshall: Yes. It happened in October/November of 1973.

Jim Bexfield: So what was your first major project that you did for him?

Andy Marshall: He was a very close friend of mine, so we just sat down and decided the first three assessments that we wanted to do were a strategic nuclear balance, the balance on the Central Front of NATO, and the maritime balance. And the fourth one that came along pretty soon after that was the so-called investment balance which attempted to look at the portion of the resources being put in both by ourselves and the Soviet Union that were going into longer term investment.

Bob Sheldon: How did you approach those studies? Did you gather together a team of guys working on that with you or did you do it solo?

Andy Marshall: The first thing was we increased the size of the office. When it had been in the White House, it was myself, two people, Robin Pirie (former Acting Secretary of the Navy), and Chip Pickett, a naval officer and an army officer, and two secretaries. Once coming over here we added some additional positions.

Jim Bexfield: How large was your staff in the Pentagon? What's the largest number you had as part of Net Assessment?

Andy Marshall: The largest the office has ever been is 17 people.

Jim Bexfield: So you kept it reasonably small.

Andy Marshall: Yes, smaller now. We're down to around 15 or 14.

Jim Bexfield: In those early years from 1973 to about 2000, if you had to pick out one or two seminal net assessments that you did that had major impacts, what would they be?

Andy Marshall: For one thing it took a while to produce high-quality assessments. One of the first things you find is there are a lot of data problems. Particularly, because we were looking ahead 5 or 10 years. We wanted to look back 20 years or something like that to try to understand longer-term trends and shifts that were taking place. That whole focus of the assessment was really on, are things going in the right direction or in the wrong direction, and what are the key competitions that are taking place. So it wasn't until the middle 1980s that I think we finally did a really high-quality assessment on the Central Front and NATO. It was similar for the strategic force as we did much better work on the naval side early and the ASW (anti-submarine warfare). We did a useful study on command and control in the late 1970s.

Bob Sheldon: Do you recall any specific decisions that were impacted by those studies?

Andy Marshall: It's hard to know for some of them. Command and control led to issuing of directives by Harold Brown. The first Secretary who probably really profited was Brown (who was Secretary of Defense from 1977 to 1981). There was some use early of the investment balance, because it tended to show that the Soviets were probably investing more than we were.

Jim Bexfield: Did you have many dealings with people like Lt Gen Glenn Kent and the Air Force analysts or Wilbur Payne and Walt Hollis and some of the Army analysts or Bruce Powers in the Navy?

Andy Marshall: In the Army it was Vandiver.

It was Schlesinger's intent to encourage each of the Services to set up a net assessment office. Zumwalt (Elmo "Bud" Zumwalt, Jr., Chief of Naval Operations from 1970–1974) did set up such an office.

Jim Bexfield: Wayne Hughes (who was in the Office of CNO (OP-96) from 1973–1975) and people like that?

Andy Marshall: Yes. William Manthorpe, former Director of the Navy's Net Assessment, Office (OP-96N). There was an early head of it who died young, suddenly. I forget his name now. The Army did not, but appointed Vandiver as the point of contact if you wanted things. And we got a lot of work also from Army Intelligence, particularly in trying to understand how the Soviets measured things, their indices, planning factors.

Jim Bexfield: John Battilega?

Andy Marshall: Battilega, and before him there was another guy. But there was a lot of just collecting of materials. The Air Force did not set up a net assessment group. They did some particular studies for us when we asked. Jasper Welch (Major General Welch was Assistant Chief of Staff for Studies and Analysis from 1975–1979); those guys worked for him for a while.

Bob Sheldon: Let me ask a Bayesian question. There's a philosophical concern amongst Bayesians on how much do you weigh the historical knowledge that you have, your prior, versus your new data that you see today. In net assessments, how do you view that balance between the old, historical biases and the new information you see?

Andy Marshall: I guess I personally put a lot more weight on understanding of the past. I think one of the most valuable things has been this going back and looking at the ongoing trends, the trends and the asymmetries between ourselves and the other side. In the end, the thing that struck me was just how totally different the Soviet military forces were from ours. It runs in a totally different way, operates with adaptations required by problems they have with the skill levels of the people they have in their forces.

Jim Bexfield: One thing that I've observed over time is people, especially military people, come through Net Assessment and then they leave and do other jobs, and they often comment about how much of a mentor you were to them and how much they learned while they worked here. Are there any secrets to your success in that regard?

