

Nevada Test Site Oral History Project
University of Nevada, Las Vegas

Interview with
Roger Ray

October 29 and 30, 2005
Middletown, Maryland

Interview Conducted By
Mary Palevsky

© 2007 by UNLV Libraries

Oral history is a method of collecting historical information through recorded interviews conducted by an interviewer/researcher with an interviewee/narrator who possesses firsthand knowledge of historically significant events. The goal is to create an archive which adds relevant material to the existing historical record. Oral history recordings and transcripts are primary source material and do not represent the final, verified, or complete narrative of the events under discussion. Rather, oral history is a spoken remembrance or dialogue, reflecting the interviewee's memories, points of view and personal opinions about events in response to the interviewer's specific questions. Oral history interviews document each interviewee's personal engagement with the history in question. They are unique records, reflecting the particular meaning the interviewee draws from her/his individual life experience.

Produced by:

The Nevada Test Site Oral History Project

Departments of History and Sociology
University of Nevada, Las Vegas, 89154-5020

Director and Editor

Mary Palevsky

Principal Investigators

Robert Futrell, Dept. of Sociology

Andrew Kirk, Dept. of History

The material in the *Nevada Test Site Oral History Project* archive is based upon work supported by the U.S. Dept. of Energy under award number DEFG52-03NV99203 and the U.S. Dept. of Education under award number P116Z040093.

Any opinions, findings, and conclusions or recommendations expressed in these recordings and transcripts are those of project participants—oral history interviewees and/or oral history interviewers—and do not necessarily reflect the views of the U.S. Department of Energy or the U.S. Department of Education.

Interview with Roger Ray

October 29 and 30, 2005
Conducted by Mary Palevsky

Table of Contents

Introduction: birth, family, early education, death of mother, father's military career	1
Education: West Point, memories of Pearl Harbor and wartime atmosphere	4
Military career: training as infantry platoon leader, service in Europe during World War II, wounded at Normandy, rehabilitation in England, return to European theater in Army Intelligence Branch (G-2), Battle of the Bulge, brother Lieutenant Colonel John Ray captured by Germans as prisoner of war, released after German surrender	8
Military career: Army Intelligence Branch studies German V-1 rockets, discusses the German V-2 and its technological importance	30
Military career and education: attends Army Command and General Staff School and then New York University for master's degree in aeronautical engineering	34
Military career: transfers to Naval Ordnance Test Station and Naval Air Missile Test Center (California) to study Navy guided missile program, transfers to Fort Sill, OK to become artilleryman, backtrack to end of World War II when he transfers to Fort Bragg, NC to restructure counterintelligence section for Japan invasion, and end of war	36
The end of WW II, personal awareness of atomic bomb and German bomb projects	39
Military career: transfers to Los Alamos laboratory, NM to work in J- Division under Alvin C. Graves and William E. Ogle, talks about "free atmosphere" of working at Los Alamos, collegiality between physicists and non-scientists	42
To Bikini for Operation Castle: participation in Los Alamos experiment, physicist Robert England's accidental electrocution, work with physicist John Malik	50
On USS Ainsworth for Bravo test, the first nuclear test he had witnessed "my baptism"	55
Experiment moved to Japtan Island, Enewetak, work with John Malik	61
Muses on integration of military career with science and engineering career, and tension between scientists and the military	63
Designs and conducts successful experiment for Los Alamos at Nevada Test Site	66
Reflects on Army career and experiences at Los Alamos	68
Discusses Wernher Von Braun and U.S. Army rocket program	71
Military career: becomes executive officer and later laboratory director of Feltman Research and Ammunition Laboratories, Picatinny Arsenal, NJ	74
Military career: transfers to NASA to work with Werner Von Braun and his team on rocket development and testing	78
Military career: works with General Alfred Dodd Starbird on rocket testing and high-altitude nuclear testing on Johnston Island	81
Failure of missile test, warhead section blew-up and aftermath	83
Military career: becomes Special Assistant to the Director of Defense	90

Communication Agency [DCA] in Washington, DC	
Military career and education: attends Industrial College of the Armed Forces	94
Military career: becomes Army assistant to Assistant Secretary of Defense for Atomic Energy W.J. Howard	95
Military career: becomes Director of Research and Engineering Laboratories and Commander of Picatinny Arsenal, NJ	96
Military career: becomes Deputy Assistant to the Secretary of Defense for Atomic Energy and then retires from the U.S. Army	97
Accepts position with DOE as Director of Operations, Nevada Operations Office [NVOO]	98
Discusses moral obligation of United States to the people of Enewetak and the Marshall Islands after testing ended, more detail on work with John Malik during Operation Castle and their discussions regarding U.S. responsibility for the people of Enewetak	101
Forward again to his work with Defense Nuclear Agency [DNA] in contamination cleanup operations in Enewetak, and return of Enewetak to self-government, Chief [Iroij] Joannes Peter	109
Reflects further on the issue of American responsibility for the Marshall Islands in light of growing fear of the USSR during Cold War, and then talks about return visit to Enewetak and his role in the cleanup done by U.S. Government of the islands	114
U.S. officials shocked by conditions on Bikini, more remembrances of [Iroij] Joannes Peter and wife Bila	118
Formal turnover of administration and operation of Enewetak from U.S. Government to Enewetak government	123
Conclusion: "I think we can never do for the people of Enewetak or the people of Bikini enough to repay them for what they did for us"	124

Interview with Roger Ray

October 29 and 30, 2005 in Middletown, MD

Conducted by Mary Palevsky

October 29, 2005

[00:00:00] Begin Track 2, Disc 1. 10/29/05

Mary Palevsky: *Roger Ray, thank you so much for speaking with me this morning. I thought we could start by you telling me your full name, date of birth, place of birth, and something about your family background.*

Roger Ray: Well, first of all, Roger Ray is my full name. My mother is said to have said that she didn't want nicknames, so she was going to give all of her children short names and they could pick their own middle names, but no nicknames.

I was born in Yonkers, New York in what was called Bronxville at the time, a small village town at that time, 1922, on February 26, 1922. I was one of five children, four boys and one girl, and I was the youngest. My oldest brother very soon entered the [U.S.] Naval Academy [Annapolis, Maryland]. This was my brother Martin, who graduated then from the Naval Academy in 1934. Next came Margery who followed her mother's footsteps into Barnard College and graduated in 1939. Next came John. John was four years older than I and entered West Point [U.S. Military Academy, New York] in 1935, to graduate in 1939. Then came Alan, two years younger than John, two years older than I, and we were probably the closest pals in those times, being but two years apart in age.

All of us five children attended the same grammar school, Public School [P.S.] Number 8 in Yonkers, and all of us attended Roosevelt High School in Yonkers and graduated in the sequence that I've given you.

Let's see, where do we go from here?

A couple of questions were raised. Two of your brothers, you said, one went to the Naval Academy, the other to West Point. Was there a military background in your family?

Well, there had not been before my father [Martin Hasset Ray]. I neglected to mention that Father graduated from West Point in 1910. We lived about fifty miles from West Point, so as you can imagine, that became part of America, as far as we were concerned, and part of our family. We made fairly frequent visits to West Point and encountered many of Father's old associates over the years. Father had served in World War I and then left the Army, resigned from the Army, and spent the rest of his life in private business; he based himself in New York City about a thirty-five-or-forty-minute ride on the train from Bronxville.

What was his business?

His business was largely business management, but with an engineering bent, and he really was a very versatile man who found himself supporting the management of large construction firms, aircraft firms, all sorts of commercial businesses. He also engaged in some professional support [00:05:00] of city, county, and state governments.

I should mention there that Mother [(Josephine) Ray West Ray] was a professional person, too, graduated from Barnard, and I think that most of her professional resources were invested in public affairs, for the most part voluntary. She, as I remember, was the spark that started our library system in our town and the spark that introduced new innovation in our schools. She was very strong in our church, and so we all became members of the same church.

What church was that?

It was a Congregational church, but it had grown out of a number of antecedents and I won't try to go into those. Most of that happened before my time of awareness.

[Pause]

Let's see, you don't have to give me all the antecedents, but you've whetted my curiosity. So this church had some sort of long history there?

No, actually we had a picture somewhere in our scrapbook of me attending the laying of the cornerstone of the church when I was four or five years old.

OK, so I misunderstood.

It was an outgrowth of a local Dutch Reformed church that we had belonged to.

What were your parents' names?

Father's name was Martin Hasset Ray. Mother's last name was West. I'm hesitating because she didn't go by her—she went by—incidentally her middle name was Ray, so named because they had very good neighbors, good friends nearby who admired her parents very much. And these families became so intermingled socially that it was just a natural thing for her to be known as Ray West Ray. But her real name was Josephine. I supposed I mentioned, or perhaps I didn't, that Mother died when I was eight years old, so I'm a little bit fuzzy on some of the details of her life, but not of her character and the strength that she gave our family. She was an educator, a public activist, public-spirited lady. Despite her five children, she still had lots of time for community activities and church activities and school, someone that we all learned to admire very young.

Now she died when you were so young. What happened? How did she die?

She had a tonsil infection that became a chest infection, and in those days there were no antibiotics, and so she succumbed after a fairly short illness. And I remember that day vividly, and the ensuing days of trying to become upright again myself, and I'm sure that my brothers and sister shared that. It was such a blow and unexpected. She was vibrant, she was athletic, she

was a sailor, she taught us all to sail and to swim, and we very much needed her in our young lives, and so that was a terrific blow, and of course it was to my father.

[00:10:00] *Sure. That must've been hard.*

Lots of good, supportive people elsewhere in the family and in our neighborhood. I'm still in close touch with those who survive in that latter category and grateful to them for keeping us identified with home and identified with our neighborhood and with them.

I suppose you want to move from there to—

One last question about your parents, which is your dad, he served in Europe in World War I, is that right?

He was in Europe but only briefly. This was at the time of the inception of the Air Corps, the United States Army Air Corps, and he established a school for pilots very early in the war and was identified with what later became the U.S. Air Force.

So he had an engineering background already, is that right?

Well, he was a West Point graduate, and that in those days meant an engineering background. I guess I should've said that all four boys and Father all attended either one or the other of the academies, alternating, interestingly, between West Point—Father graduated from West Point, then his eldest son from Annapolis, then the next son from West Point, and the next son from Annapolis, then I from West Point.

Well, that'll be a good transition, then, for you to West Point. So what years did you attend?

I reported to West Point on July 1, 1940, and at the end of our second year, which is 1942, we were informed that we would graduate in three years rather than four, and so we were converted from the Class of 1944 to the Class of June 1943. And interestingly that made it necessary to take our last two years in one academic year, and I mean truly that we did every assignment, took

every course, did the entire program of those last two years in the last year. Graduated in June 1943.

And this is happening because of the war [World War II], is that right?

Oh, yes, indeed. We were terrifically short of young officers to lead this army that was burgeoning, and we had more military training under our belt than could be passed on to a civilian being brought into the service and in the comparable period of time, so we were a resource that was running short but was very much needed at that time.

We don't have time to go into a lot of detail, but just a little bit about the West Point experience.

You were there at the time of Pearl Harbor.

Yes, we were.

So what are your memories of that era? Or maybe more generally, I guess I'm asking what the atmosphere was like to be there during wartime.

Well, I remember the day very well. A rather substantial fraction of the cadet corps were at the movies that afternoon, that Sunday afternoon when the attack on Pearl Harbor occurred. And suddenly the movie stopped and a man came out on the stage and said, We've just had word that the Japanese have attacked Pearl Harbor. I had a brother that was in that part of [00:15:00] the world, in the Navy, and others coming along very soon, and we all just ran out of the movie house and over to our barracks, and there turned the radios on to find out what we could, and of course it was very muddled. We had been given some warning as cadets in various classes that the Japanese were on the march and that anything could be expected, but it certainly didn't include that such severe damage could be done to our fleet and to our facilities in the Pacific in one bold strike.

We had hardly become aware of all of that when we received orders to appear in the lecture room by, I don't know, six o'clock in the evening. And we did go in class formation to that lecture room, and there a group of instructors, officers who were instructors in various things in the military academy, gave us a summary of what was then known. And in retrospect, I have a tremendous respect for the men who did that. These were young officers who had been just as surprised as we, four or five hours earlier, and they had a comprehensive look at the world. They had maps all drawn to show not only what had occurred in that attack but the strategic significance of the various things that the Japanese had done. It has lived to impress me for years that these men immediately turned to and got that information out to us and available to us, and that it was so good. In retrospect it was tremendous that we suddenly went from being comfortable students in that institution to being most anxious to get up and go ourselves and to finish our qualifying years and our months and get over and join the fray.

So you were in what class, then, at Pearl Harbor? You were middle of—?

Well, Pearl Harbor was December 7, 1941. We had by that time been in the military academy for about a year and a half, so we were just about halfway through, a third of the way through our original contract but by the end of that day, I should think, it was concluded that we would graduate a year early. And that of course had a terrific effect on a lot of things. It changed our academic curriculum but mostly by compressing it. We did not eliminate even the humanities and the languages and other things that might not have been thought essential for people who were training for war. But we were training for a lifetime still, and again I compliment the administration, not only the administration at West Point but the national administration for recognizing that that was an asset that must not be squandered, that we must finish our education

sufficient to do what we had set out to do in the first place, but it get it done in a shorter time.

And we really did work very, very hard from then on through that year.

Thank you very much. That answers several questions. You anticipated several of my little detail questions. So you graduated then from West Point in '43?

[00:20:00] June of 1943, yes.

And so the war's pretty much still—we're right in the middle of it at that point.

Yes, well, we're really just getting in deep. We had not mobilized as much as we needed to, for sure, and we had not brought into the military services nearly as many of the so-called civilian components that were going to be needed to fill out the ranks. The Army had to expand, Army, Navy, and Air Force—the Air Force didn't really exist, of course—Army, Navy, and the U.S. Army Air Corps was in its infancy. All of those had to expand and grow and mature.

You mentioned your brother having been in the East at the time of Pearl Harbor, did I understand you correctly? You said when Pearl Harbor was attacked, you were concerned because of one of your brothers?

Right. He was in the USS *Pennsylvania* [BB-38], a battleship, and the *Pennsylvania* was one of those that, as I recall, now my memory isn't very clear on this but at least the *Pennsylvania* was not attacked by the Japanese. I believe that it got out of Pearl Harbor. It had been in Pearl Harbor and it got out of Pearl Harbor before the Japanese attack on Pearl Harbor came. Of course you know that we lost many of our capital ships right then in that attack. Of course we were grateful that his ship had not been hit and that he was well, and I don't remember how long it took us to find that out but it was certainly a time of concern for my parents.

Now was that your oldest brother?

Yes, it was. Class of 1934 at Annapolis.

So where do you go after graduation?

After graduation I went, after a brief leave, to Fort Benning, Georgia for training as potentially an infantry platoon leader, and that was all focused instruction, focused on that particular job. There was no longer any of the what we might have called frills of economics and finance and politics and all that, but no, this is entirely military instruction for I think it was about six weeks. And it was the equivalent of what the drafted new member of the Army would have taken in Officer Candidate School [OCS]. Had he been selected after his recruit training, he might be selected then as a potential officer and sent to that school where he would not only gain his education but his promotion to second lieutenant. We came out of that school with the professional training we'd had at West Point, followed by that tactical and technical training that we'd gotten at Fort Benning, and we came out still as second lieutenants and reported to our assigned divisions, most of these being combat divisions: infantry, artillery, armor. And I and my best friend and roommate chose infantry and chose to be together and to join the same infantry division where we had a little bit of choice.

What was his name?

[00:25:00] His name was Arthur H. Rasper from Cincinnati, Ohio. Art survived the war all right, but he died young. After World War II he died of—I don't remember what the disease was. He was on vacation in South America and it was a very, very unexpected and tragic thing. His parents became Mom and Pop to me, they had a long time ago, and mine similarly to him, and I kept in touch with them as long as they lived afterwards.

So then where do you go after you become the second lieutenant?

We trained at Camp Breckinridge, Kentucky with the 83rd Infantry Division, and I was in the 329th Infantry Regiment. Art was in the 330th, the next-door regiment. We didn't live next door,

we lived quite some distance across the post, but we saw each other fairly frequently and when we were able to get a little leave, we would visit either his parents or mine, who were both in the Midwest at that time.

Our division was ordered to Europe in mid-1944. In fact, I guess it was probably April or so. And we were in the 83rd Infantry Division, went to Europe, went first to England for further training and indoctrination and just conditioning, getting more focused on the war that we were really going into. And that was during the time that the United States and Britain were very tightly bonded in their purpose to invade Europe and retake the Low Countries and work their way across France and Germany. And of course the first step in that was the invasion of Normandy, which occurred on June 6, I think it was, of 1944.

We were not in that first wave of invasion. We were too green a division to be in the front lines at that time, or to be in one of the key slots. The divisions and regiments that formed that invasion force had been in intensive training probably for at least a year more than we had. So we prepared ourselves to be in what was called the second wave. The second wave came very quickly after the first wave; we left training camp in Britain and went to the port of embarkation in the south of Britain sometime very soon after D-Day, and then sailed across the [English] Channel by the time they'd established a beachhead, and we set up camp just out of that beachhead just up on the dry land and prepared to take over whatever position we might be ordered to take.

As it turned out, the two airborne divisions that had led a good part of that invasion, the 101st and the 82nd Airborne, were in the sector that we were backing up, and so as soon as one of those divisions had really exhausted its resources for the intensive warfare they [00:30:00] had fought, fighting their way ashore and then up the cliffs of Normandy and onto the plains of

France, by that time they were just about exhausted and had to get replacements. They'd had heavy casualties, had to get many replacements and get a chance to rest up and replenish their ammunition and guns they'd lost and so forth. It had been a very tough battle to get off the beach and up onto the plains.

So we relieved one of those airborne divisions in a movement known as "passing through." They had their position on the front line and we went up the night before and met, platoon leader meeting platoon leader and company commander meeting company commander and getting a quick briefing on where they are and what their intentions seem to be, and then by daylight they had moved out and we were in their foxholes and ready for our assault.

I think our assault started on July 4. I'm not sure of that. And we were to do essentially what they were doing, to try and drive into the heartland of France and get into the rear areas of the German Army and disrupt their communications and disrupt their supply lines so that we could then overwhelm them and go on.

One of the next targets was the city of St. Lo. As we launched our attack toward St. Lo, I think that was on the morning of the fourth of July. It was quite close to the fourth of July because I remember writing to my parents later and saying it was the noisiest, brightest fourth of July I'd ever experienced. The firecrackers were a great deal louder and a little more scary.

And we proceeded with a successful advance against the Germans and were into what was called the hedgerows. Hedgerow fighting was in areas that were broken up by mounds of earth separating I suppose different landholdings of different people, and so those made convenient hiding places, convenient protected places for the defenders, the Germans, and made it much more difficult for us to try and cross the open terrain and attack.

In one of those attacks, I was in command of my platoon and as we started forward, a mortar shell struck fairly close by and I was knocked down and my leg had been wounded. I didn't know how badly but I knew that I couldn't stand, so my platoon sergeant had to take over the platoon, and that was the last I saw of 83rd Infantry Division.

For some hours I stayed there, used my first aid training to not lose my head and try and keep under control; I don't know at what time of day, a couple of soldiers, medics came by with a stretcher, a litter, put a splint on my leg, and rolled me onto the stretcher and drove back [00:35:00] to a hospital somewhere between there and the Normandy beach. So I was headed back. That led to a wait of I think it was three days down on the beach, just lying on a litter, and somebody came by every few hours and gave us a box of food and saw that our canteens were full of fresh water, and we just lay there.

The man next to me on that night was a German soldier who too had been badly wounded. I spoke some German and I spoke to him and I suppose you could say befriended him. Certainly I extended him the courtesy of soldier to soldier. And we didn't talk very much but I came to think that he was much like me and that we could get along.

We waited almost three days and finally a ship came in offshore and they sent in boats to take us out to the ship. Our litters were carried and put across a landing craft. They could get about six across one of these landing craft and we'd putt-putt out to the large ship and were carried aboard, and I guess it was about dark when we finally got the whole beach cleared. And they had a ship full of litters with guys who really didn't know where they were going and who was going to take care of them or for what; but all right, we did, and we got into Liverpool and there went by ambulance, which is a two-and-a-half-ton truck with a red cross on it, again stacking litters in that to get to the hospital.

I went to a hospital in Bournemouth, England, the 188th General Hospital, and there was very soon in bed and for the first time with real sheets and a beautiful nurse named Goldie with a very, very comforting personality. I dragged that out. I stayed in that 188th [General] Hospital, I think, for four months, in the whole hospital chain. Bournemouth was probably about a month or six weeks of that, but I had to go to a rehab hospital after I was released, and there to get re-equipped and be ready to go back to Europe.

Let me ask you, without getting too deep into it, but during this whole experience, that's really an intense experience, I guess I would say, but what's going through your mind when you said early on when you were first injured, what was going to happen, were you in pain, and then what kinds of things are you thinking?

Well, yes, I was in pain but we had been given some pain relief, medication we carried ourselves. We had also been given Sulfanilamide pills. We didn't have penicillin, we didn't have a lot of the other fancy stuff, but we had I think it was twelve pills. Most of us for whom that's a dim, distant memory think of that pill in such a way that it grows with each year that we tell the story. They were pretty damn big and you were to drink a canteen full of water to follow the twelve pills. And I took mine and started to drink my canteen full of water and a German [00:40:00] machine gun bullet hit my canteen and *tschoo*, it went south. So I got about a half of the amount of water I should have taken with that number of pills. It was many hours later before I got a place where I could get a drink of water, and by that time I was sweating profusely and very uncomfortable from it. That was explained to me later by either a nurse or a doctor as not uncommon if you don't drink all the water with your pills. That's just an aside of no particular consequence, but it probably describes rather than being a variance from the norm, that probably

describes the norm for most combat wounded. Nothing goes exactly as planned and exactly as you trained for. Nevertheless, I got into a hospital at some very late hour of the night.

I guess I should back up a little bit and say that my brother John, four years older, who was by this time probably a major, had been in France since the initial invasion. I think he went in in the second wave perhaps. Anyway it was soon after the opening of that campaign. And he was uncanny. He still is. He kept track of me. Some way or another, he knew where the 83rd Division was going to land and where my regiment was deployed, and he came and visited me. The night before I was wounded, he visited me in our last foxhole before we were breaking out on the German lines. We were to launch an attack on the fourth of July, and John visited on the third of July just to buck up my morale and see that everything was fine. Yes, it sure was, and I felt on top of the world and my division was a good one and my platoon was the best one and that sort of frame of mind. So John just visited for a few minutes. Oh, he said, Is everything all right? Do you need anything?

I said, Yes. We lost a machine gun coming ashore.

And John said, Ah, well, I'll see what I can do.

And later that night, perhaps two o'clock in the morning, a Jeep came into our area and the driver of the Jeep was calling out in a whisper, stage whisper sort of, Anyone know where to find Lieutenant Ray?

And I said, Yes, I'm it.

He came over and said, Your brother sent this.

A machine gun. I won't explain except that it was one that had been lost on the battlefield by its gunner probably and someone had found it and turned it into the ordnance people to reissue and John went by there and found it and took it to me, or sent it to me. That was one of

many encounters that he and I have had in our whole lives that are similarly coincidental and interesting.

We launched our attack on the fourth of July and were successfully subduing the German resistance. It was pretty clear that we were going to achieve our goal, which was to get to the [00:45:00] very important junction and city of St. Lo. On the night of I think the sixth or seventh of July is when I got hit. I guess I got ahead of myself before a little bit and I guess you'll have to unscramble this or I will.

Well, let me just make a comment here about that. It's really common, both based on how people tend to remember things and my questions, to go back and forth, so I'm not ever concerned about exact chronology and you don't need to be.

OK. Well, the night that I was wounded and I was finished, of course, and had to be taken out in the medical evacuation, I stayed overnight in a field hospital, which is not much more than a big tent with a nurse and a corpsman and a doctor occasionally. And it was on that occasion that my brother John discovered where I was and came to see me. And that's where I got mixed up before on John's visit. I had two visits from him.

It's perfectly clear what you're saying, yes. So the night before the battle and then after you were injured.

Right. And he came and said, Well, the main reason I came, I want to be able to send Father a message and let him know that you're OK, and from what I see, you are, so that's the message I'm going to send him. Anything else you want to say? And I said, No, except tell him I'll be back, and as I had told my platoon and as I had told my battalion commander who saw me when I was being evacuated.

Well, I guess I should resume then as we were loaded aboard ship and taken to England and there unloaded and put on trucks and carried to hospitals. And I went to the 188th General

Hospital and there I spent the next couple of months recuperating and getting ready to go to rehab to again return to the continent and get back to my platoon if I could.

So it was clear pretty early on, then, you knew that your injury was such that you would be able to return.

Yeah. All of my evacuation had been done under the assumption that I had a fractured thigh bone because it was a rather ugly wound just halfway between the knee and the hip and I couldn't stand on it and I couldn't stand it either. And we didn't have X-rays in the field, of course, and didn't have any way of knowing, and so it was immediately splinted and I had a leg splint all the way down to my shoe. When I got to the hospital, probably three or four days after I was wounded, I did get into an X-ray and they took a picture and yes, the leg bone was all right, so they were able to take that splint off, and it was a traction splint which straps to several places on your leg and keeps it extended. And despite the fact that the bone wasn't broken, I could not stand. It had been disabled. And I still had my boot on my leg, and they cut the boot off before I went into the X-ray, and it had been used sort of as part of the splint. They cut it off and all of the meat on the back of my heel came off in the boot. I had just a bare-boned ankle. The wound had [00:50:00] been up in my thigh: but those several days with no blood circulation there had caused that to become gangrenous, and so I had a longer rehab than I might have had just with the bullet wound. The whole thing took about four months for me to be fit for duty again, and I was certainly desperate to do that, to get back, and I hoped I could catch up with my platoon.

Fast forward, I guess, to the day that I was released from the hospital system, and again made a ship movement across the Channel, and we were just loaded in trucks as so much fresh meat. Identity was gone then. We were just in the hands of the transportation people. We were just people that had to be moved from here to there. But they did know the destination because

we all had been part of the 83rd Infantry Division, and we went up to the closest replacement depot to the 83rd and there were unloaded, and we had no organization at this time. Nobody was in command, nobody was in charge of anything, and we were just tons of meat. And we were in an encampment. I should say that my division had had terrible losses in that same period that I left, and these were largely men returning just as I was, hoping to join their old outfit and looking forward to that. We were just camped and fed while the division was some miles ahead, and of course they had picked up other replacements to fill our jobs along the way, and they drew upon us for individual replacements or small packets of men to go and replace what needed to be. That was probably the most uncomfortable period of time when we knew that our division was up there and our friends were there and we couldn't join them and couldn't go back to our jobs.

In the midst of this, one morning I heard my name being called, and answered.

Lieutenant Ray.

I said, Here, sir.

He said, Sir, I've been asked to get you and take you back to our headquarters.

[And I said], OK, what is the headquarters?

He said, Well, it's the replacement battalion headquarters.

OK. I went back to the replacement battalion and met the personnel officer there. I think he was a captain. And he said, You're Form 66. Your record shows that you speak both French and German, is that right?

I said, Yes, not fluently but I certainly can read and for the most part understand spoken both languages.

He said, Well, that's what we need. Come with me.

And I said, what's going on?

He said, We've got a requisition to find a company-grade officer (company grade is a lieutenant or a captain) with combat experience and fluency in German.

And I said, Well, I was once reasonably fluent in German, but it's been a long time since I used it, it's been a long time since I was taught, but yeah, I guess I can speak some German.

[00:55:00] He said, Well, let's take you in and see.

And I went in and met the senior personnel officer there and he looked at my record and talked to me a little bit. Oh, this guy must have combat experience, too. And he said, Well, let's send you forward for an interview. You won't need to take anything with you. This is just for an interview.

And we went up to a little town in Germany and there I was introduced to a captain, I guess, who was to take me over from there. And I said, What is this about, Captain?

And he said, Well, we have lost our senior German-speaking officer in the intelligence section and need to get somebody in there to train right away.

I said, Well, I don't want to mislead anybody. Yes, I speak some German and I guess I can brush up on it. I'm not fluent right now.

He said, Well, let's go and see.

Well, he turned me over to a driver and told him where to take me, and I reported to the intelligence section of the 1st United States Army. Well, I had gone from—I was a platoon leader in a company which was in a battalion which was in a regiment which was in a division, and you get thus many divisions and you have a corps, and then two or three of those corps and you have an army. So I was going up the ladder organizationally far beyond anything I'd ever been in or served in. But I got there in a Jeep and went in and was introduced to *the* senior intelligence officer in that organization, Colonel Benjamin A. Dickson, Monk Dickson. I suppose it might've

been somewhat attractive to him to find from my record that I was a West Point graduate, because he was also. And in any event, I was taken in to meet Monk Dickson and he shook my hand strongly and enthusiastically and said, Welcome aboard.

[And I said], Well, does that mean I'm assigned, Colonel?

[And he said], Well, I've got to run it through the jute mill, he called it, and see what comes out, but as far as I'm concerned, that's what I want to do.

He had spoken to me in German almost from the beginning of our interview and I had responded in German and it seemed to work, so he decided that I was what he needed, a combat-experienced officer who could speak German and had had reasonably good training, which he had to acknowledge because he too was a West Point graduate.

So I said, Does this mean I'm to be reassigned, Colonel?

[And he said], As soon as I can arrange it. Now, let me send you down to the G-1, which is a personnel officer, and get you a billet, a place to stay, and I'll see you later this afternoon.

And I went down and met the personnel officer and he assigned me to a place and he said, By the way, Lieutenant, do you have a brother named John?

I said, Yes, sir.

[And he said], Would he be Major John Ray? Or lieutenant colonel, I don't remember which at that time.

I said, Yes. Do you know him?

He said, He's right in this headquarters.

[And I said], Oh, my goodness, really?

And he said, Yeah.

[01:00:00] He assigned me a place to stay, which was an apartment that I shared with three other men that I had never met before, and it was perhaps a mile from the headquarters, walking distance, and that was fine. It was in Spa, Belgium, a very nice town, a place with the baths. So I went to my room—oh, no, this lieutenant colonel, I think it was, or major, had said, well, you haven't seen your brother, then.

I said, No, I haven't. Is he right here?

He said, Yes, he lives just down the street from where I'm assigning you. And he gave me the directions to get there and said, Why don't you go down and check him out?

So after I'd checked in at the billet I'd been assigned and put my things—didn't have much in the way of things, I went down and John's room was unlocked but he was not there. I went in and I've forgotten, I think I probably met someone who knew him and he said, Oh, he's just off on some sort of errand. He should be back very soon. Why don't you just sit down and make yourself at home, fix a drink if you want.

So I sat there and waited for John. And he came in that room and a more surprised man you've never seen. He said, What in hell are you doing here?

I said, I'm assigned here, Sir.

And he said, You're what?

And I told him the whole story. He said, Oh, my gosh. Well, come on. Wait, did you go see Monk Dickson dressed like that?

I said, It's the only dress I've got. This is the one uniform that I have had on for the last two weeks, lying in the mud, and it hasn't been laundered, but it's the only thing I have.

[And he said], Oh, God. Well.

And he picked up his phone and called the Army Quartermaster's officer. This is the man at the Army level responsible for all kinds of supplies for this army. And John explained the situation to him. He said, Can you get him a suit of clothes quick? I'm not going to let him out of my room looking like he does now.

The supply officer answered and said, Sure, Johnny, I'll send it down.

Well, they sent it a man from the Quartermaster down to take my measurements, and he went back and within a half-an-hour I had a full outfit laid out and it was pressed and all set. So I got dressed and felt a whole lot better about going out and being seen.

And that introduced me to Army Intelligence. I'd never trained in intelligence, although every soldier does and every infantry officer certainly trains in intelligence, but at a very low level—we were talking about divisions and corps and armies and the logistics of those larger organizations, which are the business of the G-2, the intelligence people.

I guess we ought to just fast-forward there because I spent essentially the rest of the war in Europe in that office.

Well then, we've got about a little less than ten minutes left before I want to pause, so just so I can have a sense of it, don't fast-forward quite yet. Tell me a little bit about what that work involved.

Well, in the G-2 office, there is maintained the situation map available to the Army commander and his senior staff to be able to come in and pinpoint on the map every German unit that we [01:05:00] have identified so far, and every American unit that is opposed to them. And in a very short time these senior people could be briefed on the tactical situation that would face a commander in any one of those smaller units and/or in one of the larger units; it was our job to know everything that had happened in the last twenty-four hours in that region. That's the essence of intelligence, to know what the enemy has been doing and to some extent be able to

forecast not what he will do but what he can do. That's probably the first lesson that I learned as an intelligence officer, that you don't ever try to forecast what's going to happen but you have to be able to forecast the capabilities that the enemy has at this time, and you know the capabilities that we have, you can match those up and make your own mind up about the likelihood of success or failure of any proposed move. That's all kept on a situation map that would be, well, bigger than this wall right here, and I mean from there to here.

So how many feet?

Oh, I'd say probably six feet by eight feet. And that would cover the entire battlefield that is of interest to this organization, way over on its right, way over on its left, and in considerable depth in the enemy's positions. So our business was to receive reports from every source imaginable and integrate those into an opinion, I guess, or facts as to the enemy facing us and his ability to resist or to counterattack. That summarizes in about three sentences what I learned in about six months in that job, and it was fascinating, and I met a whole lot of wonderful people. It was my good fortune to have that learning experience and a real challenge. In fact, intelligence became my career, I suppose, after that for quite some time.

John meanwhile, brother John was the ammunition officer for the 1st United States Army. This means for perhaps four divisions on the front and a couple of reserve divisions, providing them with their needs in ammunition under all circumstances, either when they launch an attack or when they are counterattacked, when a breakthrough occurs, or whatever might happen. And so the ammunition officer has to keep up with that same tactical situation and respond to it by estimating ahead of time what's it going to mean in ammunition requirements. John was a frequent visitor to our office. He still couldn't get over that. What in the hell? How did you get here? But we had very little time together, but we tried to have a meal together every

couple of days, and of course you couldn't telephone. Telephones were in critical shortage. We needed those for the actual business we were doing. But we found ways to get together, and it was quite a thrill for me to be back with my brother, and I guess to him.

On December 15, he came into our office and looked me up and he said, I'm going today to go out where we have an ammunition depot that has I don't know how **[01:10:00]** many tons of ammunition, move forward in forward storage, so called, to be prepared to go and replenish ammunition supplies of the front line divisions. We were just about to launch a big attack across the Rhine River, and so they had moved a lot of ammunition forward.

Then came what has become known publicly as the Battle of the Bulge. The Germans counterattacked before we could launch our attack, and it was certainly not expected. Of course we knew that it was always a possibility, a probability, likelihood, but it was not expected to happen at that time. They did it with great energy, wonderful planning, and they were a great success initially. They broke through and chewed up one of our infantry divisions within twenty-four hours. That left vulnerable a large ammunition dump that brother John in his staff capacity had selected as the place to put forward-placed munitions for our attack, ready to catch up and keep up with the advancing divisions. Now when the tables were turned, that was in danger, and so John came in to see me and to look at our maps and to talk to others in the intelligence section. He wanted everything we knew about routes forward to that depot, about the best way to evacuate the munitions, and about the strength of the German forces that were expected to attack.

[01:12:19] End Track 2, Disc 1.

[00:00:00] Begin Track 2, Disc 2. 10/29/05

OK.

We gave him every bit of information we could in what is called a G-2 estimate of the situation, an intelligence officer's estimate of what the capabilities of the enemy are, not what his intentions are but what his capabilities are and how these might affect them. And it wasn't a happy situation. We had great quantities of munitions that the Germans desperately needed if they were to continue their attack, and so it was a precious prize for either side.

John went up to see how he might evacuate those munitions. He came to a road junction halfway to that place and it was being held by Germans; They had captured some one hundred American prisoners, and John became a hundred and one, and his driver became a hundred and two. And they were all lined up in a field for some unknown purpose. They were not being told anything, just "get over there." He certainly recognized that all of them were there at peril of their lives, but there was nothing they could do to resist.

Suddenly one of the German officers noticed that John was wearing lieutenant colonel's leaves on his shoulder. Makes him a fairly senior American officer, and a prize, the idea being that coming from where he did and having that patch of the First U.S. Army, he probably knows a lot that we'd like to know. And so rather than keep him there for whatever was to be the fate of these other guys, to be evacuated as prisoners or whatever, they took him in a Jeep, took him back for interrogation as a prisoner of war. In that fracas—and I don't remember when it was that it occurred—he took a bullet through his helmet and across the scalp and out the back of his helmet. Nobody knew at that time, he certainly didn't, nobody else did either, blood streaming down his face, and the German driver didn't pay any attention to that. He was told to take this guy over there. So he was evacuated through prisoner channels, but to an interrogation station. And his wound was, I won't say superficial, but it was not life-threatening, so they treated it with field first aid and took him in for interrogation. And of course they spent a good many hours

trying to learn some of the things they didn't know about our ammunition supplies. They could tell that he had some knowledge of—I don't know how they knew but they managed to get from him enough information to decide that as a lieutenant colonel, he probably knows a whole lot that we'd like to know.

That was the last I saw of John, the sixteenth of December. And the German counteroffensive continued for some time. I'd have to get my history book out to decide when the German attack was finally snubbed off and we were able to resume our drive to the Rhine River. I tried desperately to find anybody who—I talked to some of the men that were in that prisoner group to see if they recognized him and yes, they did, but nobody knew where he went. **[00:05:00]** And most of that group of a hundred were gunned down right there with a machine gun. It was an unprovoked and unjustified act on the part of a single or a few German soldiers. I'm convinced, I think John was too, that it was not part of the plan and they'd not been sent there to do that but they just found they had an easy target of a hundred Americans, bingo, "let's take them out," and they did. We didn't know all this at that time. When we finally retook that road junction, I asked that we have a special EEI, essential element of information established for the group that were being interrogated about that to try and reconstruct the occurrence. And I asked if anybody saw this man, did anyone see a lieutenant colonel there. No. So when we went back and recovered that road junction and found the frozen bodies in the snow. I got hold of the graves registration people and asked them to be on watch for, and I described John's dress at the time and his appearance, and came back later with just a negative meeting: we didn't find anything that matches the description you had. We don't say that he wasn't there because we weren't able to identify all of the people that were there. So that's important only to probably our family, but I had to tell my father by my next letter that I had reason to be hopeful only with negative information. I didn't have any positive information

that would indicate that he was still alive nor where he was, but I would sure keep my ears open and let him know. Our family went to the end of the war without knowing.

[PAUSE]

The only thing I really knew was that he had not returned from that mission that day. I did know exactly where he'd gone. I did know about the cold-blooded murder of about a hundred American soldiers at that location and about that time. So despite my misgivings, I still tried to give to my family a positive outlook.

And within a few days, probably within ten days at the most, we had retaken that road junction and all of the corpses had been recovered. I did not personally go there. I couldn't at the time. We were very heavily engaged. But I did talk to men that were there to make this recovery, and they gave me pretty good assurance that John Ray had not been in that group of bodies that they recovered. I described him, described what he was wearing, and they saw no one in that uniform. He was a lieutenant colonel and they would have, I think, recognized that. So I had [00:10:00] reason to be optimistic but certainly not to be confident. I tried to carry that optimism to my family, to my father especially, and he would pass it to others.

But we really did not know, and I simply had to put it out of my mind. The next several months it was very difficult to do so, and friends innocently would walk into the office, any word from Johnny? And I had really tried to put that out of my mind and get my job done. I finally wrote a little note which my steno took down and typed out and we ran copies of it, just a little thing like a three-by-five card, and the sense of it was: I am in a bit of emotional turmoil and though I know that your intentions are good, it is rather hurtful to be reminded ten times a day that my brother is missing, so if you want to do the most kind thing you can for me, just leave that subject alone until I know

something. And they were all very good and very kind and that no longer was a troublesome thing. I came to be more and more optimistic as time went by.

Besides, we were very, very busy. We were advancing against the Germans again and we crossed the Rhine River and we had a very successful campaign against the German Army which ultimately led us to joining up with a Russian force, a Soviet force coming from the other direction. It was clear that although it was all dispersed and nobody knew where the lines were, the Russian capability to fight was surrounded. I think that word was certainly being passed up the line by the German Army and finally led to an ultimatum from General [Dwight D.] Eisenhower that the Germans had better surrender promptly or their army would be destroyed and with it, inadvertently of course, a good part of a lovely part of Germany. On about May 6, I think it was, the German Army surrendered.

Two days before that, I had a telephone call, and I answered, and the voice at the other end said, Rod? This is your brother John.

You can tell that that's still an emotional moment for me. And I just said, Where in the hell are you?

And he gave me his location. He said, I'm free. And I have a Jeep driver here who's agreed to take me back to my headquarters.

I said, Well, I'm there and I'll be waiting.

So I guess it was the next day that he returned. And we were in Weimar, Germany and [00:15:00] someone called me on the phone and said, Your brother is down here. He gave me the location. What shall we tell him?