Andy Marshall: No. I know people say that. I'm not sure what mentoring means in a way [laughs], what is specific about that. I don't think of myself as what I would think of as mentoring as instructing or teaching. I think it's more a matter of you have these issues, problems, tasks to do, and you try to encourage and direct a little. But mainly people should do their own thing.

Jim Bexfield: Yes, but I think the people that come through appreciate the guidance that you give, the insights that you provide. It helps them grow as analysts.

Andy Marshall: That may be. I don't think I give a lot of guidance. [Laughter] Phil, do you want to speak to that?

Phil Pournelle: I've been trying to be silent this whole time, but I think you're being a bit modest. I think the most valuable thing you've provided for us is time. Time to stop, time to read, time to think. This is my third Pentagon tour and I've never had this much time to actually sit and think and read and talk to my colleagues about what's going on. I will concur with the statement that you don't necessarily give a lot of guidance because I lay things out and you say, "Yes, good. Keep going." [Laughter] It's both encouraging and daunting at the same time.

Andy Marshall: Yes. For the moment we haven't really been doing the same style of assessments that we did, but then we did evolve a kind of basic format of what the basic structure of the thing would be that had to be filled in. But I think that's right, we have problems and people are here maybe two or three years, it's like writing a PhD thesis. There's a set of problems and issues and you work on that. It's not a different problem every six minutes or every few days.

Phil Pournelle: Yes, if you can find me a place that will accept a classified PhD dissertation, please let me know. [Laughter] I'd like to turn it in for credit, please.

Andy Marshall: At least my view of it is that if it's to be useful, it just needs to be analysis at a level beyond what normally takes place. And has been tailored very much so that sometimes it's used and sometimes not. To be an aid to the Secretary or the very top level people, it's not trying to answer more mundane issues.

Bob Sheldon: Let me ask a question from your economics background. One of the critiques leveled against the Intel Community, I think

dating back to the 1960s or 1970s, was they did a bad job of estimating the Soviet economy.

Andy Marshall: Terrible. That was one of the great quarrels that both Schlesinger and I had with them. But it's not a failure just of the Intelligence Community, it's a failure of, I don't know whether it's 85 percent or 99 percent of the American economics profession. It's a shame, I think, on them that they have not addressed it as a question of "How the hell did you get it so wrong?" And as I say, it's not just the Intelligence Community, it's the whole of the economics profession. Paul Samuelson, I forget how late it is, he was talking about the Soviet Union is likely to pass us in the next decade. This was in the 1970s. And people who were more sensible, like Warren Nutter, were seen as nuts to raise questions about the likely performance of the Soviet economy. So it strikes me that they're nonlearning groups of people who are unwilling to say, "Here's an error of really massive size"; and it's important, because it's critical to thinking about, "okay, are they going to be exhausting themselves or not?"

They were also wrong about both the numerator and the denominator. They were wrong about the size of the economy (this is for the Intelligence Community), and underestimating the size and the cost of the Soviet program.

Bob Sheldon: In the current day, a similar accusation has been made against the Intel Community and the economists for not understanding developmental economics, like Afghanistan and Somalia and parts of Africa. Is there a way to rectify that problem?

Andy Marshall: I don't know. I don't know about the latter one. They're certainly making, as in the Soviet case or other kinds of more socialist economies, they're not making any attempts that I can see to do better. It would take a really critical examination of why did they get it so wrong. That never took place as far as I know.

Jim Bexfield: Let me ask a different question. I recall a few years ago there was a lot of controversy about whether Net Assessment should continue as an office reporting directly to the Secretary or whether it should be pushed somewhere else at a lower level. It's fairly unique for an office like yours to have stayed reporting to the Secretary for more than 40 years.

Andy Marshall: Well, it hasn't in a way. Brown didn't like so many people reporting to him, so administratively we became part of Policy, but we had direct reporting to him in the sense of sending him documents, not through the Policy people, but that worked fine. But the relationship to the Secretary varied. Some of them are a lot less interested than others in the kind of analysis we do.

Jim Bexfield: Any insights about how that issue got resolved?

Andy Marshall: The issue has been resolved. I guess they're still working on how it is exactly we're going to be part of Policy, but in principle, that's what's supposed to eventually happen. The 2015 NDAA (National Defense Authorization Act for FY 2015) makes ONA a direct report to the Secretary of Defense.

Jim Bexfield: Is it supposed to eventually happen?

Andy Marshall: Yes.

Jim Bexfield: What do you see in the future for Net Assessment? Where do you hope this capability and group of people go?