I said, You tell him to stay right where he is and I'll be there.

Well, in two minutes I was there. Got a Jeep and went down and picked him up.

I should back up a little bit because I think this is an interesting adjunct. General Eisenhower had issued an edict some weeks before. When the Germans, as they became desperate, they were trying to bargain with whatever they had, and the German commander said, essentially his words were that It'll be tit for tat in the Hereafter. If you people unjustly treat our prisoners, we're going to reply in kind and it'll be even worse, so don't shoot our prisoners, don't injure them, don't mistreat them. I don't think that ever any American commander ever countenanced any unfair practices in that regard, but it was a good thing to know that the Germans had said that, and we therefore were meticulous about looking after their prisoners in a gentlemanly way. And there came the relief, now knowing that John was no longer in the hands of the Germans.

Well, I don't even remember where I was or where he was when we met. It wasn't in Weimar but I don't remember whether it was indoors or outdoors or that it mattered but it was a long, emotional hug and more, and we had an awful lot to talk about, an awful lot to catch up on, but the most important thing was to get on the wire right away a message to family, which I took care of that afternoon.

Eisenhower had said henceforth, to the Germans, we pledge that if you release any of our prisoners or if we retake any of our prisoners, they will not be reemployed in this theater of operations. In other words, don't shoot them because you're afraid they'll get back and keep fighting you, because we're not going to let them do that, Eisenhower said, we're going to just ship them home. And the Germans respected that from then on.

So it was John's destiny to be sent home immediately. He went to the Army commander, General [Courtney] Hodges, and said, General, I don't want to go home. I want to go back to my office here. General Hodges said, Well, Ike has said we will not

return to combat any soldier who has become a prisoner and then gets returned to us. But now that we've got an armistice, we don't have combat, so John, welcome back to your job. Incredible. I don't know of that happening elsewhere in that war, that a guy who had been a fairly senior person and returned was able to return to his job.

So he came back and of course there wasn't any job to do either at that time because the war was over, the war with Germany. What it meant to us, to me and to John, was that when our [00:20:00] headquarters left Europe for home, we'd be together. And what he didn't know at that time and what I had an inkling of and guessed was the reason that we were immediately shipped back as a unit, as a headquarters, was that we were going to go to the war in Japan.

Let me ask you one thing before you go on, which is tell me a little bit about the actual surrender, the day of the surrender, what you remember about that.

Very little. This was the whole thing that was on my mind at that time. I knew it was coming. Everybody in our headquarters knew that it was imminent.

All right. That makes sense. The minute it was out of my mouth, I realized the thing with your brother was so much in the forefront of your mind.

I just vanished from my office because we'd won the war; it was over, we didn't need to do the work that we had been doing. We had to report to our offices and keep the system going because there was an awful lot of after-action reports and that kind of thing to do, but we were not any longer in a position of directing or providing support to an army at war. So it was quite different, and my boss for sure was very liberal about sending me off to go take care of Johnny, which I did to the best of my ability. We restored his uniforms to him just as he had done for me and a lot of little things like that that we both remember, and that was just the highlight of the whole experience.

We came home. John was not well. He really needed a lot of attention to such things as malnutrition and his head injury that hadn't been really adequately taken care of. He was OK, certainly nothing to worry about, and he got very good care.

I'm not asking you to go into a lot of detail, but because of his rank and because you had said he had been interrogated, how had he been treated generally as a prisoner?

I think generally very well. He'd been captured once before by the Italians in Africa during the African campaign and he found that at least with the Italian interrogators if he stood up to them, they knew that they'd better not toy with him. But I think that generally speaking our prisoners were not mistreated, except perhaps by lower-level units that were in the frenzy of the fight and didn't know when to stop. I don't think that in the interrogations and in the organized POW camps, that they were miserably treated in the sense of not enough food and not enough shelter and not enough warm clothes. They had a winter that was pretty bad. He was captured in December, and fortunately he was dressed in pretty warm clothing, but that doesn't last very long when you're a prisoner. And they marched them on foot great distances. Nothing intentionally cruel but the whole thing was a punishing circumstance.

OK, thanks, I generally wanted to understand that.

And I guess that would complete that segment. I'm not sure where you'd like to go now.

[00:25:00] *Well, you said you went home. I have one question that's really tangential but I was curious. Did you know as a person in Army Intelligence, where you were, anything about the intelligence mission to find out what the German scientists knew about the—?*

Yes, of course, and I got this perhaps in a too-close-a-family discussion, and my professional life in that period of time was undergoing really dramatic change. The Germans had started using what we called buzz bombs, V-1. V stands for *vergeltungswaffe*, reciprocal weapons that will

pay the Americans back for their bombing. That was the whole purpose. Or the Allies. I said Americans but the Allies, pay them back for the bombing and the long-range artillery that they were using. The Germans were running short of the ability to do that. They'd lost most of their sites from which they could launch or fire large-caliber weapons. They'd lost most of their railroads that could move the big weapons. But they had come up with two new weapons of war. One was the *vergeltungswaffe-eins*, retaliation weapon number one, which was a small airplane, a pulse jet engine with an unmanned guidance system, and they would enter the trajectory that they wanted this thing to fly and launch it with great big jet-assisted takeoff bottles, and it would fly at perhaps five or six hundred miles an hour, and it carried about a ton of high explosive. Definitely to be a retaliation weapon. It was not accurate enough to be able to be aimed at any particular thing, any particular asset, but just go and disrupt our rear communications.

That's the buzz bomb, V-1. We took a lot of those in First Army, one right in the dooryard of the place that I was staying, and missed my billet maybe by fifty feet or something like that. Hundreds of these things were flying, and they were terrifying to the civilian population because they had no rhyme or reason to them. They might at any time come in on a country road and hit somebody's house. It was sort of an ugly adjunct to the war. It had no purpose other than to disrupt our rear communications.

In our intelligence section, we had no one assigned or even cognizant of that threat. I became interested in it when I started to see these reports, and on my own I plotted every one of those impacts on a map, and there were hundreds of them, and my purpose with that was to say, I wonder if there *is* a pattern and we just don't recognize it yet. And so I had the time and the consequences all plotted on this map. And it did occasionally seem that they had picked a trajectory and launched a number of missiles, approximately along that azimuth, that trajectory,

[00:30:00] and then just set them to stop and dive in. Whatever choice they made, I later decided that it was random, that they just weren't that precise about their planning; but you couldn't find that out unless you plotted every single one of them and with time as the other parameter, then go back and look and see how this all occurred. And I thought I was getting some ideas about that. My boss thought I was too and there wasn't much else in the work that I had been doing, not much else to do but that, and so it became a logical thing for me to become in charge of keeping track of the *vergeltungswaffe*. I went out to the site on as many as were nearby that I could get to, and hoping to get some wreckage that would tell a little bit about the thing. We knew nothing about its composition, how it was built, didn't know anything about the design and how it worked.

One of them became a dud and came down in Belgium, and I rushed over there and looked it over and got an ordnance company to send a couple of mechanics with tools over with me. And I identified what I presumed to be the guidance system, guidance package in this, and had them cut that out and bring it to me. Took it back to our headquarters and talked with some of the ordnance people, and we took it into the shop and dismantled it and found out enough to be convinced, first of all, that there was no command from the ground required for any of this to happen. They just were not commanding it once it was launched. And secondly, that there probably was no prearranged program in this guidance system to tell it, now you're over your target, go ahead and dive. And I wrote a paper for my boss with all the reasons for this—which was a couple of pages and it would have taken me a couple of hours to explain it all the way—but I said my tentative conclusion is that there is not necessarily any command control available once this missile is launched. It is preset to go somewhere, and that that somewhere is so indefinite that I don't believe that it's a precise guidance system at all. Well, it turns out months

later to have been a final inefficient conclusion from the Army that it wasn't any sort of a guided missile, that it was a missile gone astray really from the time it was launched.

Well, that was very important at the time because if we could just find that pattern, find how it was controlled, we might be able to give warning to these places that were about to be hit, including our own ammunition dumps and our own encampments. Never did that really contribute very much. It did contribute on one occasion to the evacuation of an entire air support for First Army, from one airport to another. I had plotted enough detonations on the surface near that airfield near Liege, Belgium, and I had plotted enough strikes near that which seemed to be [00:35:00] closing in on Liege, that it seemed to me very likely that now that they had it zeroed in, they might send enough of them to saturate that whole area, and if we still had that air wing there, it would've taken terrible damage.

I went over and talked to the commander of that air wing, an Air Force major general, and took my maps and showed him. I said, *This is no guarantee for sure, but I think it would be prudent at this point to move.* By golly, before nightfall they had taken every airplane off that field. It got a couple of hits, but certainly not as much as I had thought it might get. So it's not a conclusion that I would want to brag about. It happened perhaps to come out that way.

But that was the kind of thing that I got into. I still have somewhere in this house a piece of the guidance system of that missile, the gyrocompass, which is an air-driven gyro, and it was in perfect condition. I carried it all the way home and when I had some spare time after the war, I polished it up and mounted on a mahogany block and used to have it on my desk. A wonderful talk stimulant. It's somewhere in this house still.

But that sort of completes our war in Europe, for my family at least. And very briefly I'll say that John, as soon as he'd had a reunion with our family, as I did, and had gotten back home, he went into the hospital for, oh, I guess a couple of months. Not bedridden, but observation and testing and to make sure that he hadn't had anything that would keep him in trouble for the rest of his life. He's still living. He is in the hospital in Boston and has been for about, oh, since last December after he had two strokes in one day. But that's certainly not directly related to this. I talk with him daily and we have been up to see him. He's just moved to a hospital seven miles from his home near Boston. He's doing all right but his whole right side is paralyzed. He doesn't have the use of his right arm or right leg. He's in a wheelchair. But he's chipper and doing OK.

And he's how many years older than you?

Four years. He's eighty-seven.

So you come back from Europe when, then?

In I think it was late May of 1945.

So you're twenty-three years old.

Yes.

That's amazing, all that packed into that young life. So then I think more is going to get packed in, though.

Oh, yes. Well, this little episode that I've described, or it's not really an episode, this part of my history in that war having to do with guided missiles really intrigued me. I haven't said anything about the V-2, which was their much-advanced rocket-propelled vehicle that they launched against England in great numbers and with just the results they wanted. They didn't have to hit [00:40:00] anything in particular. They were just trying to terrify the British population, and they did a pretty good job of dropping those in the middle of London in the middle of the night, and

they carried two thousand pounds of explosive with again no rhyme or reason to their targeting. The only way that we could defeat those is what we did do: target the railroads that had to carry those to a launcher, target their manufacturing facilities, and just keep those crippled as much as we could. And that worked pretty well. I went to one of the V-2 factories before I came home and saw the very crude facilities they had for constructing and saw that they were unprotected, those facilities were unprotected, and so our bombing certainly crippled that weapon and it never became strategically important. Terrifying to the British but not strategically important.

But the most important thing about that is that it told us that we had just seen the opening of technology in a new way to fight wars, that is, with the guided missile; it decided me that I would like to learn more about it and I'd like to find a way, while I was still in the Army, to become better educated in that field. Aeronautical engineering was certainly not part of my West Point education, nor part of my purpose in life until that time, and I thought that was something I'd really better go after. I applied for civil schooling. We had a new program right after the war to get young regular Army officers back into graduate school, let them select from a number of different fields, and aeronautical engineering was the one that appealed to me at that time, so I was very fortunate.

I first went to the Army Command and General Staff School at Fort Leavenworth [Kansas]. And I was about seven years ahead of my time in that. Usually that was for officers with at least ten years of commissioned service. And I and three of my classmates from West Point managed to get sent to that course, and we joined men as much as ten years older than we as fellow students. That was a broad structured course. The Command and General Staff School was designed for training officers who had gone up to, say, the rank of major and were ready for command of a battalion, training them in the bigger picture.

What was your rank at this time?

Captain. I had made captain during the time John was a prisoner. And my two classmates were also captains. We had many colonels as classmates, that is, in Fort Leavenworth. But we enjoyed that and learned a lot.

And about a month before graduation, I got word that I had been selected for civil schooling, and I would report after graduation to New York University to study aeronautical engineering for two years for a master's degree. And I did that. And it was wonderful, an eye-[00:45:00] opener, really broadened my scope a lot. And being back in the New York area was pretty nice. I certainly branched out from aeronautical engineering to a number of other things, whatever option would keep me in the broadest way from losing my compass and just being an aeronautical engineer. I was still going to be an Army officer and I would still want to understand history, I still would want to understand how to speak and how to talk and how to write. So it was a very rewarding at NYU. I had some fine instructors, professors. I think we had seventeen officers in the group that I was in. I think we had one or two first lieutenants, one full colonel, and the usual mix between those two.

What would I do when I finished? I don't think the Army knew, and I certainly didn't know. And that has always amused me a little bit that the Army personnel people knew that they had to have a broad range of graduate studies available; with the technology that was being introduced into warfare and the financial difference in the cost of war, we needed to have all bases covered, we needed to have people that could do graduate work in just about any field you can imagine.

And so we aspiring students were welcomed by the Army as we volunteered or requested, however you want to say it. It didn't change my perspective, I don't think, my

perspective on myself as an Army officer. I think it just broadened it. I wrote one of my theses on the fact that we mustn't lose sight of the fact that we are first soldiers and our purpose in the Army is to make better soldiers of ourselves and of those who lead—that may take a whole lot of different fields of expertise and education, but don't throw the baby away with the bath water. I never considered myself to have left the Army. I hadn't. I was still a captain in the Army when I finished that course and subject to orders from Washington [D.C.] on the next place I would go.

When I graduated, I asked for thirty days' leave and got it, and at the end of that leave—where did I go? Oh. I had specialized in guided missiles, for obvious reasons, and all of the things that would lead to a successful guided missile program. When I graduated, we didn't have a guided missile program. That job was probably going to go to the antiaircraft branch of our [00:50:00] Army, but that wasn't even certain. So I was sent to Fort Bliss, Texas, where we had the antiaircraft school, and nobody was very sure what I'd do when I got there, but OK, go ahead and report and we'll see.

One very bright young man in that headquarters heard that the Navy had a guided missile program on the West Coast, and he approached his boss and said we ought to get somebody in there to find out what they're doing and to learn about it. And they looked over the roster and looked at qualifications, then called me in and said, I think we have a good assignment for you. We want you to report to the Naval Ordnance Test Station, which is up in the desert, Inyokern [California]. I did that and reported there and found that the Army had a detachment there in training, just to watch the Navy with their handling of missiles and learn what they could about doing it and be ready in case the Army someday get some of those beasts.

So I was commander of a platoon. The day I arrived I was given command of that platoon, and I guess it was about thirty men. They had come from every walk you can imagine in

the Army. None of them had any specialized training that would fit that, and so the Navy was using those guys as an extra pair of hands when they had to move a big box or whatever, but they weren't being given any real training. I saw opportunities for them soon after I got there, maybe two or three weeks, and then I started classes in our office, classes for these men to give them some of the background that their Navy buddies already had received from the Navy, and to equip them so that they could be given more than stevedoring to do. They could begin to understand what it was all about. And so we set up a classroom and they spent about half their time in the classroom, and that meant they spent about half of their time with me because I was the only one on the scene who was qualified to teach any of the things they needed, but I could teach them the fundamental math they would need and something about engineering principles, and I found that there were a few gems in this group who really took to it very well. And I was visited by my boss who came from Fort Bliss, Texas, a colonel, and he was very much impressed with that. He said, You know, Ray, we've got a platoon down at Point Mugu where the Navy is actually launching missiles out over the sea, and they've got some very fine technical facilities and technical training. How'd you like to go down there and do the same kind of thing you're doing here, where you've got better facilities, better qualified people, and maybe we can give you better support. I thought, wonderful. So I did go to Point Mugu [California], the Naval Air Missile Test Center, and over the next probably year and a half, I went between the two because I was given nominal command of both places. I had to go and visit back and forth, but I did my [00:55:00] teaching mostly at Point Mugu, and there became involved in and interested in the Navy's programs.

I learned that the Navy was going to send a carrier up to the Gulf of Alaska to make a launch. Well, let's say it was an experimental launch into the stratosphere for gathering

information, and this was the Navy—I won't think of it right now. And so I joined that team and I said I wonder if we couldn't take one of these missiles we've been firing here and at Inyokern, put the launcher on the flight deck there, and do a high-altitude launch from the Gulf of Alaska? It would be the first time that a ship has ever done such a thing and might be of interest to some of the people here to get data from that missile. The Navy jumped at it and I got a crew together of our troops and trained them to work aboard the ship, and went to the Gulf of Alaska with two Lark missiles, simply to see if we could get them to altitude and if we could operate from the rolling deck of the ship and the temperatures were down in the twenties or something. And yes, we were able to do all that, and we had a successful launch, with the failure of one component. These were solid-propellant rockets that boosted it until it got up to speed and then they were supposed to break off and fall to the ground. Well, one of them didn't break off, and so the thing started to spiral and the captain of the ship said, What do we do? And I said, You've got to destroy it, sir. OK, so we destroyed it, rather he did, pushed the button to self-destruct it and it was far enough away from the ship that it didn't do any harm. I was afraid it could just do a cartwheel and come back to the ship and be all kinds of problems.

Anyway, that certainly got me interested in more field testing and better-equipped people and better missile equipment. I guess I was sold on staying in the guided missile program then for a time. That time ended up to be about two-and-a-half years, I guess.

Then my career people, career managers in Washington wondered: Well, what are you going to do next? What are we going to do with you? Fortunately about that time I was becoming senior enough, old enough to go to the advanced artillery course, and that was a switch because I'd been in the infantry career ladder and, well, I was switched to artillery then and went to Fort Sill, Oklahoma and got turned into a red leg, as we called them. I guess their

legs got red from chafing against the sides of the horse when they were hauling artillery pieces. So I became an artilleryman on the books. Well, I went to the artillery course and completed the advanced [01:00:00] artillery course, and then came the usual question, what in the hell do we do with him now? And let me see now, I'll have to stop for a minute and think what the motivations were for my next move.

[01:00:29] End Track 2, Disc 2.

[00:00:00] Begin Track 2, Disc 3. 10/29/05

OK, so as I said, I'd like to continue, if you would talk to me a little bit about—we have the story of coming back from Europe, and just a little bit about where you were and what you were doing at the end of World War II, and then we'll come back around to where we left off before.

Well, the end of World War II came, at least for us, very suddenly. We were back from Europe, fully expecting to go to Japan to be one of the invasion armies of Japan. And I was at Fort Bragg, North Carolina and we were restructuring our headquarters organization to be more in tune with what we would be doing there. Pretty obviously, German language specialists were not needed; Japanese language specialists very much were. I was in the intelligence section, as you recall, and we had people very familiar with German language, German customs, German culture. We had no one who knew very much about Japan. At the same time, we were releasing a lot of people who had enough points for release from active duty or for return to civilian life, and I was by that time the senior officer in the counterintelligence section because all of my superiors had been allowed to go home. They were not regular Army and they were finished. At the same time, I had been given three new people to work with me. Two were Japanese-born. One was a son of a minister in Japan who had very fine command of the Japanese language, Japanese culture, and

he was the senior of those three. They were two second lieutenants and one first lieutenant. I was then still a captain. And that became the nucleus of our counterintelligence section.

We didn't get very much further with our reorganization before the war ended. In fact, I was on leave and with my family, my father and sister and maybe one brother, John. We were in Long Island at East Moriches—you know that name—and enjoying the first really relaxing time that we had had in several years, when the war ended. I remember very well when we heard the news on the radio and then hurried down and got the newspaper at the corner and read of the dramatic incidents that had taken place in the last few days. And John and I and Father took our sailboat and crossed the Great South Bay and over to the beach and spent a wonderful afternoon there just relaxing on the beach and in the sun and the water, and we knew that our lives had changed overnight. Didn't know just what we were going to [do] but we certainly knew that it was a great relief. Father was greatly relieved, having lost one son, having had one a prisoner, having had three wounded. He was ready to relax too, and it was certainly a wonderful relief.

[00:05:00] Very soon after that, I got word that I had been accepted for admission to New York University and the graduate school of engineering; that was another delightful occurrence, something I had hoped for but certainly had not been counting on because it was not an easy thing to do, to have that selection made, but it was certainly a wonderful time in my life to change professions and change my environment so dramatically.

Let me ask you here, and we can then circle back around unless there's something more you want to tell me about NYU, but let me just ask you, at the time, being a technical-type that you are, do you remember having any thoughts or questions about the nuclear weapon, about the atomic bomb?

Very much so, yes. I had heard only snippets of information by that time, but I think that I knew of the principles. I certainly was not a bomb designer, I wasn't on any scholarly level acquainted with it, but it seemed to me perfectly logical and it was a step that I don't think surprised or shocked me.

OK. But while you were in Europe doing intelligence, had you known anything about the intelligence effort to find out about the German bomb project? You know, General [Leslie R.] Groves sending ALSOS those people over—?

No, I don't think I had known anything about those things.

I would imagine that would've been kept compartmentalized.

Well, I'm sure it was, and my proper venue at that time was those things that were on the battlefield that we were going to have to confront. I was certainly interested in German technological advances and I had very carefully studied and worked on an understanding and appreciation of both their V-1 and their V-2 missiles to guesstimate what their production might be and what kind of ranges they might be able to achieve, but no one thought that we needed to anticipate intercontinental launches, and so it still didn't sound like anything that threatened our country, but it certainly threatened the troops in the field and the nations that we were trying to liberate in Europe.

Great. So we've sort of gone back and picked up that piece, so thank you for that. Then when we ended this morning, you had been to Point Mugu, you'd been up to Alaska, you came back to— you have to remind me now.

Well, let's see, I came back to Point Mugu and I guess in about that time I was selected to go to the artillery school.

[00:10:00] *That's right. That's the piece I missed. You went into artillery.*

Yes. I had been an infantry officer all along up until then, but it was clear that my career was in the artillery field and specifically that I probably ought to transfer branches. I did. That didn't make any big difference because I still stayed at the same assignment. However, soon I found it desirable to go to the artillery advanced course, which was a course for officers with seven to ten years of service, to be able to be a senior staff officer in the artillery business. And so I did go to Fort Sill, Oklahoma for I think it was about a four-month course. And at that time, I studied both field artillery and antiaircraft artillery.

It's not going to be easy now for me to reconstruct that next year or two—but well, I was soon on orders to go to New York University for a two-year course in aeronautical engineering, so that would take us up to 1948, and it did. Now have I tripped over my calendar?

I think we have the NYU and then artillery, so that's got to put us into the fifties, I think.

That's correct. That's interesting. Now that transition into cannon-fired or rocket-fired bombs, I guess I'd have to do a little looking to find out when that occurred. I thought I had it in my head but it's not there.

[Pause]

—because Robin, child number three, was just about to be born, and so we had to stay there until she was born, and then we packed her up as an infant and drove from Fort Sill to Los Alamos. At Los Alamos, that's where Vivian, my youngest, was born. Robin was the one who was born at Fort Sill. Yes, that was Lawton, Oklahoma where Robin was born, and we drove to Los Alamos, New Mexico. And there I was to report to the Test Division of Los Alamos National Laboratory. I did report there and I think [00:15:00] that I was as puzzled as my new bosses were about who sent me here and why. It soon became apparent, but I had no inkling ahead of time. I don't remember where I was expecting to be sent instead of that, but I've always liked a new venue

and a new challenge, and so we found Los Alamos a delightful place, fascinating place.

Wonderful surroundings, wonderful climate, beautiful countryside. And as soon as we got there, within two days we were in a very nice—I guess it was a duplex, and we stayed there for perhaps a month, and we were cramped and they knew we were cramped, and they had told me that they would have better quarters available shortly, and very soon we got word that we could move into a single house, four-bedroom house, and that was right on campus at Los Alamos, so it couldn't have been nicer. Good neighbors and as I said, the climate, the surroundings were great. Pretty cold winters, pretty snowy winters, but that didn't seem to bother the kids. It didn't bother me. And I reported in to my new boss. I was not sure and he wasn't sure why.

Now is this Graves at this point?

Al Graves. Alvin C. Graves. He was the division leader of the Test Division. Fine man to be looked up to and admired and to learn from. His executive, his immediate deputy was William E. Ogle, and Bill Ogle was another fine guy, and I soon realized that Ogle was really going to be my immediate superior. And that was in the Test Division.

We were then preparing for Operation Castle, and I was hearing a whole lot of words I'd never heard before, trying hard at night to learn them all and learn what they meant and how they acted with each other. I was assigned by Ogle to work with a good friend of his whose name was Bob England, as in the nation, and England was a young protégé of Ogle who was said to be a whiz with diagnostic measurements, and that was going to be my business, that was going to be our business for the indefinite future. We had a small laboratory just off the main laboratory building, and as far as I was concerned, the instruction was only, be prepared to measure alpha on a series of thermonuclear tests. How do you measure alpha? That's up to you. And alpha was part of the exponent in the equation $F=MA$. And I had to learn that math, I had to learn that

physics, all brand new, different entirely from what I had been doing at the artillery school and what I'd been doing at New York University for aeronautical engineering, and I remember that Ogle said, So you're an aeronautical engineer.

I said, Well, that's what my degree says, sir, but I haven't practiced aeronautical engineering at all yet. I'm hoping to.

[And he said], Well, you probably won't do it here.

Ogle had an acerbic way of dealing with things, but his heart was as good as gold and he was a really great guy to look up to and to work with. He said, Well, I'm going to send you to work with Bob England who's been working for me and I've been overworking him, so I'll make it a little easier on him and overwork you. You're going to be measuring alpha and England will tell you what that's all about, and I guess if you have any other questions you'll ask him.

I liked Ogle immediately and continued that until his death many years later.

Measuring alpha was, to oversimplify a little bit, measuring the multiplication rate of neutrons in the beginning of a nuclear explosion. The explosion is begun by compressing with a chemical explosive, compressing enormously the material that is fissionable material and is to become the fuel of the bomb. And therefore in the early days that compression was done with chemical explosives. You had this little package that you knew would explode if you could first compress it down to a very small fraction of what it had been; then the neutrons can travel with very high velocity between one spot and another, and in that process they release a great deal of energy, and that continues the process and it goes on as a chain reaction, essentially uncontrollable. You want it to be uncontrolled but you have to hold it together until all that occurs and while that occurs by having a heavy blanket of chemical explosive on the outside just continually pushing, all over microseconds but never mind, it did that in the time that it takes for

the neutrons to move multiplied by I don't know what. The neutrons move very rapidly through whatever medium they're in, and so the whole concept is to contain this fissile material for long enough for it to be compressed and for those neutrons to be able to do their work in causing the explosion, therefore the detonation of the bomb.

Our group, which was about I guess fifteen people or so but I wouldn't swear by that number, our group, a small group of physicists and assistant physicists, attempted to find ways to [00:25:00] measure the rate at which those neutrons were produced and released, and that rate is related to the rise time of alpha, the exponent of this equation. As that exponent becomes higher and higher, more and more energy is released and used to cause the explosion of those particles of uranium. That took a couple of months to understand. I don't think I ever really understood it, I don't think anybody ever really does, but I could understand the concept.

And Bob England had several ideas about how we might measure alpha, the rate of change of alpha or the shape of that curve, how we could measure that. And he was attempting to build instrumentation to make that measurement and record it so that on a test explosion, you would come away with a film, with a curve impressed on the film that would show the rate at which those neutrons were being produced. We're talking in tiny fractions of a microsecond for the time scale of all this.

And so for the next perhaps almost a year, I had to learn about instrumentation to see and measure those things and try to innovate not the bomb, that was other people's business in the Weapons Division of Los Alamos. We were the Test Division. We were to find ways to look into that scene of that explosion and record as precisely as we could the efficiency of that explosion and the efficiency of the containment, which was the thing that held it all together while all this could occur, for if it just flew apart with the initial explosion, nothing occurred. The designers

had to hold it together with explosives, and they designed all kinds of amazingly intricate techniques for doing that.

We were way down at the end of that chain, reporting back to the designers how well their work had worked. I suppose it was several months before I had grasped that concept enough to feel that I could be a contributor in that. And I worked a lot of the time alone, trying to devise ways of making measurements. This didn't require any nuclear physics to make that measurement, but the nuclear physicist needed those measurements. And I was very excited to [00:30:00] find that I could, with the materials at hand and with the instruction I had had, the education I had had, that I could think up ways to improve what was going on, what we were doing in instrumentation.

By about a year after I arrived there, we were ready to go out to Operation Castle, and on Castle we were to first try out—of course we could mock up this situation at Los Alamos but we couldn't have an explosion, so we had devised ways of making measurements, being close enough in to make the measurement but far enough away so that we weren't blown to Kingdom Come.

Now before we leave Los Alamos, I had a couple of questions about that. You're in the Army, and what is your rank at this point?

Captain.

You're a captain. This is a really trivial question, but when you're an Army captain at Los Alamos, are you working in uniform at that point?

No. No. Most people didn't know I was in the Army. My bosses did. But it was not part of my name, part of my status. I was in J-Division and J-Division was not very rank-conscious anyway,

or Los Alamos wasn't, for that matter. But many people that I worked with for years never knew that I was in the Army. And I wasn't reporting back to the Army with anything.

That's the second part of the question, which is, the Army sends you, obviously you were working on weapons here, so it's this collaboration with the physicists and the nuclear guys and women and the armed forces, but you're not reporting back on anything. That's your assignment? That's where you work now?

Yes, that's right. I am a contributor in that group, in that venue, and for Army record purposes, my performance was not rated, not reported a rating of excellent or good or whatever. He's here, we're satisfied, go away, we'll tell you if we want another one. There were very few of us, I think about at that time probably five in J-Division, no more than five, and we didn't submit any reports to anybody in the Army. I don't believe that any efficiency report or other report was sent by Los Alamos. I think that the most Los Alamos might have done would be to say to the Army, this fellow isn't working out, so we don't need him anymore, or to say, he's doing fine, we're delighted to have him. Those were about the efficiency reports you might've gotten.

It was an entirely new atmosphere, a very free atmosphere, that is, free of direction and supervision coming down a chain of command. The direction and supervision came from people with more knowledge than I had, and that meant that if I needed help, I had to go and find the scientists there who knew what I needed to know. And I never said anything about I'm Major So-and-so or Captain So-and-so, sometime I got to be a major. I never had to check in that way at all. This is Rod Ray from J-Division, I'm working with, at that time, Bob England, and need [00:35:00] your advice on something, and sit down with him and talk about what I needed and he'd make a suggestion, and I was free to go off to the stockroom and get anything, I mean utterly anything, never mind what the price is, what the cost is, if you say that you need this

material or that or this equipment or that, you got it. Bill Ogle I saw probably, except for staff meetings, I saw Bill Ogle maybe once a week. How's it going? Fine. Is there anything you need? No. A little bit more professional talk than that but most of it was just getting-to-know-you kind of conversation. And hours were not anything anybody worried about. When do you come to work? When you have to, to get your job done. How long do you stay at night? About that long.

That was a whole new atmosphere for me, but a beautiful one. I just felt so privileged to be around these people and I was beginning to run into names that I'd read in the newspaper and had heard about and read in textbooks. And I was beginning to bring some of those textbooks home and do a lot of studying on my own.

Names like?

Oh, gosh, Herb [Herbert F.] York. James Van Allen. The Van Allen Belt, you ever heard of that?

Yes. That's OK, I didn't mean to put you on the spot, but I get the idea.

I think I could give you a pretty good list after a while but—

Let's not take time now.

We're years away from—

I know. I'm sorry if that was out of left field. That's great. That answers my question because you know you wonder what that relationship is. It sounds like from what you're saying to me, tell me if I've got this right, there must've been some kind of need and Army filled that need, I guess, with technical people at Los Alamos.

Yes. I think they needed, we used to say, grunt labor.

A very high level of grunt labor, I would say.

Sure. Sure. And for Bill Ogle and Al Graves, I would say the key element, the key characteristic they were looking for is someone who wants to learn, and they were patient as could be, and so

were many of the other—well, most of the other people. I could go into any office in J-Division, Los Alamos and ask for a little time with any one of probably fifty people, because I wanted to talk about something that this one or that one had written or had done in the past and I needed some advice on whether my approach was a good one for what I was trying to do, and it was always a patient listener. Just amazing, the atmosphere and the environment in that laboratory, and I would say you have to blame this on people like [J. Robert] Oppenheimer and, well, Al Graves, of course.

[Norris] Bradbury, I guess, at that time.

Oh, Bradbury, yes, certainly. I didn't have much contact with Bradbury in the early days because **[00:40:00]** he was directing the entire laboratory and I was perhaps at the level of which there might've been four hundred in the lab. But if you ever got his ear, you got a patient ear. And Bob Watt was one of the people there, too, that I came to admire greatly. He was not a very pleasant fellow personally, I thought. He was gruff, businesslike. He had no time for socializing. Walk in and talk to him about baseball and he went about his work. Walk in, tell him, I've got a problem, can you help me with it? He'd sit down and work with you. And that was something certainly quite new to me, that relationship with colleagues where there was not very much hierarchy, and there was a lot to learn about how to deal with people under those circumstances, how to be helpful to them if they wanted your help, how to stay out of their way if they didn't. And Bob England, my immediate boss at the beginning, was not terribly communicative, but he became so. He was maturing in his job, too, and we got to be quite good friends. In fact, when he was asked to put together an experiment for the Castle operation, and asked by Al Graves, I think, who do you need to help you, or what people do you need to help you, he said, Can Rod Ray come? And Al said yes. He said, That'll do it.

And we went to Bikini that winter to prepare our experiment, and we had to construct it all in the field. I had in the meantime sort of taken charge of a machine shop on wheels that we shipped out there, and I did all the assembly of all of our oscilloscopes. I think we had twenty oscilloscopes on the benches all operating at the same time and just the two of us to maintain them—no, we had one fellow that worked for us, not a degreed person but a very fine hardworking man, and the three of us took this experiment to Bikini in two big trailers, the thirty-five-foot highway trailer that you even today see as the biggest cargo trailer on the road. In one of those was our instrumentation, one was parts and equipment, and the third was a machine shop. And I had put together the machine shop with all the things that I had learned that we would need, Bob England designed the arrangement of the oscilloscopes and the power systems in another trailer, and the third fellow sort of carried the water.

And we went to Bikini with—now this was to be our entire resource at Bikini. That's one of those things that wasn't easy for a lot of people to understand, that you'd go out there to do a fairly sophisticated technical job, you can't pick up the telephone and call for spares, call for parts, call for a different kind of instrument. You have brought with you everything you're going **[00:45:00]** to use. And so we had to practice at Los Alamos, practice doing the experiment that we were going to do there, all except for the bomb.

And the station for our equipment was about ten miles from the detonation site. And there were of course many, many such setups. I suppose Los Alamos alone sent probably a dozen experiments that were each at a site comparable to ours. Some had more people; none had fewer. And all of these had to be tied together in a network of communication lines so that we didn't interfere with each other so that we all knew to the nearest tenth of a microsecond when things were going to happen and could be prepared for it. There was a safety network of

communications also because if something went wrong, it could affect everybody else in the whole atoll.

We were getting our experiment ready and it was looking good. We had done many dry runs wherein we created a simulation of the detonation of the bomb, electronic simulation, and went through the whole sequence and tested all of our equipment to see that everything worked and didn't have any glitches. We were in that process and in the trailer that I spent most of my time in, which is where we had all these oscilloscopes lined up, and I was principally concerned with the maintenance of those oscilloscopes. That's just a great big radio that had just a whole nest of radio tubes and wires and condensers and resistors, a mass of wiring, and you have to check out every portion of that before you put it to use; if something goes wrong you have to learn to do the diagnostics to find out what's wrong, locate the trouble, isolate it to one component, try to get that component either out of stock or out of the main stockroom or borrow it from somebody next door, and put it back in business.

Now I would stress that this was all electronics. My formal training in electronics was like that. I was an aeronautical engineer. But my training in electronics came starting that first year at Los Alamos in great heaps, and it was wonderful. It was exciting. I discovered that yes, I could understand what was going on and I could be somewhat creative myself, I could find shortcuts, and that was a real thrill.

On one of our many days of preparation—and by the way we did dry runs almost every day leading up to the time that this test was to be fired—on one of the days leading up to that, one of our oscilloscopes was misbehaving. And I had mounted all of these on a wooden bench, and they had to be grounded to the main power system for safety reasons and to protect the [00:50:00] equipment, and they all were by a technique that I had devised, of fastening them all

together in a gang and giving them all the same what was called an electrical ground plane. They all were neutral at one point by being connected by cables. One of our oscilloscopes went down, was in trouble, couldn't operate, and I did not know that circuit at all. I had had no electronic training to amount to much at that time. And Bob England, my boss, asked me what was wrong and I told him and he said, Oh, OK, well, why don't you go on and work on the other bank of them on the other side of the aisle and down the corridor to the end of the trailer. He would pull this one out and replace whatever needs to be replaced. In doing that, he disconnected the ground wire from that oscilloscope, and I have no explanation for it, he knew much better, but he had this oscilloscope floating. That is, if it had an electrical charge on it, it had no place to dump it. And England disconnected the ground protection that it had to the next oscilloscope and then unbolted it from the bench. This thing weighed probably eighty-five pounds or something like that. He was a little fellow. And he started to pull it out and his hand bridged between this oscilloscope that was disconnected from the ground and the next oscilloscope which was still connected to the ground, so now the ground for this oscilloscope was through his body into the next one. I was doing something else. Our technician was doing something in the other end of the trailer. And I heard this strange buzzing. And I turned around and England was just lying across those two oscilloscopes. And I shouted back to this other fellow to shut off all the power, which he did, a main breaker. I guess I said, Pull the main breaker, and he did. Now the trailer is dark, and I told him, Come up and open the door here so we can get some light in here, and then help me lift him down, and he did, and it was intuitively clear to me that he was finished. And I started giving him artificial respiration and doing all of the first aid things I knew to do, and sent our mechanic for help. He went out and got on the radio and called for help. We were alone on this island. And it seemed like forever. I started giving him artificial respiration until I could hardly stand up or hardly

kneel up over him, and got this fellow to come in, and he was not much help. I was still doing artificial respiration when a helicopter landed outside and the doctor and two physicists came in, and the doctor took one look and went to feel his pulse and he was already beginning to get cold, and he looked up at the other man and said

[00:55:00] Well, Bob was a very good friend, had been a very good friend. I knew his wife and his two kids at home. And he was Bill Ogle's protégé and I knew it was going to be a terrible blow to Ogle. And I guess I won't go into much more detail for that occasion. I know that I was devastated. That night, Ogle found me sitting on a rock down by the surf and just listening to the waves pound in, and I guess I was sobbing. And Ogle came over and put his arm around me and he said, *Tough one, Rod.* And I don't know how long we sat there. We didn't say anything. And of course we had to get a helicopter and he was sent down and declared dead immediately by the doctor, and somebody sent a message to his wife. We soon were joined by others who took over and arranged for his body to be shipped. And Al Graves came in to see me in my tent and I was just staring at the sky. And with just one hand on my shoulder, just a gentle pat, he said, *It's tough, isn't it? Of course that did it. Well, I don't think I'll tell you more about that night, but he asked me, would you like to go home? I said, No, indeed. I'd sure like to be able to hold Larry [Laurene] and tell her what I know, but I think she'd want me to be here, and I know Bob would, so I want to stay.*

I guess it was a couple of days before we tried to recover from that, and Graves came to me and said, *You know you can't do this. We've got to have somebody come in here and work with you. I have every confidence in you and what you're doing and what you will do, but we can't have you stay here on your own.*

He introduced me to John Malik. As different as night and day from his predecessor Bob England, and an iconoclast. Nobody got close to Malik until.... He was the best thing that ever happened to a drowning man.

[01:00:10] End Track 2, Disc 3.

[00:00:00] Begin Track 2, Disc 4. 10/29/05

So you were saying when we had [the machine] off that you felt personally that you really wanted to see that experiment through?

Absolutely. Al Graves put it to me very bluntly. He said, Rod, do you want to go home?

I said, Absolutely not. I can't carry on this experiment myself, I'm not experienced enough or educated enough to do it, but if there's somebody who can take it over, you got my support in any way.

He said, Do you know John Malik?

I said, I don't think so. I heard his name but I don't think I've met him.

He said, Well, Malik is a tough nut to crack. He's all business, he's a brilliant mind, he doesn't know what quitting time means, but I guarantee you that if you go to work for John Malik, you're going to learn faster than you have any other time in your life.

And he was right. John's about a head shorter than I and must've weighed about all of a hundred pounds soaking wet, but what a brilliant mind. And he quickly understood this experiment which had taken about year for us to build, and he made a few suggestions about what we might do, changing the antenna a little bit and a few other things like that. But he took it over entirely and we had it working within I suppose a week after this accident, and we were ready for the next big dry run, which was successful and everything worked that day and it was marvelous.

Our assistant in that team, the technician who had been in the trailer with us, quietly left. I presume that he was offered an opportunity to go home. This was an emotional upset for him and he couldn't deal with it. He left and Malik and I took over the whole thing, and I became both the technician and Malik's assistant, and we very soon got on common ground, and our experiment was successful when that first shot went. And I went back in in a helicopter. Of course we had to be off the island. We had to be on a ship.