Andy Marshall: I think if it's to do the kind of thing that it has been doing, it needs to have direct access to the Secretary or the Deputy. How it's been used depended a lot on them. There have been periods where we've been used, and not just to produce net assessments, but to do other kind of tasks. Schlesinger used the office, for example, to undertake some lessons learned activities with respect to the Yom Kippur War. Later efforts, we did a similar kind of thing on the Falklands War. In the aftermath of 9/11, Paul Wolfowitz (Undersecretary of Defense for Policy from 1989–1993) had us run several special studies for him in addition. Also the character of the office has changed. It was set up at a time when the central issue was how militarily we stood relative to the Soviet Union, with allies on both sides, but that was the focus. For a while now, we've not had a central opponent. I've had an interest in China since the middle 1980s, the most likely emerging really serious problem. I don't think that the US Government as a whole is quite at that stage yet. *[laughs]* It seems likely to me.

Bob Sheldon: I have a MORS question. You're loosely affiliated with the MORS community. We've invited you to speak at some

of our symposiums, and some of your people participate in MORS. What's your view of MORS?

Andy Marshall: I personally haven't been to any for a long time.

Bob Sheldon: But you came to one at the Air Force Academy a few years ago.

Andy Marshall: Yes, I don't know the dates of it. I like the MORS symposiums. I think it's terrific, meeting a lot of the people. So, I'm all in favor of it. I don't get around to going myself very much.

Bob Sheldon: I'd like to turn it back to Phil. What questions would you like to ask your boss here?

Phil Pournelle: What do you think of the trends within the Operations Research Society community itself? MORS had a near-death experience over the last couple of years. Some argue it's on life support and part of that may be because of what it does or doesn't do for its customers. You've been on the outside, so to speak, as was said, you're loosely affiliated, but what do you think—not necessarily the MORS as the society but the operations research community, those who participate or don't participate within MORS. The trends, and whether or not they're meeting their customer's needs.

Andy Marshall: I don't know that I have the sense. Within the Services themselves, only the Army really has a substantial effort ongoing—that's the only one I know of and have had much contact with. In the Navy, there are people like Wayne Hughes or others, but there's not an organized unit really, as far as I know. I've lost track of the Air Force in that area.

Jim Bexfield: I think the Air Force does too, perhaps not as strong as the Army. The Navy is, I think, third in terms of how they organize and manage their operations research people, and Marine Corps is maybe slightly below the Navy. So I think the Army is the most organized, the Air Force sort of second most organized, and then the Navy and then the Marine Corps. So, I think you're right.

Andy Marshall: But in terms of other things, the analysis—given the Chinese being so much like the Russians in the extensive role they seem to give to operations analysis, I would think a role for that, again, is something to look at.

Phil Pournelle: So your own experience at RAND, particularly in the early years, was with these diverse communities coming together—economics, psychology, et cetera, and they're more generalists. And yet, the Operations Research Society as a whole seems to become more and more specialists within specific disciplines going into greater and greater details.

Andy Marshall: Yes. That struck me thinking about it before the meeting, that while obviously RAND was in part inspired by the operations research done in World War II and was kind of a continuation, extension of it. But yet on the whole what it focused on was not entirely, as you say, operations research, although this shift that Wohlstetter made in carrying out these broader studies, was like operations research in the sense that the studies were focused on how to carry out certain kinds of operations better than they were otherwise programmed to be. But much of the RAND work was looking at new technologies, where things are going to go.

Bob Sheldon: Let me circle back. You said one of your parental influences was you had a lot of books around the house to read. What kind of books would you recommend to your people that are working for you now?

Andy Marshall: I don't know. The kinds of things that interest me are histories. That's why

I've, here in the office, invested a lot in a variety of historical studies. Like when we got interested in where they picked up on the Russian interest in or belief that we were entering a new period of military revolution, would be to say, "All right, let's look at past periods where there are big changes that people think of as military revolutions. What do they look like? How long do they take? Why is it some countries do better than others?" and things of that nature, and also strategy. There's a wonderful book on, I forget the name of it now, well, about the Russian anticipation and then preparations for dealing with Napoleon's invasion in 1812. So, I think histories.

Bob Sheldon: Of those histories, can you give us two or three that pop in your mind as being the best history books recently?

Andy Marshall: There's that one that I just mentioned, the one about the Russian preparations. There are these things I sponsored on the innovation in the Interwar years by Wick Murray and others. Stephen Rosen's book, *Winning the Next War: Innovation and the Modern Military*. Again, innovation in the military is a huge issue.

Jim Bexfield: This was very good. And it was great learning a lot about your experiences and ideas and relationships, and it brought back many memories. So, we really appreciate it.