Right. Let me clarify this. So your experiment is on the Bravo shot, on the first shot, is that right?

Right. And we were about ten miles away from it, but that's too close for that. If you recall, that was about fifteen megatons and it would've just—well, it would've taken care of us if we'd have been there.

So where were you actually when the detonation took place?

On board ship about thirty miles out.

Which ship was it, do you recall? I've got [USS] Curtiss [AV-4], [USS] Estes [AGC-12], [USNS Fred C.] Ainsworth [AP-181].

Ainsworth.

What was that like?

Oh, it was very well equipped. There weren't very comfortable sleeping conditions. It was crowded. But none of us minded that, and quite often we'd sleep out on deck instead of in the bunk that was inside. Food was pretty good. We were aboard only for, oh, I guess three or four days.

[00:05:00] *Had you ever witnessed any kind of fission or nuclear explosion? Had you been up to Nevada [Test Site]?*

I had not, no. No, I had not seen a nuclear explosion before, and this was the biggest one that we ever fired.

I know. Now how did they have you all set up for when the explosion was going to take place?

We had high-density goggles and we were told to face away from the blast, and we were far enough that you could feel the heat, but it was just a warm, like a sun coming up suddenly. When the concussion came across the water, we certainly felt that. But it wasn't scary. We all knew. Many had experienced it, and those who hadn't could hear about it from others. So no, there was nothing frightening about it. But it was just awesome to see that fireball form, and we were told to face away. We had our high-density goggles on. And it was probably, oh, twenty seconds after the detonation that we would start to turn around and see. If it was blinding you, you just waited. We did not expect to feel any concussion of any consequence. Sure, you could feel the rumble and you soon felt the heat. But I don't believe anybody was fearsome about it. We were well prepared. We knew what to expect and we took appropriate precautions. How it would be twenty miles away and not expecting it in a war situation, I don't know. I can imagine that would be devastating.

How far away were you again? What did you say?

I think we were about thirty miles out. I don't know.

But at some point you turn around and you see this.

Yes.

So what were your impressions at the time when you saw it? Just the physical impressions. I mean what did it look like?

An enormous orange fireball. And that came first of course and you didn't look at that; you didn't turn around until after that had been pretty well formed and was beginning to subside. I

think they told us when we could turn around. Did they do it by speaker or tell us ahead of time? I don't remember for that one. But nobody had ever seen anything like this before. This was the biggest ever. And we knew that we could expect that it was going to be something nobody had ever seen before, and a lot of people were a little bit fearful when they heard that. We all had confidence in the safety calculations that had been made.

I'm trying to separate different events. I needed to get back in and get our films out of the [00:10:00] camera because the fallout was hitting Bikini even that early, and by fallout we mean particles that have become radioactive, particles of sand, of water, and those fall on your trailer and they continue to radiate, and so you got film in there that you want to protect and take with you. Well, we had pre-positioned lead boxes about as big as an automobile battery in front of the cameras that I had, and I think I had twenty cameras to unload, and about ten of those would fit in a box, so I had two lead boxes. I had to go in, and of course the power was off, no sense in worrying about that, the power plant had been blown up too, but go in and open up each camera, get the film, and put it in that lead box and go to the next camera. And then I couldn't carry two of them at once when they were filled with the film. I took them down to the doorway of the trailer. I wasn't able to leave that door open because that would invite the wind to bring in the fallout debris into the trailer when I was in there. I had to work in the dark. I had left battery-operated lanterns in the trailer and they worked all right and I was able to recover all the film, put it in the boxes, taken them down to the door of the trailer, and then about six steps down on the stairway, the helicopter is maybe, oh, thirty or forty feet away, pick this thing up and you couldn't run, just have to walk or sort of hobble because it was so heavy. And the man in the chopper, a crew member in the chopper was there waiting to take it from me and put it up while I went back and got the second one left. I don't know how long I was on the beach, probably no

more than seven or eight minutes, but that accounted for about half of my allowed dose for the year, and that's recorded on a film badge and is still in my records.

Let me ask you a couple of questions about that. How long after the shot—let me put it this way.

Did the fact that the explosion was larger than expected, were you aware of that at the time, do you recall?

I wasn't. I'm sure that those experienced bomb watchers from Los Alamos probably were betting and guessing, but it clearly had gone beautifully, everything had gone well, and the fireball was the biggest anyone had ever seen. So on the ship I remember hearing men who had been on several operations say, wow, you know, they were just almost awestruck by it. And I don't think I learned until after we got back aboard ship that it had been much larger than expected.

Now do you recall the length of time before you got on these helicopters and flew out to get this material? Was it hours?

Oh, no. No. I would guess it might have been twenty to thirty minutes. The first thing that happened, I believe, was that the flagship of our flotilla launched a helicopter with one of the Los [00:15:00] Alamos people aboard to fly over and assess the damage, if there was damage, and the conditions on the beach. And I think they also carried instruments to measure the radiation levels on the beach before we were released to go. And that all probably took maybe half-an-hour, to send the chopper out, get the information, take the measurements, and then deliberate. I think that might've been a half-an-hour.

So it was in the plan that at some time shortly after the detonation you would go recover these instruments.

Right.

Were you wearing any kind of protective clothing?

Only protection from dust. Coveralls that were taped closed; there were no open seams in them. And as soon as we got back to the ship, we took those off and they were destroyed or at least gotten out of the way.

So were you the only one that went down on the island to get these things, the only individual?

No, I was not. I was the only one who went to that island because we were the only station that was out there.

So you were the only one to go to your station.

Yes.

OK. That's what I wanted to know.

And it was not prudent to send more than you needed. We had practiced this. I had practiced before and it was the job I was there for, to get it.

Now when you say you'd gotten half of the dose, was there anything done about that, or you just knew that was the case?

It's in my record and it has been ever since.

But not sufficient to send you home or anything at this point.

Oh, no. No. Sufficient for me to sort of snicker when I hear these days when I'm being irradiated daily down in the hospital and I hear those numbers and I say, oh, wow, been there.

Now your experiments are then delivered in these lead boxes to?

Well, we took them aboard ship where we had a laboratory to develop the film.

Oh, OK, right on the ship.

Oh, yes, we had to have a complete photographic capability on each of those recovery ships because the film is perishable and precious. The radiation is all over the place and you're trying to measure the radiation that was incident on that film, so it was very important to get it

processed as quickly as possible. And I stayed around in the photo lab until they had, the expression is “souped the film,” and got a look at a couple of the plates and went out and told John Malik that we had gotten some good data, I was sure. And yes, we had. The experiment was a success. And when I saw Bill Ogle later that day and told him, he smiled and patted me on the back and said, Bob would be proud. Bob, the man that we’d lost, who was one of his very good friends, one of Ogle’s very good friends.

That was my baptism.

Quite a baptism.

It was indeed. Oh, and I suppose I might stay with that for a couple of minutes. Al Graves called [00:20:00] us together, me and Ogle and a few others, deciding what comes next. We had a number of additional shots on that operation. I can’t remember now how many, but it was probably around ten.

We’ve got that in the book. We can look.

And none of that could be done at Bikini. Because Bikini was very heavily contaminated, we couldn’t go back there and work, and had to send in special crews to get our equipment trailers out; and these were employees of Holmes and Narver who were hired to be burned out. You know they could work only a few days under these conditions and they wouldn’t be allowed to get any further radiation, so they had to be sent home. So they were hired for a short-term job, with the knowledge they would be exposed to radiation and the radiation exposure that they would get in the first how many days would finish their eligibility to continue that same kind of work. Now some of them might have other jobs that did not subject them to radiation, and so they could move over to those jobs. But we “burned out” a lot of people on that shot [which means we were exposed to the maximum acceptable integrated radiation dose]. It doesn’t mean

they were significantly harmed but by the rules of the book, we could not allow them to get any further radiation on that operation.

We put our experiment back in shape. First had to clean the trailer up, and they were washed down before they left Bikini, but then they were brought down by ship to Enewetak. John Malik and I selected a spot on Japtan Island at Enewetak and our trailers were delivered there. And then we picked up our momentum and got back to work and had no further ill incident and got some very good data. And John had a chance by that time to improve the design of the experiment and make it more effective, and we also went to electromagnetic recording. That is, among other things, we were recording the electromagnetic signal that comes out of a bomb when it's fired, radio signal that comes out, and that had similar significance in diagnosing the performance of the bomb.

It was during that time with Malik that I came to find him a splendid teacher. He didn't talk very much, he wasn't a sociable guy, but boy, he knew his stuff, and in no uncertain terms he made sure that I knew it. And we became very good friends, in fact lifelong friends until he died. He taught me more physics in two months on Japtan Island than I could have gotten in a couple of semesters in a university. Really terrific. A grand guy. And I told you, about a hundred pounds and a foot shorter than I, but boy, he was heads taller in his intellect and a very [00:25:00] wonderful friend. He was out there on that operation just as an observer because he'd been on a number of operations in sequence and was worn out. He didn't think he could take on a big experiment on an operation that year, but he realized duty calls and he did and to my great good fortune I got to know a very fine man. Worked for him the rest of the time I was at Los Alamos. Almost four years. And we stayed in very close touch for years after that.

So were you out in the Pacific for the balance of Castle then, for the rest of the experiments?

Yes, I was there for all of Castle. And packed up our stuff to go home when it was over, our trailers and stuff.

And you did similar kinds, looking at similar kinds of effects on all the explosions.

Yes. Well, and with Malik you didn't stand still. You didn't stay on one experiment. I learned a lot of physics from him. He was always puttering and trying to work up an experiment that would be fun to do, that nobody had ever done before, and that sort of was contagious. I enjoyed it very much.

We were on Japtan Island. We were the only two people on the island. And there were monitor lizards on that island. They got up to four feet long. Great big long lizards. And they would surprise you in the dark at night when you were walking down to the pier and all of a sudden one of these things comes across. Looks like a dog. We had names for it, well, for several of them, one of which was right close to our trailer, I guess nested there.

John and I had a whole lot of fun, we really did, fun in our work and fun at play. Ogle made a good choice when he turned me over to John. I don't think I could've stayed there without him. He was a challenge. He was a very decent man. We continued our social association for many years after. Of course I was still closely associated with Ogle, until he died.

It was a very rewarding time. I wouldn't trade that experience for anything that I can think of, my experience at Los Alamos from the beginning to end and all the people that I came to know. Sure, there were people that were not as friendly and I didn't care for as much as others, but that's true in any situation. I sure made some good personal friends and close association with men that I admired in such a way that it was a pleasure to go to work. And I worked seven days a week while I was there and so did just about everybody else, I think. But it was then at

[00:30:00] least a very fine place. Everybody fully committed, fully dedicated to what we were doing. As far as I know, fully honest in everything we did.

I wanted to ask you because of your experience having come out of that terrible war, it came to my mind when you were talking about working with John Malik on that island, it's such focused technical work. On a day-to-day basis, are you thinking at all in terms of the larger context of the Cold War, of the Soviet threat? How does that work out in real terms?

Oh, I think so. I think that I knew. In fact I did some writing about that, mostly in personal letters. I didn't have any trouble at all in bridging the mindset between being a soldier in personal contact with fear and danger and having an enemy right there—and bridging the gap between that and being in a much more scientific venue. I had certainly consummate respect for, oh, just pick whatever. General [Omar] Bradley. That was no greater, I don't think, than my respect for Al Graves. And although I didn't know Bradley personally, I did know a lot of other senior officers and came to be on very close and intimate, friendly terms with them. General [Alfred Dodd] Starbird was one of those names. And I don't believe that there was any qualitative difference between my love and respect for Starbird and my love and respect for Al Graves or Bill Ogle. It was on a different plane but it was still a part of the human experience that is rewarding. I don't know whether that answers your question or not.

It answers part of the question about the relationships, and I guess the other part of my question was the Cold War itself. I guess I'm thinking when you're a soldier in World War II, the reality of the war, as you suggested, right up near your face, but the enemy is different, the mission is different in the Cold War. And to what degree you're thinking in those terms? Well, and you're working on this highly technical stuff, too, which takes all of your brain power.

Oh, I think that I could never be away from the reality that this is the same conflict in a different [00:35:00] mode, I guess. I didn't have any difficulty at all in shifting gears, I think, between my military career and my science and engineering career. Each had its place and I was comfortable in both of them. I found that I could argue and debate on either side of that wall, and so there wasn't any wall there.

I remember Bob Watt was one of the group leaders in J-Division. Watt was an aristocratic sort of Ph.D. who didn't mind at all getting his hands dirty and was a real good leader of men in scientific work. And I was an Army officer and just about everybody in the group knew it, and I used to get kidded a little bit about it, but it was good friendly kidding. And one night we were in the barracks at Enewetak. I remember this very vividly. I got into an argument with one of Bob Watt's people. I don't even remember the precise nature of the argument, but it had to do with the politics of war and of the work that we were doing. And I argued strongly that they were one and the same and that the two businesses need not be in collision, the military business and the science business. They had to be partners in this world in the shape that it was then in and is now. And this got to be a pretty heated argument with the fellow that I was arguing with. I wish I could remember his name. It doesn't matter, though. He finally came around to my thinking, or at least he seemed to. And Bob Watt, this aristocratic all-physicist, said, *You know, gentlemen, I think we've sprouted a scientist here.* I figured that was the nicest comment, nicest critique I had ever had in my life for anything, of this argument. I guess I had rather eloquently put this other fellow in his place and shown him that just because I wore an Army uniform some days, I was just like he was.

Anyway, I remember Bob Watt very much for that. We were not close friends at all, but he listened and these discussions were pretty heady. Edward Teller was in some of those, and

that gives you a clue as to what kinds of people I'm talking about. We all slept in the same building. We all drank the same beer. All had the same worries. I think it was a terrific privilege that I had to be associated with Los Alamos for as long as I was.

[00:40:00] *Give me a sense, just generally, what was the cause of tension there with the Army and the science, you know, the guy that was arguing with you. I mean just so I have a sense of what kinds of debates might be going on.*

That's a good one.

And if it doesn't come to mind, we can skip it. But there's some sense of tension between—what I'm picking up from what you're saying is that there was some kind of tension between what the scientists are doing and what the military is doing?

Oh, yes, there certainly was. I mean not every one of the scientists accepted the idea that we had military people in this business at all, and not every one of the military people accepted the scientists as having any practical good sense at all. And so they were at loggerheads to begin with, came into it with preconceived notions, and I would say that for the most part, had they had the privilege of the experience I had of working on both sides of that street, it would never have occurred. Had some pretty heady arguments. Not arguments. I guess they were just—
Debates.

Yeah, debates and discussions, conversations. I don't think I left an enemy behind at Los Alamos. Certainly there were people that didn't think as highly of me as others, but that's just in the cards to begin with. I will never feel anything but privilege in my opportunity to work at Los Alamos and to work with Los Alamos people. And I later worked with Livermore people and with the same result. In entirely different circumstances but I have been closely associated with the Livermore group in our efforts to clean up what we left behind in the Marshall Islands.

Right, and I want to get to that. But with Los Alamos, you said you were there four years?

Yes.

Now during that time, did you go up to Nevada during that stint?

Yes, alternating years we went to Nevada. I guess for one operation of that, I was an independent researcher. I had designed an experiment, took to the field myself, had one other man with me who was, well, an assistant, but I was entrusted with one measurement that was mine and mine alone, and it was fun to do. I designed the equipment, designed the experiment, and took it out to the field and physically did it.

Do you recall which test that was on or which series that was on? And if not, we can look it up.

I've actually got the book [DOE/NV-209-REV 15 December 2000]. Let's get it after we're done.

I can probably reconstruct that.

Let's not take the time. We'll just put the note in. And this was in Nevada then that you went up and did that experiment.

Yes.

Did it work?

Yes, it did. It was an experiment to prove an experimental technique. Now I can tell you the purpose of it. We were doing safety tests in that year. You know that in the most common design [00:45:00] of an atomic bomb, there are a number of detonators around a sphere of explosive.

And simultaneity is a condition that one hopes to achieve. That is, having all these detonators fire at the same time, allowing even for the length of time it takes for an electric signal to go down this six-inch wire versus that nine-inch wire. That short separation is enough to smear the effect so that it is not as effective as it would be if they all detonated at the same time. We needed to have an experiment done in Nevada to test various ways of getting simultaneity in those

individual detonations, and therefore we needed to measure those very close in, and if the simultaneity was not adequate, if they were smeared in time, the thing just wouldn't detonate. It would not succeed. So it was important to measure that time distance between the signal that got to one part of the explosive and the signal that got to another part of the explosive. The bomb system, the bomb mock-up itself was destroyed because it did ultimately detonate, but if it would not detonate simultaneously from all of these points, then it just sort of crumbled and didn't give the energy release that was needed, that this was a high-explosive energy release that was needed to compress the nuclear package.

Now, let me see how I can put this. Because we could not recover, the thing was going to blow up anyway and be destroyed so you couldn't recover pieces that would give you clues as to that simultaneity, so we needed a way to make the measurement while it was all occurring. And the bomb was going to go off, but we needed to find a way to make measurements of the arrival time of this signal to these various detonators and not have the system that makes that measurement itself get blown up.

Now I built a jury-rigged thing that they tested on one shot and then made corrections and later got it to work effectively, and what this did was to run a piece of motion picture film at very high speed over a fluorescing crystal that held up above ground and focused on the test. And it was designed to be able to detect if there were time separations between the signals that got to the bomb. That is, measure the time that the electric circuit carried that message for it to detonate, and on these various channels, pick up the difference in time between the arrival time of that signal at each part of the bomb. And I built a detector that could look at the different parts [00:50:00] of the bomb and record those all on movie film, on motion picture film, high-speed Kodak film. But if the bomb went off, did detonate, then even this gadget would not—even if it

didn't detonate well, it could still destroy this gadget. So I put the detector above ground and brought the light signal from the detonator being fired into this on a motion picture film that was being pulled at high speed through the—well, it was a lens that was looking at a fluorescent tube, and then pull that film down six feet below the ground so it will not be destroyed and gamma rays will not get to it in time to destroy the film. And so this meant that I had a vanishing detector that would get out of the way before it got injured. And the film was down in a hole. We could go back out then and collect it after the bomb had gone.

I think that was the only one that I devised myself and took to the field. And that was really fun. Somewhere at home I've got a picture of installing this great big thing in the ground and it was—what was the name of the—? Rube Goldberg. Someone came by and said, *What is that?* And another voice said, *Oh, that's Roger Ray's Rube Goldberg.* But it worked, and so I was gratified, and we had a new way of determining the performance or why the performance had failed on a bomb. But mostly I had some new information and new knowledge that I could use in other things.

But that was the wonderful thing about Los Alamos. Come up with an idea. If it's not cockamamie as all get out, you'll be allowed to do it and be financed to do it, and take a month and design it and go take anything you need out of the stockroom to build it and send things to the shop that you want. I suppose it cost maybe ten thousand dollars to build that thing the first time that I tried it, and I had that license because I'd worked for long enough and demonstrated that I knew what I was talking about. That was the gratifying thing about Los Alamos, I think, to have the freedom to work. What a wonderful feeling.

Now it's getting close to five o'clock. We've been talking a long time, so I'm going to release you in a couple of minutes, but let's close with this and then we can turn it off and talk about what makes sense for tomorrow. But you said you were at Los Alamos for four years?

Right.

And you're in the Army and at some point you've become a major, is that right?

Yes.

So how do you not be working for Los Alamos anymore? Is that an Army decision?

Sure. I'm still in the Army all of that time. My paycheck came from the Army. My efficiency reports, such as they were, were written by civilians, Bill Ogle, Al Graves. Whether they were understood by the people that received them, I don't know. But I had a good reputation at Los [00:55:00] Alamos and in Germantown as people came to know in the AEC [Atomic Energy Commission] headquarters what this was all about. And I don't think I was hurt a bit career-wise. Oh, sure, I was not ever going to be a division commander in the infantry because I had not enough experience as an infantryman to go much further than I had gone. Had I stayed with the infantry, presumably I could have. Absolutely no regrets. What wonderful experiences.

My later assignments I won't go into now but I was director of the research and development laboratories of the Army's Picatinny Arsenal ordnance laboratories. Then I was borrowed by NASA [National Aeronautics and Space Administration] at Cape Canaveral [Florida] and got into the NASA space program for, oh, I guess about a year before the Army called me back as we were recalled to do some more testing in the Pacific.

I don't think I ever lost a thing by all this, and marvelous associations, tremendous educational opportunities every step of the way. Every day was a lesson. If I had it to do over, I wouldn't change very much. I might spend more time in the laboratory. I have no regrets about

my time in the infantry and my time in Europe, certainly not that. Time as an instructor, everything that I have done in my service I found rewarding. I hope that there are a lot of other people that can say that.

OK, I think we'll stop for today.

Good.

[00:57:43] End Track 2, Disc 4.

Interview continues on October 30, 2005**[00:00:59]** Begin Track 2, Disc 1. 10/30/05

Late in my tour at Los Alamos, which was due to expire in June of 1957, I was more and more in contact with people at Redstone Arsenal [Alabama] in the Army and in particular with the people who were thinking about putting a nuclear warhead on the tip of a rocket and introducing that as a rocket-propelled nuclear warhead for some future battle situation requiring it.

The Army had at Redstone Arsenal a fascinating team of people headed by Wernher Von Braun. Von Braun, as probably is pretty well known already, had headed up military rockets for the German Army, and as soon as the war ended, in fact as the war was ending he was spotted by some of the Army ordnance people who felt that the rocket was to be an up-and-coming part of our arsenal. And so they made efforts to recruit Dr. Von Braun and a large number of men of his team to come and work with the United States Army ordnance because we had an infant rocket program of our own. Von Braun and a fair number, I think probably about fifty of the German scientists and German technicians and engineers, did agree to come and assist with the development of that program and, as a natural consequence of that, they were recruited to go on permanent work status with the United States Army. And interesting dual citizenship arrangements, but a good many of them promptly became American citizens as soon as they could and, in my experience, became loyal citizens almost simultaneously. And I mean that very seriously, that I never knew one of the top members of that team who was other than a solid U.S. citizen.

Wernher Von Braun was at the head of that group, but there certainly were many others and I could name some of them and I probably will. When I learned of that and learned that they **[00:05:00]** were to be briefed at a session at Huntsville, Alabama where they would be

acquainted with what the Army's plans were and invited to participate, I was a very interested onlooker, and before very long became a very interested member of that group. Von Braun was the senior of them and a very eloquent and erudite man. I spoke enough German to enjoy private conversations with him, and his English was quite good even that early in the time of our association. I managed to get myself invited to about as many meetings as they had to discuss the role of these people in the Army ordnance program and to feel that I was almost a part of that, and so I sought opportunities to keep that association going.

At that time, the Armed Forces Special Weapons Program, short name AFSWP, had been established in the Pentagon, and I was invited to, ordered to join that group. And so this was somewhat an accident of circumstance, but also the result of my having become quite interested and seeking opportunities to be in touch with the people who were responsible for it.

One of the men who headed that, who really was the number-one head of that group in the Army's Ordnance Corps was a man named John B. Medaris. Interestingly, John B. Medaris, in an earlier incarnation a few years ago, had been the ordnance officer of the 1st United States Army, and so my brother John had been his ammunition officer. And when I arrived at the 1st Army headquarters back in Spa, Belgium, before the Battle of the Bulge, I met many of these people, and when John was captured I became very close to Colonel Medaris at that time, who felt very bad that he had lost one of his right arms in John Ray, and immediately we were friends. Despite the difference in age and rank, we found ourselves mutually respectful and friends.

When I learned that Medaris was heading up the Army ordnance team that was incorporating German scientists into its bag of tricks, I went over and met Colonel Medaris again and said that I would enjoy having the opportunity to work with him again if that opportunity

ever became available. He said, Your timing is very good. We have a meeting next week, all week, with those German scientists, and I'd welcome you. Come and [00:10:00] listen and participate. That formed the occasion for me to meet Wernher Von Braun and the senior people of his group, and it was an association that was never broken until his death and the departure of others in similar situations. So I suppose this was happenstance but it also was a consequence of I think my having gotten interested very early and with my experience with the Navy ordnance, Navy rocket programs and Navy ordnance, I had something to bring to them.

Now had Von Braun basically invented the V-1 and/or the V-2?

Well, no, I wouldn't say that, but he certainly had been a part of the team that was inspired to do that, and even against some resistance proceeded with it because they so believed. Von Braun was a thinker way out forward twenty-five years or a century, I'm not sure which. But he always foresaw the role of the rocket in warfare and the role of the rocket in the Army's part of warfare, not just bombs dropped out of airplanes but something that did not need a pilot and could carry a bomb from one place to another virtually unopposed. He was a real visionary and a delight to work with. Energy that you couldn't imagine. And he had a very loyal team of followers among the German scientists and engineers, and he very soon had a very loyal team of colleagues in the American system. It was a wonderful marriage of interests. And Von Braun was a very persuasive man, a man with a very pleasant character, a good sense of humor. He very quickly took to American ideals. He very quickly enjoyed the differences between our establishment and that of the Germans which he had served before. Here he was a partner. In Germany he had been on the one hand a servant of his masters; on the other hand, an aristocrat to his team members. All of that was sort of washed out into an inspiring personality, and I just found him a very nice person to work with and around and very soon to be dedicated to. I was quite willing to work

with Von Braun and his team. It was not just Von Braun, of course, it was a lot of fine people that had come with him and been trained with him. And their ultimate goal, or at least the ultimate goal of the Third Reich, of the Germans was world domination, but that was not the goal of Von Braun and it wasn't of any of the people that I worked with. Theirs was the exploitation of technology for the good of our government and our people. Surely that's a little bit colored in his [00:15:00] favor and I have to acknowledge that, but I never once doubted his 100 percent loyalty to the United States and what it stood for. So that's my testimonial to Wernher Von Braun.

Now I have to pause a little bit, please.

OK.

[00:15:23] [At this point, the recording is turned off and then turned back on.]

My next formal assignment from the Army, to my great delight, was to be appointed executive officer, which means number two in the hierarchy, of the Feltman Research and Engineering Laboratories, a group of ordnance laboratories at Picatinny Arsenal in New Jersey. I had a lot of technical credentials for that assignment. I had had very little in the way of management experience in a large technical organization, but I was just as pleased as I could be to be ordered to Picatinny, which is in New Jersey, twenty-five miles from New York, I guess. And Picatinny was the Ordnance Corps source of ammunition research and development and a certain amount of production of warfare ammunition, mostly artillery ammunition. It had nine individual laboratories, one explosives, one propellants, one for rocketry, I won't go through all of them; but nine different basic engineering disciplines that were represented there, and all to provide new designs, evaluate new designs, supervise and direct the early manufacture of those trials, and testing of all those things.

Well, I had a pretty good reputation by now in the business of field testing and field utilization of things that had just come out of the laboratory, and so to a degree that experience went ahead of me and I was welcomed and given a pretty good free reign as executive officer. The director of the laboratories was a non-technical Army officer, a fine manager, and he was five years ahead of me at West Point, a relatively senior man, and I'd never known him before, never heard his name before. Albert Weinig was his name. And Al Weinig greeted me on the day I arrived. I think I was a major and he was a colonel. And we sat down and talked about where I might fit in his organization, and he said, well, I'll tell you why I called you here, because the deputy director of these laboratories is leaving us, he's being reassigned, and I think I would like to have you as my deputy. I said, well, I'm pleased and honored, Colonel, and yes, of course, I'd like to be.

And so I went to work for Al Weinig and learned. My goodness, I had to learn all the ordnance terminology and had to learn the organization of ordnance, the financial status of these laboratories, how they were supported and by whom, and just an endless list of management [00:20:00] things, as well as the details of the engineering that I would be supervising. I had nine individual directors of the individual laboratories and a staff of two assistant directors under my job. Those were both civilians. And fortunately we had good personality connection immediately. It didn't take very long at all to become not just friends but respectful friends, and they knew and I knew that each of us had something to bring to this marriage and that it could work and it would work and it did work.

I stayed as deputy director until there was an upheaval in the Ordnance Corps which resulted in the removal and replacement of the senior man in the whole organization, our commanding officer, of the director of the laboratories, and a few of the other key people. And I suddenly found myself no longer deputy director but director of these nine laboratories. I was by

far the youngest man in that whole group of people, but I guess I had a pretty good technical reputation and it didn't take long to be on even terms with all of them. That was a marvelous opportunity and a delightful experience. And by the way, I was not an ordnance officer at that time and here's one of the very important ordnance organizations that I was to take control of. I soon became an ordnance officer.

I think I had three years as director of the laboratories, and that position, in a very interesting fashion, moved up in the overall hierarchy of the arsenal and in the Ordnance Corps, so that I had influence in the ammunition manufacturing part of our business, in policymaking, Washington meetings, budget meetings that decided what our slice of that pie was to be, and I found that very heady but also very enjoyable to have the tools to work with.

So are you still a major at this point?

I became a lieutenant colonel in that period.

OK. And then in the hierarchy, just so I understand it, so you're the head of this lab, and then who's your next superior? How does that part of the hierarchy work?

I was the head of the organization known as Feltman Research and Engineering Laboratories, plural. Of course I had a staff for that, to cover all of the labs, and then the lab chiefs reported direct to me. I was on the staff as well of the commanding officer of Picatinny as his principal advisor on ammunition research and engineering and development and production.

Production was something that I sort of engineered my way into. I thought that we needed to be thinking about the production problem while we were developing ammunition because if you couldn't make it, there was no sense in designing it, and we needed to have a hand in the design development that would best facilitate mass production. Interestingly, my [00:25:00] father in his last civilian activity before he rejoined the military services, he had

established an ordnance ammunition plant in Indiana for the Ordnance Corps. And I had visited there and I of course got to know the senior people who ran it and planned it and did the engineering, and so I knew the lingo and knew the problems and knew something about mass production, which was a big transition from the work bench to the production line. Picatinny had a pilot production branch, and while I was director of the laboratories, I had very close contact with the man who was director of that branch and we developed techniques of transition and techniques of trading people and so forth to make it work better than it had.

I had lots of contacts by that time in Washington outside the ordnance business but in the user's role. And so my experience earlier in rocketry and in the movement of transitional weapons into the hands of the troops, and how we developed the supply lines and how we developed the training for those people, this was all familiar to me from another viewpoint. Now I was in the place where I could influence it and it just seemed natural to me and I certainly was thrilled with the prospect, overworked, seven days a week, and enjoying it to the hilt.

Well, that's my transition into ordnance.

[Pause]

My service at Picatinny was certainly an important road junction in my career, and looking back on it I find that it had some logic from the very beginning and I don't know where that logic came from. Sometimes it was an initiative that I took; other times it was an initiative that someone else took. But there are people involved there and I suppose that immodestly I was gaining a reputation within the Army and especially in the field of weaponry and research and development, and so my name I guess came up a number of times as a candidate for a number of different jobs.

When my tour was about up at Picatinny, NASA was beginning to have a very important role in weapons research and development, and a lot of that was focused on missiles, missile testing, missile development, and much of it focused on Cape Canaveral. I'd been there [00:30:00] as a spectator, I'd been there as a participant, as a contributor. And it was there that I became quite comfortable with my colleagues from the German Von Braun group who were taking the lead in getting the United States into the space race and way up ahead in the space race. I think that it was probably Wernher Von Braun himself who discovered that I was in a sense footloose, that I was going to be available for reassignment pretty soon, and Von Braun wrote a letter to the chief of ordnance who was General [John] Hinrichs at that time, a three-star, very senior, the top ordnance man in the Army hierarchy. Von Braun wrote to him and said, When we open our branch of the NASA facility in Florida, there's one guy we'd like to borrow from you, and he gave him my credentials in a letter, and I soon had orders to Washington to be interviewed by General Hendricks. After a rather exhaustive technical review, he sort of sat back in his chair and said, Roger, do you want to take another holiday from the Army and from the ordnance?

I said, I've never thought of it as a holiday, General. I've gone, first of all, where the Army felt that I was needed, but also where I thought that I could do the most good. I've been tremendously fortunate that each of these moves has given me a great deal to package and take home in the way of experience and abilities, and I stand ready to accept whatever assignment I'm given, but if I'm asked would I like to do this, the answer is yes, emphatically, sir.

He said, Splendid! I'd have given the same answer. I'm going to make you available to NASA on detached service for as long as we all agree on it.

So I packed my family up and we went to Cape Canaveral. And we were given quarters at Patrick Air Force Base. And I believe that my title was Director of Launch Operations. A big jump into a swirling pool and nobody knew what was down there. It was a whole new technology, it was a whole new military organization, and we had to learn it step by step by going to the source of the best information. And so I was on the road a great deal of the time, to Cal Tech, to Aberdeen, Maryland, to the Pentagon, and back down to Florida, and to all of the major contractors' offices to find out just what we were going to need that we didn't then have, [00:35:00] and then to try and figure out how to build it.

Safety was one of my principal requirements. Of course finding the right people was a top priority. But I found that I really had a sort of a carte blanche. I could travel where I thought I needed to, almost had a pass into any office that I wanted to go into to learn more about what we needed. Certainly not anything you could call an unlimited budget, but at least an adequate budget. That didn't have to be one of my concerns at that time. So I could spend my time on concepts rather than the details of carrying them out.

And the Von Braun team at Cape Canaveral was strongly supported by the team at Huntsville, Alabama, which was the Army's rocket and missile headquarters. They had purchasing officers, they had libraries, they had contacts all over the world for the things that we might need, and we are a brand new organization that had to lean on them. And I fortunately had the opportunity to meet most of those people or most of the key people in that organization and to have my name recognized when I called, and so I very quickly had entrée in most of the places that I needed to go. Another wonderful and heady experience for a young officer who'd been an infantry officer only a few years before, and I found respect and support and regard from some of the bigger names in the business. I can't say enough for the support that I got from the Army:

Army personnel, Army policy, the Chief of Staff of the Army, all of these people found out that I had some qualification that was scarce and that was in demand and so I did get freedom to operate for all the time that I was with NASA.

Von Braun became a good friend, more than a good friend, a good mentor. I remember being in Hawaii with my family that winter and we had a project on Johnston Island that Von Braun was quite interested in. I invited him to come out to Johnston and see how we did things in that part of the Army, and he did come. I rather brashly, I guess, one afternoon, I guess it was probably the third of July, I said, Wernher, we have a very special celebration on the fourth of July, as you know, and my family is going to have a picnic on the beach. We'd be honored if you'd stop by with us. [And he said], I'd enjoy that. Thank you. And we set up a time and I sent a car to get him and he came down and met my wife and children and a few guests that we had there. And after our picnic, at early dark, [00:40:00] there was a big fireworks display off the beach and out over the water. I probably shouldn't say this but I will say it. The Navy was in charge of that fireworks display since it was to be done from a barge or a boat. They had some spectacular rockets prepared to give a beautiful display in the sky. And the first three of those fizzled. One of them blew up in the air, another one dived into the sea, and I don't know what happened to the third one.

OK, I guess I've probably wandered enough on that subject.

But let me ask you one thing about that subject. What kinds of things were you doing out at Johnston Island at this point that you had to go out there?

It was our main launch base for experimental rockets, not with any warheads on them, but it gave us the advantage of making measurements all the way from Hawaii. As things went on in the sky, we could get photography much better from there than we could from the isolated islands of the Pacific, and Hawaii had the technical equipment to do this sort of diagnostic work. It was

also logistically very close to Hawaii, easy for us to resupply. We had probably four flights a day out of Honolulu, so we could bring people in and out. We had a series of tests there, and did for all the rest of the time that we were doing rocket testing. Several years we operated at Johnston Island, built a big blockhouse, and even during the resumption of nuclear testing, fired some nuclear tests from there and detonated in the stratosphere where we could have photography on the islands of Hawaii, logistically very much more simple than had we done it down in the mid-Pacific. Had only tiny little dots of islands to work with.

Johnston was entirely a U.S. possession. The military base—when I first went to Johnston, there was an Air Force first lieutenant who was the commanding officer of the island, and we moved in on him to examine his facility and find out where we might put the things that we were going to have to build. And this little guy, he was just overwhelmed, and before he knew it, here we had come in in one airplane, about a dozen scientists and technicians aboard, and we went to survey this facility and decide if it could do what we wanted it to do. Our commanding general was General Alvin Leudecke in Washington, but at that time he was out on Enewetak, I think, and he sent us in to look at Johnston as a potential place to do these rocket launch operations. And we made a one-day trip in and surveyed the whole place, picked where we would put things, what would happen. And as we left that afternoon, just an airplane full of fewer than twenty-five people, this first lieutenant stood there and saluted as we left. And he never knew what hit him. [00:45:00] Within weeks ships were coming in, airplanes were coming in, we had hundreds of people on the island. And he was of course overwhelmed, and the Air Force sent in a rather senior person and a big new management team because it was a big job.

I'm afraid these are becoming reminiscence rather than recollection but that's the way it was.

Well, no, but that's all right. This is stuff we can't get out of the books. That's why it's good to talk to people. One other quick question about Johnston. Were you involved at all when we did the nuclear tests there?

Yes. I guess I was the safety officer for many of those. I was the project director for several of the high-altitude nuclear tests. And at that time our commander was General Starbird. I was his senior assistant for that purpose, right on his staff. There was nobody between me and General Starbird.

Now I have to get the chronology straight. That comes after NASA.

Yes. Right. Yes, I never got back to NASA. I was called back by Starbird, who knew me by reputation and a small amount of personal experience, but he knew what I had been doing and he knew that he needed that talent, and he had known me as a cadet, and he knew that I was an admirer of his, I'm sure, although he would never say that and I didn't ever say it to him, but I certainly was. Incidentally, just a real incidental, I had four different and consecutive assignments with General Starbird, lasting over ten years, almost unprecedented in a military career. I stayed with him when we changed jobs, I guess is what it was. I really was a staunch admirer of his and much more than that. When we on occasion had disappointments, he shared them just along with me.

I'll tell you a little bit about Starbird in one brief anecdote. On Johnston we fired Thor missiles, all carrying thermonuclear warheads, which means hydrogen bombs [Operation Fishbowl]. And measurements were to be made from every island that could see Johnston and could see that point above Johnston, and from numerous stations in Hawaii, an enormous collection of talent scattered over thousands of miles of ocean, and all focused on this one little place. As you might imagine, that was a very expensive operation to put on. We had probably

half-a-dozen Navy ships involved. We had I should think at least a dozen dedicated aircraft involved, making measurements at high altitude, surveilling the place for safety and so forth. An enormously complex operation, joint operation involving all the military services in one way or another and a large civilian component from several of the laboratories.

I was the project officer for the detonation itself. It was my job to coordinate the missile carrier, which was Air Force, the Thor missile, the warhead design and construction which was [00:50:00] largely under Picatinny Arsenal and the Army's ordnance. Navy's role in that was I guess primarily making measurements from amphibious aircraft that were nearby. I guess it was the biggest responsibility I'd ever been handed, to pull all that together, and it was my job for General Starbird. There was nothing between us, nobody in between us, for him to go through or for me to go through. I had continuous 100 percent access to him. And he and one other man, Bill Ogle from Los Alamos who was his technical director, were the people that I dealt with most closely. I respected and loved both of them very much, as men, as friends, as admirable people.

The first test [Checkmate, 10/20/1962] was such excitement. We had a big celebration the night before, going down all of the details to make sure that everything was fine, and then stopping at the end of that to have a couple of drinks and get to bed early because the next day we really had to go with it and do a lot of good work.

The next day we probably worked harder than I've ever worked in my life, getting ready and feeling the weight of that responsibility.

Finally came the magic time, and the Thor missile was launched about 11:30 at night when the stars were right and everything else was right. And it went up to almost the designated altitude, and with no warning the warhead section blew up. Not the bomb itself, but the fuel system, something had gone wrong. We'd gotten a leak, I guess, in the fuel system and gotten

fuel vapors up in the warhead section, and then a spark got those and this thing blew up, and of course into the sea, and our work of many months splashed in with it.

Then of course our immediate thought was, I guess that's the end of it. We'll never be able to do that again. We did have a spare, but we weren't certainly going to just run in and get the spare and try again. We had to find out what had happened. I think it was Lockheed [Aircraft Corporation] that was the engineering firm that put together the missile carrier, and they sent in a big team to look it over and we sent boats out and the Navy went out with small submarines to recover pieces and try to find an explanation that we could believe. We had plenty of explanations that were guesses. Finally decided that there had been a leak in a fuel line and we'd identified what the fuel line was, and after it was made, then to armor that and do other things to make it less vulnerable to the vibration and whatever else might've taken it out. Well, it was about three months before the next missile was ready to come out. I'll fast-forward and say that it was successful and it was a marvelous night.

[00:55:00] Not long after, it was the night after the first one blew up, I was known for writing poetry about things like this and I did, and usually they were parodies on some poet's writings. And if you possibly know the poem "The Cremation of Sam McGee", I'll think of his name, the writer of that [Robert W. Service]. But it starts out, "The Northern Lights have seen strange sights, but the strangest they'll ever see was the night on the marge of Lake Labarge when I cremated Sam McGee." And I had learned that as a Boy Scout and used to stand near our campfire and let the flames flicker in my face as I recited that in that tone of voice. And I just couldn't get that out of my head, that night after this thing blew up, and I wrote, "Oh Johnston's lights have seen strange sights but the strangest they'll ever see, was the night when Thor would fly no more and scattered us with debris." Well, I have it.

Yes, I'd love to see it

OK, I'll give it to you. Anyway, I wrote that, and that very night. And the next night, as we completed our meeting, what do we do next for the next couple of months, I asked General Starbird if I could have the floor for a minute. He said yes and I read this. Well, it just broke up the crowd and restored our good humor if we had lost it. Some certainly had and some were very dour about our prospects for the future, but this seemed to break the ice. I gave Starbird the original in my handwriting and I have since reproduced it. I'll show it to you and give you a copy. [See poem "Bluegill . . . Prime?" at end of transcript]

OK.

[00:57:24] End Track 2, Disc 1.

[00:00:00] Begin Track 2, Disc 2. 10/30/05

After that really tragic end of that attempt to launch the warhead which we had given a code name of Kingfish [Bluegill], we usually had a postmortem right after every test, and we had gone to the site of that postmortem which was the cottage in which General Starbird was living, and had his senior people, his senior staff and a few others. And I was to report what had happened as soon as I had enough information to do so, what had happened and what our prospects were for going ahead. Well, I felt a combination of determination that the answer was "yes," and uneasiness with the answer was more likely "maybe." We didn't know enough yet. And understand, this probably represented almost a full-time year of effort on my part, when I had thrown everything I had emotionally and physically and mentally into making that a success.

After I reported to the meeting in General Starbird's quarters, I asked to be excused and left the room. He lived in a little cottage, temporary quarters, in a little cottage that was on the shoreline of Johnston, and that's where we had all of our senior staff meetings. I went out the

door on the ocean side and just sat down on the ground outside the back door and listened to the waves lapping at the shore. Looked up at the black sky and the stars and tried to get myself pulled together. I guess I'd been there probably fifteen minutes, with all kinds of thoughts going through my head, that we might try again, we might make it, we might never be able to make it. What would we do then? How could this have happened? What was the cause? All of these things were running through my mind. And of course there was a natural component of self-incrimination. And I was sitting down on the ground, my knees up and my arms around my knees, and I guess I have to acknowledge, weeping.

General Starbird, who was probably six inches taller than I and about my same build, and who was bearing even greater responsibility than I at this time, came out. He went out the front door; I'd gone out the back door and sat down on the sand. He came around the front and just looked around to see if I were there, suspecting that I might be. And yes, he saw me there, came over, and his big gangly knees sticking up, he sat down next to me in the sand, and I felt a gentle [00:05:00] hand on my shoulder. And that's all he said [words were not needed].

[Pause]. I don't know how long this went on. I sat there just I think silently weeping, and as much of that was for having let him down as for anything that I might have been able to take personal responsibility for. It was too complex a problem to say that any one person had failed. As a matter of fact, it turned out that it was a failure in manufacture that none of us could've even known about, but this is not the time to know that or to even think about it.

The kindest words I've ever had from anyone in my life came next. General Starbird said, *We're going to do it.* He patted me on the back and silently walked away. In minutes I had gotten up and walked out to my billet which was out on the other side of the island on the end of the little point. Fortunately I had an isolated spot and a quiet room, again with just the waves to

listen to. And a great blessing of sleep came quickly. I was exhausted for maybe two nights of no sleep leading up to this, so it was natural. The next morning looked a whole lot brighter, and I've always attributed that to the great man which was Dodd Starbird. End of that point.

OK. Thank you for that.

Oh, and that's the day that I started to write this.

And then you started to write. So the code name was Bluegill. Then also in the book there's Kingfish, but that's another test?

Yes. Right. The names of the tests were fish names.

OK. Because there is a Bluegill Prime here. That must be when you reshot it.

Yes. Well, Bluegill Prime, that was the way we designated another try at the same experiment. If one of them failed, we gave it a Prime name.

Thank you for that. So we've got Starfish Prime. That meant that Starfish didn't go the first time? Starfish probably blew up or didn't function.

So Bluegill Prime was right before the moratorium, the twenty-sixth of October, and then came Calamity, then there was Kingfish later. OK.

And I guess we had a double prime in there somewhere. Maybe that wasn't Bluegill. It may have been in another test of another series. But that was the way they were designated. If you tried the same shot again, it was Prime. Try it a second time, it was Double Prime.

All right. And this report may not tell us that much detail. They may not make that distinction. So that was Los Alamos. But it looks here that Livermore also had tests in [Operation] Dominic, I'm seeing.

Oh, yes, they did.

But it doesn't look like the rocket tests.

[00:10:00] Who provided the warhead, that's what designated it to Los Alamos or Livermore.

They were the only two that could provide a live warhead.

OK, good. Thank you very much for that.

What's the year, just for fun?

Nineteen sixty-two. So it's before the moratorium is going to go into effect. And you were explaining when we took the break that they were in the stratosphere, you're saying?

Yes. Yes.

But they fell under the treaty.

Yes. I guess they were called exo-atmospheric.

Exo-atmospheric. Thank you. I had forgotten that word.

Outside the atmosphere. Outside the sensible atmosphere. Of course there's atmosphere there but it's maybe, I don't know, a thousandth of a percent of density compared with what we have here at sea level.

OK. A thousandth of a percent.

Well, don't use that number for anything but it's sort of that way. It goes down exponentially as the altitude goes up, and so not very much air. You can't have an air-breathing engine or rocket. It has to carry its own oxygen. That's what that's all about, that you need to carry a tank full of liquid oxygen to burn the fuel. There's no oxygen there as is true here in the close-in atmosphere. You get the oxygen for the burning from the air, so all you have to do is carry the fuel; you don't have to carry the oxidizer. But as you go into rocketry, you have to provide the oxygen on board and pump it. That means keep it cold so it can be liquid.

Well, that's a useful bit of information then that I hadn't quite grasped.

That's the meaning of exo-atmospheric. And that has to be taken into account in all calculations of—well, aerodynamic surfaces don't work, trim tabs and that sort of thing don't work outside the atmosphere because there's nothing for them to push on or to pull on, so you have to have rocket jets to change direction, rather than to have rudders and the steering mechanisms.

Those mechanical things. Right. OK. Well, that's all very useful.

OK, we're going to have to go to 1962, right?

Yes.

[Pause]

I suppose it goes without saying that by the end of that operation I was exhausted physically and emotionally, but ultimately satisfied that we had done our best and we had indeed produced the results we set out to produce, at great cost in energy and emotional energy for a lot of the people. I knew who my true friends and allies were for sure in that group and it was a wonderful feeling. **[00:15:00]** Whether in triumph or defeat in those times, I had the same friends, the same support, and I guess I gave them the same in return. And I won't try to list them but you've heard the names many times and prominent among them are Starbird and Ogle. But also from my family. My kids didn't really know except that I was absent quite a bit, but brothers and sisters who were in touch with me and my wife and neighbors knew that I was carrying quite a load and when I came home from that operation, I was ready for a rest. I didn't expect to get it for very long. I didn't think about a long vacation somewhere. My family and I had a small apartment over in—well, I want to say Silver Spring [Maryland] is close enough to that, and I went there intending to get some sleep, first of all, and really relax, hoping to take my children and wife on a brief absence and outing. But it was getting to be wintertime and we didn't think we'd travel very much.

I think that I probably got back to them on a Friday afternoon, slept most of the next day, and on Sunday about eight o'clock the telephone rang. I answered.

A familiar voice, Alfred D. Starbird: Roger.

[And I said], Yes, sir.

[And he said], What are you doing?

I said, Well, I'm just waking up, sir.

He said, No, I mean what are you going to do now?

I said, I haven't even taken the time to think of it, General, but I know that I'd like to have a brief rest and then get back to work.

[And he said], How soon can you be over here?

I said, Where is "here," General?

He said, On Courthouse Road in Arlington, and he gave me the number, on the third floor, and the Defense Communication Agency is the name on the door. Just come on up there.

It's Sunday morning. And I said, All right, when do you want to see me, General?

And he said, How soon can you be here?

I said, Well, I haven't had breakfast yet but I suppose I could be there midmorning.

[And he said], That'll be fine. I'll be in the office. Are you feeling all right?

I said, Oh, yeah, sure, fine, I had a good rest.

[And he said], OK.

Starbird had been plucked off by Secretary [of Defense Robert S.] McNamara to take over the Defense Communication Agency which was, in McNamara's words, a shambles. Its management was poor. I'll say inadequate rather than poor. That's all I knew then. But I went [00:20:00] over to Courthouse Road and up to the third floor and saw the office, DCA, and the door was locked. I knocked and someone came to the door and I identified myself and he said, Oh, yes, sir, the general's waiting for you.

I went in to General Starbird's office. He had been pulled back from our task force at Johnston. As soon as we had the last success, last missile fired had been a success, the very next morning he was packing and we all went down at three o'clock in the morning to see him off at the airport.

[We said], where are you going, General?

He said, Washington. I don't know.

I guess I had said, What are you going to be doing?

He said, I don't know.

All kinds of speculation that they might be calling him in to fire him, or that something else strange had happened.

Well, the Defense Communication Agency was, from a management standpoint, in disarray. And he had built a reputation that McNamara respected and McNamara was the kind of guy who would say, all right, let's see, who's the best guy we can think of? All right, let's get him. Never mind what he's doing, never mind what the consequence may be, to him, to his family, to his staff, to the job he's doing, send him in here. And Starbird had reported in and he said, You are the new Director of Defense Communications, and pinned a third star on him. And I am modestly honored to know that the first name he thought of was to call me to come and join him.

And I walked into the office and he got up from his desk and came around, nobody else in the office, came around and took my hand and said, *Welcome, fellow communicator*. Neither one of us had ever had a communications assignment in our lives. McNamara knew organization and he saw that this was a man who would make it work, whether he had any experience in it or not. And he was exactly right. And so I became Special Assistant to the Director—until we get a better title for you—and moved into the office right next to his. And that began my experience in defense communications, and it was a big, big, complicated organization running one of the biggest businesses in the world. If you think of the onset of a war and say the U.S. Government must take over the management and control and utilization of *all* of the communication systems that we have—AT&T [American Telephone and Telegraph], postal telegraph, all of these companies, all of these competing organizations and many of them not competing, but this must be brought under one management for the purposes of national communications. Of course they would continue their normal business, but their first priority must become support of this activity, the defense activity.

This was in [Nikita] Khrushchev's heyday and we truly were in peril nationally. There were big cards being played in that game that would affect both countries forever. I think [00:25:00] McNamara's move there, as well as many of his other moves, were really inspired. I think he had vision. He of course had lots of help, lots of support, and he had wisdom of his own, but also he had the wisdom to pick good people in every critical job. And that's how Starbird had come up.

Now I can remember that after the Bluegill firing and after a successful Bluegill Prime, we had I suppose three or four additional tests, so I'd stayed on Johnston for those but General Starbird had been pulled out right after—I'm not sure whether it was after this Bluegill or the

successful Bluegill. I think that he was allowed to stay long enough to get a success from that test. We could find that out.

We can look that up.

But his management acumen, his ability to select people and to give them the authority they needed and back them with his authority when they needed that was legendary in the Army. And I think probably if you had asked McNamara at the time, he would have had something to say akin to “Dodd Starbird can do no wrong.” He wasn’t that permissive, blanket permissive, but I think when he bet his money on a horse, he gave it everything he had and that’s what Starbird needed to be able to do the job that he was given. And I had the great privilege of being his number one, right hand, with no communications credentials anymore than he did. We used to laugh when he’d call me in the office and say, Well, my number one communicator is here. We can start the meeting.

So that was my next move. And I think that I went from there—I was selected to go to the Industrial College of the Armed Forces—Starbird probably thought that was a good thing in a couple of ways. Being a student at that college at Fort McNair [Virginia] was certainly a lot more restful, a lot more opportunity to rehab than had might have been another management job as such that I had had. At least I found it so and I enjoyed that year. Gosh, that was good. And that’s where we went out, we the students in that class went out in private industry and examined methods of management and control to learn as much as we could about how these big corporations operated and what lessons might be transferred into the management of the military establishment.

I found it a most rewarding year. We traveled to Europe. We looked at the way the Germans ran their show, we looked at the Brits, the French, looked at NATO [North Atlantic Treaty Organization], and then looked at all the major commands of our Army. And it was good

[00:30:00] graduate work at the master's level. Many of the members of my class were taking courses in local colleges and universities at the same time to dovetail with the things that they were doing at the Industrial College and came out with dual degrees. I didn't do that. I decided I'd put all my energies into what I was there for, and that turned out to be wise and also to give me a little time with my family for the next year.

Where is the college?

In Fort McNair, Washington [Virginia].

Oh, you said that. That's right. OK, Fort McNair.

A very fine institution. The Army War College is on the same location. A different curriculum, a different purpose, but lots of exchanges of faculty and speakers. Really a wonderful opportunity, and when I look back on the number of years that I spent as a student for my thirty years in the Army, I think I got the best of the bargain. At the same time, if I were the personnel officer of the Army, I would say the Army got the best of the bargain because all of this is plowed into the people who are going to be running your show for the rest of their lives.

[Pause]

My first assignment after the Industrial College was the Office of the Secretary of Defense [SECDEF]. In the next tier of that office was the Assistant Secretary for Atomic Energy, and I was to report to his office. He was a civilian. I was to report to his office as a Military Assistant, of which there were four, one for each of the military services and then a senior assistant who sort of was responsible for those three. I was the Army Assistant. And for the next, I guess probably a year-and-a-half, I was in that office, primarily responsible for Army interests in that Office of the Assistant: representing any nuclear-capable Army unit, representing atomic

defensive measures of the entire Army, and generally being the responder to a variety of questions that came from the public.

Who was the undersecretary at the time?

No, it's Assistant Secretary for Atomic Energy, was Jack Howard, W.J. Howard, a splendid man who came out of industry, out of Sandia Corporation in Albuquerque. And it was [00:35:00] a real pleasure to work for Jack Howard, I suppose because his usual question was what would you like to do next, rather than when are you going to get my job done. We very quickly became good friends and we had many mutual friends. I'd never met him before, but I very soon knew that we had been friends for a long time, long before we met, and that's true even today.

I worked for Jack Howard for I suppose about a year. And I can't account for my next move at this point. It might have been to be appointed Director of the Research and Engineering Laboratories at Picatinny, which was the top research and development job in that establishment. And that was a great privilege. And my timing, I think, is about right on that, that that was the time it came, when I went up there to take over the entire laboratory complex as the director. I had been executive officer and I'd been earlier director of individual groups of laboratories, but in this I was in, oh, I guess it was the commander of the post and everything between that and the scientific worker's bench. Again, a pleasant change, and I wasn't anxious to leave Jack Howard or the Pentagon but it was so nice to go back up to Picatinny where you're out in the countryside, and I had good friends and I knew the place, and my kids enjoyed it, too, to go back there and rejoin some old schoolmates.

I'm now trying to think of what terminated my tour at Picatinny. We'd better interrupt for a minute—

[Pause]

You need to say this again because I need to get that distinction. So you had been—

Well, I had been an assistant to the Assistant Secretary of Defense for Atomic Energy. I guess Military Assistant was the correct, complete title at that time. When I was asked to return, it was at the end of my time at Picatinny Arsenal. In fact it ended my tour at Picatinny Arsenal when [00:40:00] Assistant Secretary Carl Walsky telephoned me at Picatinny and said, I would like to ask for you to be Deputy Assistant to the Secretary of Defense, for Atomic Energy. Do you have any objection? And of course I didn't. And I reported there. I can give you the date now, I think, or approximately. I retired from the Army in 1969.

OK. That was going to be my question.

I put in for my retirement a year after I got that assignment.

So you're this deputy as an Army officer.

Yes, that's right, Deputy Assistant to the Secretary of Defense for Atomic Energy. The Assistant was a Ph.D. civilian, Carl Walsky.

OK. And you're his deputy.

Yes. He had met me I guess when he inherited that job from Jack Howard and I was already in place there on his staff, and we worked very well together, I think, and so he remembered that and then he wanted to bring me back to Washington. I was commander at Picatinny and that was the top job you could have there; there was no question it was a heady job and one that I enjoyed, but this was one that had a higher calling and with a higher call on it and I didn't feel that I could turn it down except for cause. I knew that I could do it and I knew Walsky and I certainly didn't object to having to move again, although my family might not have liked it as much as I did.

Who was president at the time? I'm just trying to get a sense of what the administration was.

It had to be a Democrat.

[Lyndon B.] Johnson maybe?

Lyndon Johnson perhaps. Very likely. But we can get that.

We'll get that too.

At any rate I accepted that job and did it for one year, and just short of the time that year expired and my name was on the eligible list to be promoted to Brigadier General and it did not come out on the selection list. I decided then that for whatever reason it was not likely that I would be promoted in any reasonable time, two, three years. I had had about as top-level jobs as I could expect as a colonel. I might be moved around from one colonel's slot to another. I'd had about five colonel's jobs and that was fine and I'd enjoyed them all. I wouldn't say that I was terribly disappointed and thought myself a failure. But I just thought, OK, the Army has other needs better met by other people, and go to it. I didn't know what job I might've gotten had I been promoted.

[Pause]

So you submitted your papers for retirement?

Yes. I retired from the Army. I had thirty years of service, twenty-seven being commissioned years. And I almost immediately accepted a Civil Service appointment. Now we had better pause. You've got to remember—[Recording stopped for off the record comments]

[00:45:46] End Track 2, Disc 2.

[00:00:00] Begin Track 2, Disc 3. 10/30/05 recording resumes mid sentence

—career officer, when he decides that the chances of getting any greater challenges, never mind the promotion really, I'm serious about that, never mind what the title is or the pay or any of that sort of thing, but rather when you decide that your horizon is the one you can see and there's not going to be a further one for whatever reason, then you start saying, well, what else can I do and where? And the time to decide that is right now. I've already had my last shot, the first shot

really at becoming a brigadier general, which would have opened up another vista of opportunities. That door is closed. I can certainly have a rewarding life if I stay right where I am and accept more and more responsibility, but I know that I'm not going to have a broader vista open up. So while I'm young enough to do it, I'm going to look and accept something more, and the something more came along and so I submitted my request for retirement. You don't ever resign from the regular Army, short of being requested to.

I had no serious regrets about that. Sure, I was disappointed that I had not progressed one more step, which would've been two more steps of others, but I had so many other opportunities available at the time that I thought, well, I'm going to say that's been a nice career, a good one, I've had lots of wonderful associations and certainly learned a lot and grown a lot. Let's move on. And I did.

So where did you go after that? As you know, I'm trying to get you back to the main subject, but let's get there the way you want to.

I went immediately, I guess on the very next day, to the Department of Energy [DOE], which had been the Atomic Energy Commission [AEC]. I'd worked with the AEC for a long time. I'd been at Los Alamos for a long time. I had as many professional friends in that organization as I did in the army, and in fact my inclinations were in that direction. Science and technology had become my bread and butter, and although I had had good troop positions and had served well as a troop commander and enjoyed it, it seemed the time to do it.

I was offered almost immediately at the time of my retirement the position of Director of Operations in the Nevada Operations Office [NVOO] of the AEC. That's the office that operates the Nevada Test Site [NTS] and a much larger complex of contractor establishments throughout the world, throughout the country and even the world, and was responsible for representing the

Atomic Energy Commission in all overseas operations. I knew most of the people and was [00:05:00] known by most of the people and was, I suppose I'll say immodestly, unanimously selected almost before my application got to them. I was interviewed. My interview board took an hour and one cup of coffee and I was then offered the position of Director of Operations in Nevada. That was really the number two operational slot in all of the test business of the Department of Energy.

What was the number-one one [position]?

The Director of that office. He had much broader responsibilities and certainly much less day-to-day either accountability or active management. I had been in operations management for longer than he had. My reputation was good with the laboratories. That was a very important feature because your key resources were the two laboratories, Los Alamos and Livermore, and then a number of ancillary things including the military laboratories.

So this is now the early seventies?

It must've been, yes, about 1970. What have you got, Dorothy?

Dorothy Ray: The C.V. [curriculum vita], a résumé, and a Perspective of Health Physics in the Marshall Islands [An Address to the Annual Dinner of the Health Physics Society, Honolulu Chapter, May 28, 1982].

Oh, great.

Dorothy Ray: He gave this in '82 in Honolulu. Is that it?

Roger Ray: Yes, to the Health Physics Society. Wonderful. Where did you find those? You better make sure. Are there two copies of this one?

We can make copies maybe.

Dorothy Ray: The C.V.?

Roger Ray: Yes, we can run a copy before Mary leaves. I know I've got copies but I think that will straighten out the chronologies.

[Pause]

I think that Health Physics in the Marshall Islands was a talk I gave to the Health Physics Society in their annual meeting in Honolulu, and yeah, I had earmarked that too to give you a copy of.

Great. So then you've moved to Nevada, I guess, you've moved to Las Vegas.

Yes, yes, we did move to Las Vegas. And although my domain from there was largely the Nevada Test Site, and I'd spend a lot of time at the Nevada Test Site in my earlier years, I had responsibility for all operations at the test site, but also our operations which were beginning to grow in the Pacific. And that, I think, was one of the principal reasons that I was chosen for that. I have that experience in the Nevada Test Site but I probably was more qualified, more familiar with the operations and the need for Department of Energy support in the Pacific; that was a natural match, and I think I owe to Bill Ogle at least a strong vote of confidence that he gave early on that rather assured that I would at least get serious consideration.

And so that marked the end of my, really the close of my direct association with the [00:10:00] military and the first time that I served as a civilian but in a senior governmental capacity. A very easy transition. I enjoyed it. I enjoyed the people I was working with, and many of them across the line I had worked with for years, many of them right there I had worked with for years. I was a stranger to some of the junior people, some of the people down a couple of levels, but that didn't take very long. Troy Wade was one of them. *Way* down the line.

[Pause]

I had not spent very much time at the Nevada Test Site in the previous five years, I suppose, but I knew what was going on from reading reports and from my interest in our

accomplishments there, “our” being the United States Government. I won’t try and define whether they were specifically AEC accomplishments or military accomplishments or civilian otherwise. I thought we had an outstanding team combining military and industrial and civilian aspects, and it was really a pleasure to just step right in to something in which I felt very comfortable and was I think quite well received.

At that time, the whole of the Marshall Islands situation was dormant as far as the U.S. Government was concerned. We had a few people out there off and on, we of course had a fair amount of property to be looked after, but we had not really recognized as a government and as a department of the U.S. Government that we still had a tremendous responsibility to those people who had been displaced from their homeland in order that we could take the opportunity to damage their homeland and leave it a shambles. We destroyed their civilization there. We made them almost 100 percent dependent on U.S. support and largesse. But we pretty much turned our backs on their tradition, their independence, their very beautiful, simple way of life. I had had the privilege of becoming familiar with all of that and I had become friends with a number of Marshallese people and officials as well as lower-level people in the government, and I was very sure that we had not done our job adequately.

The people of Enewetak were not asked; they were just told that the bombs were coming and they would have to be moved for their own safety temporarily to a place some distance away, and they were asked to help in the selection of that place, and they selected the Ujelang [00:15:00] Atoll. They had some ancestors there, they had friends there, and they felt that at least culturally they would be still at home, even though they would be quite distant from their home, several hundred miles. They were moved, and the United States built for them and helped them build housing, schools, other facilities to provide at least the bare essentials that they would need.

They received shipments of food, they received money with which to buy from the ships that came by, and superficially they had been pretty well treated. But emotionally and culturally they sort of abandoned their history. They abandoned their tradition. It seems strange to say but they had left the graves behind, the graves that were their site of paying reverence to their ancestors, and all that was gone. And the United States came in with big machinery and tore down huts and other facilities, built roads, built docks and piers, brought fast, noisy boats, and in general almost overnight changed the nature and character of the place. They didn't come back to visit. They were not invited to come back and visit. For most of the period that they were absent, or at least initially in the period that they were absent, there were classified things going on and they could not be nearby. There were also dangerous things going on and they couldn't be nearby. And there was always the fact that we often had large numbers of males in the military and in the workforce of the civilian component who would have their eye on the females in the population and that certainly was a potential problem and something that we had no way of dealing with. And so they were kept apart, completely apart.

When the need for the test islands was finished, we walked away from them. We didn't immediately have a program of restoral. We did not, I'm sure, and when I say "we" I wasn't there so I'm saying we the United States. We did not have a program of restoral, a program of reeducation, a program of reintegration of their society into the society of the Marshalls even, of the northern Marshalls. And they were dependent for a long time, decades, on field trip ships that came into their port, I suppose on the average one every couple of weeks. Limited provisions [00:20:00] available on the ship for purchase. Limited trading capability. No intention of providing passage to other places.

And so they became a new society with a new culture, preserving some of the old and always preserving the leadership and their internal structure, but having not very much to draw upon to make it flourish, to make it attractive. I'm sure that the consequence of that to the young people was really devastating. It was not long before there was a generation that did not remotely resemble what had left Enewetak and did not remember tradition and culture as it had been. There were many good people who voluntarily got into that situation and tried to visit them, tried to record their history, tried to encourage them, tried to help them rejuvenate their traditions, help their education, but this was a society that was just disappearing.

I can't tell you when I came to have those feelings for the first time and when they started to crystallize and make me want to be an activist. When I came into the position that I did as Director of Operations in Nevada, that fortunately included Nevada's responsibility, such as it was, to look after United States interests in the Marshall Islands. And so I made it a point to visit as early as I could at Majuro, the capital of the Marshalls, and to visit Enewetak and the other islands that might be involved, and I was determined to go to Ujelang, their exiled home, as soon as I might. And I didn't wave any banners. When I got back from these visits, I talked to people in Washington, talked to people in Nevada, and found that everybody really agreed with me in principle. Nobody had money, nobody had troops, nobody had a plan, but yeah, that's a good idea.

In—oh, I have to find the year for this, but in the early sixties, I guess. The Defense Nuclear Agency [DNA], which I think then had some responsibility for liaison at least with that place and its residue from our test program. It was recognized that we had really left a mess, a mess in terms of what was needed to renew that or restore that civilization. And they got some money and they thought they might do something to permit some of the Enewetak people to

[00:25:00] come back and look over their land and even take residence there and perhaps that they could regenerate what had been their society. But there wasn't very much in the way of support and those were more excursions than anything else. The Enewetak people were asking, please, may we go back and see our land? And they did make a trip or two. But there was no hope that anything really worthwhile could be done unless great amounts of money were spent, first of all to clean up the debris, get rid of any hazardous debris, not nuclear explosives but jagged sheets of metal and perhaps some old explosives that might be accidentally detonated by someone doing an excavation or whatever.

I don't know how it got started, but somebody in the Defense Department [DoD] decided that we at least needed to clean up what we'd left behind. That was just unacceptable and unconscionable to leave behind old rusting wrecks of trucks, buildings that were ramshackle and had collapsed, water lines that were worse than useless, tangled cables that crossed their lagoon and so even boats had a difficult time knowing where to anchor because these old communication and power cables ran from island to island. Enewetak was, oh, something like forty-two islands, I think, in a ring and those were connected by varying sizes of cables. All those were hazards for the fishermen. All of them interfered with not just the beauty of their place but the utility of almost anything that they had. You want to dig a hole and you go to dig the hole and you find a great big block of concrete a foot below the surface. How do you get that out of there and why is it there in the first place and will it explode if you tried to move it? So the Defense Nuclear Agency was prevailed upon to conduct a survey and decide how to approach that problem.

I think that Bill Ogle was one of their consultants on that job, and Bill suggested that DNA, Defense Nuclear Agency ought to get in touch with Roger Ray who knew a great deal

about Enewetak and had looked at this same problem from a different aspect. And I was invited to meetings of the DNA staff to decide what ought their priorities [to] be. I don't have a copy of those, I don't have a record of it, but my mental record is number one priority: clean up the junk. Big job, including the highest priority, hazardous junk. Hazardous could be anything from old batteries that had acid in them and might cause burns to sharp pieces of metal. Obstructions in the waterway that might make it difficult to get into the pier and other such things. Well, DNA managed to get an appropriation from the Congress to do what I'll call a first-tier cleanup. I don't know what their language was in the legislation but to do a first-tier cleanup and that required a [00:30:00] complete survey of the atoll. I went down as a volunteer to offer my services, to offer help in not only trying to find things that might be important but to make suggestions about what might be done.

Let me backtrack a little bit. In the second part of Operation Castle, when my station at Bikini had become badly contaminated as earlier in this story, we made the decision that that experiment that I had been doing and was now pretty much responsible for needed to move and the best place to move it was Enewetak rather than Bikini. John Malik was the scientist on that program and I worked very diligently with him, he very diligently with me. We were good partners and good pals. He had the science and I had the, I suppose, the engineering planning that would help to carry it out. And we moved to Enewetak with all of our equipment.

Where would we put it? Well, we wanted a remote place that would not be in the way of other larger operations and which would be safe from the other operations that were there. And that turned out to be Japtan. Japtan is a little more than a square mile, I guess, across the channel from the main island at Enewetak, which is Parry Island, and it had not had any population since the Enewetak people had left. It was in its pristine condition, with the exception of a few

structures that had been put up to support the operations at Enewetak. But it was mostly overgrown, lizards four feet long, all kinds of wildlife that we'd never seen before, wonderful coconut trees that were bearing, and nice shade. It was a beautiful lush green island and had a good pier to take the small boat so we could get in and out day or night.

So John and I decided that we would set up our new experiment there. We had our two great big thirty-three-foot trailers brought down from Bikini and emplaced on Japtan. And initially we built sort of a hutch for us to stay in. Soon found that it was better to have a trailer for our living too. It was nothing but a shell of a cargo trailer but we built that into something too. And Malik and I moved onto Japtan. Holmes and Narver, the contractor, brought a big generator over so we could have power and a big diesel tank so that we could have fuel to fuel it and a big water tank so that we could collect water and keep it clean and pure. A big pier was already there. So we were in business. Oh, we had to have a communication facility but we did. That was mostly just radio over to Parry Island, the main headquarters.

Now we were an independent organization. This was still during the Castle operation. And it was really paradise for us. We had a good experiment, we knew what we were doing, we [00:35:00] had a fine machine shop that we'd brought onto the island. We seemed to get along famously. And we could have a helicopter bring over from Parry Island or from Enewetak anything that we needed that we hadn't thought about. And we got that response too, really immediate. We got our mail every day. Of course there wasn't any mail every day but any mail that was there was delivered to us. Our food was delivered fresh and it was good. I was the cook and we probably ate better in that mess hall than any of the other people there at Enewetak.

We had a very pleasant about two-and-a-half months I think. We made measurements on every succeeding test at Enewetak or at Bikini, and those were all successful. We were pretty

much left alone. Bill Ogle used to come over almost every afternoon for a swim. We had the best little swimming beach anywhere. It was quiet and, well, I think both of us, John and I felt if there is a paradise for a hardworking guy, here it is.

And I *learned* from him. I was not a physicist, as I've said, I mean as I've led you to understand by the other things I've said about my education. I'd not been trained in physics, especially nuclear physics, and here I had one of the most brilliant minds in Los Alamos in that field. And he taught me and I suppose I taught him a little bit. And so we had a very enjoyable and productive two-and-a-half months.

And we talked, John and I, about the plight of the Marshallese people, especially the Enewetak people. We saw the residue or the remains of their settlements. We saw how they must have been just uprooted and moved and gone, and what a paradise they had had before they left. And he and I talked night after night about this as a prime responsibility; even though it's a few people, it has to be an important responsibility of our country and of our laboratory. And I was then assigned to Los Alamos. I called myself a Los Alamos person. We had done this to those people and we were continuing to do it and I know that he joined me in feeling that we had an obligation there that we'd better not forget.

We had a couple of visits during that time from Marshallese people and I came to know some of them quite well, mostly those who were in government, and they were there of course on official business to come and see what needed to be done at Enewetak. They were sincerely interested in trying to help the Enewetak people get back and they wanted to know what it would take to do all these things.

You're back now later, or is this when you would get visits during Castle or this is the later time?

No, this is afterward. Well, it's both, and I guess I did smear that a little bit because—

No, I might have missed it.

I was talking about when John and I were there during Castle, and when Castle was over we left.

Right. But I think the important thing, and I'm glad you went back there for that, was that you two were talking about it at the time.

Oh, yes. Yeah.

That's a really great point, so I'm glad you looped back to Castle for that one.

We did that, and we talked about it at Los Alamos many times. I joined John's group. He was a [00:40:00] group leader at Los Alamos and when we got back John said, what are you going to do when we get back to the lab?

This is finishing Castle and I'm still an Army major and nobody knew where I was going or when or why.

I said, well, I'd sure like to come back here or stay here and keep on with the kind of things I'm doing.

And he said, well, I'd sure like to have you do that.

By this time I had become very much a member of the Los Alamos team. I had worked with them for four months and had found a lot of common ground with them. And one of the most narrow scientific minds I ever met. I'm not going to give you a name on this one. But also one of the most brilliant lived in the same dormitory building that I did at Enewetak. And I suppose that was a building of maybe thirty or so. Edward Teller had a room there when he was there. Other group leaders of the laboratory did, and just about every one of the group leaders of Los Alamos had a bed there. And so we had our evenings, a martini hour before dinner and our after-dinner hour of talking about what had happened that day and what was going to happen the next few days. And I guess I found a camaraderie that was still strange to me, strangely wonderful. And I decided, this is where I belong. Well, I was fortunate enough that Bill Ogle

thought so; he was the deputy division leader. Al Graves thought so; he was the division leader. And that put us pretty close to Norris Bradbury. So if it took the interest of the laboratory to make that happen, I guess I had very strong support for it. On my next preference statement that an officer submitted every so often in those days, I said my first preference was to continue in my present work and in the same circumstances with the Los Alamos laboratory, that I found it a marvelous learning experience, and that I felt that I could be useful there. And that seems to have worked and so I stayed for four years.

Now I took you back there a little bit but I want to get back to the work you were doing later with the Los Alamos people when you said you were going out to Enewetak for this first Congressional appropriation with DNA, I guess.

And I guess I did skip around and we were back before the time that they had any cleanup funds. *But that's good because you made a good point there.*

But yes, I had by that time gained some reputation among the civilian components of the [00:45:00] laboratory—not only does this man understand and have experience out there, but he has an empathy for it that is valuable [that] we should treasure, we as the laboratory. This is something that we haven't seen in the military. You're going to have to polish that.

Well, you said it nice and straight, so that's fine.

I had made it clear that I was prepared to devote my life, with whatever suit on, to devote my life for the next how many years to improving that situation because I felt that it was a moral obligation of our country. And I thought that there were a few people who understood it but far too few, and if I could participate and inspire other people and sell yet other people, I would be doing something to be satisfied about and rewarded about.

Well, that happened, and I can't define when things switched and in which direction except that I became known in the Los Alamos group as, first of all, a potential Los Alamos guy who could do things that the laboratory would be pleased with and proud of, and at the same time that I cared about the Enewetak people as far too few people did. I went back there a couple of times under those Los Alamos auspices while we were doing cleanup efforts, but I had spent a great deal of time with the Defense Nuclear Agency people whom I understood to be entrusted or soon to be entrusted with whatever we did about cleanup. And so I met all of the senior people of the DNA, Defense Nuclear Agency and its arms, and I think they believed me. I think they maybe even wished that they had the wherewithal to support me more than they had had before. I got some converts I guess is the way to say that, and it was wonderful to see that emerge as a part of the mission of the Defense Department out there. And we got money into the appropriation. I met all of the commanders of the Defense Nuclear Agency and of the field command of DNA and of their Pacific office and the incoming directors of their operations who were usually Army colonels. I was on a par with them certainly in a lot of ways and we spoke the same language and they understood what I was doing, and many of them I think were somewhat envious, wishing that they had the freedom that I seemed to have to go into things like this. Where does that show up on your job sheet? Well, it didn't. Of course it never did. Wonderful days. I slept well at night, had not many disagreements with either Washington or Enewetak. I suppose I'm telling a secret that might bear heavily on my counterparts in future years but I had found ways to beat the [00:50:00] system and to use the job that I had and the resources that were provided for me, not use them improperly but to shift their direction enough so that in doing what our government needed, we could also benefit the people of the Marshalls.

During that time I sat in on many of the councils of the Enewetak people and the Trust Territory Government and was welcomed in those. I knew the District Administrator and I knew the other members of that hierarchy, and some of them felt that I was like a brother rather than a government agent. I treasure that still. And they gave me to understand that I was welcome in their community anytime, that I seemed to know their life philosophy and to know their needs, to care for them. And so I make no bones about it, I bent every rule and law that I came across to try to make it apply to this group of people and to persuade. When senior came out, I didn't care how many stars they had; I would talk to them about this obligation of our country. And it got across to certainly most. Not all, but most. Every director of the Defense Nuclear Agency—this is a three-star job—every director invited me into his inner circle and treated me as an equal. I don't think I ever took undue advantage of that, but it sure did help to have that entrée in Washington, in Albuquerque, in Hawaii, and on the island. I was on a first-name basis with every director of the Defense Nuclear Agency for I guess twelve years, and when they had a serious decision to make that might have an impact on the people of Enewetak, I was usually called in to join their deliberations. And if it was in a testimony in the Congress in Washington, to testify in behalf of the people of Enewetak or in behalf of the Director of the Defense Nuclear Agency, to give the Congress my best unbiased opinion. A wonderful feeling.

You asked me earlier—well, perhaps you didn't ask the question but we came to the question of how did I feel when I didn't make brigadier general in the Army. That was so far behind me at this time and I was so grateful that I had made the move that I had because I never felt a greater sense of being needed and of accomplishing what was needed, really in my entire life. Not in Normandy, not in any of the other jobs that I had had. Never did I feel more strongly

that I was serving whatever God I worshipped, whatever principles I inherited from my parents. Boy, I slept well at night.

That's a long-winded introduction to something, but that was the way I came into the [00:55:00] Marshall Islands for my second time, first time being to go as a bomb tester and the second time to see what we could do for the people. I was on the platform as an honored guest when Enewetak was turned over, the operation and management and the totality of their islands was returned to their chief, [Iroij] Joannes Peter. You've got his picture over there. You'll see it again; if you haven't looked at it already, you'll see it again. I guess I was the only one on the platform who was there because he had voluntarily gotten into this difficult situation and been gratified every day of it. Three-stars of the Army, two-stars of the Navy, all of the brass from Washington, Assistant Secretary of the Interior, and then there was Mr. Ray. No title, just Mr. Ray. And I did get a chance to say a few words, which I did, but I got a chance to listen to words that it would embarrass me to repeat now, even if I could. It was I guess the day that I got the most heartwarming welcome and greetings from the Enewetak people, and from the troops that were there as observers who knew what I'd been doing but didn't really know what it was all about. If there ever was a day to mark down as a triumphal day for a person like me, that was it, when we saw these people have returned to their self-determination, their rightful property, and with the pledge of the United States Government that every required resource would be made available to see that their lands were restored and that their civilization was rebuilt. I think we spent forty million dollars in restoring what probably would've sold for a million dollars before we ever got there. But we had done damage. We owed those people a great deal and we returned it not lavishly, just they now had a church, they now had a school, they now had housing, they now had a dispensary, they had boats, they had a pier, they had all the facilities such that they

could move back in and not live an American life, live a Marshallese life with the things that they really needed and that God had given them a long time ago but that had been denied them for so many years.

I guess I'll stop there and give you a chance to ask a question or start me in a different direction.

[00:59:23] End Track 2, Disc 3.

[00:00:00] Begin Track 2, Disc 4. 10/30/05

[Recording resumes mid-sentence]

—association. Here were people who went into that arena not for personal gain, not because you could make a million, not really to better themselves, but because they felt the mission and the need. We were in a race with the Soviets that was believed in by most of these people. Some of them believed on one side. I won't say that. We all believed on our side, but some of them had great differences, strong differences about how these could be dealt with, and that led to presidential politics and Congressional politics and the bias of the newspapers. We had some heated arguments. It was fun. [Pause] —gratifying experience.

You know, something occurs to me as you're talking about these two periods of time, so let me ask you a question to try to get an understanding of how you reflect on it now, looking back. I'm going to summarize a little and you tell me if I've got it right. You've got the early days in the Bravo days, the Castle days out on the island and your opportunity to be with these extraordinary people, government, science, contractor, a lot of gifted people. And then later when you're in the position that you are that you've just be discussing with me, you say, But we haven't lived up to our commitment to the original people that lived on this island. Now from all the work you did on it, how do you understand how that happened? Where was the responsibility for that on that continuum from when Castle was going on and then

those, what, twenty years later, I guess, you're looking at twenty years later, when you look back and see, hey, wait a minute, we didn't live up to our commitments here. How did that happen, do you think?

I'll have to ponder that a bit. I do feel that our government as represented by the senior people who were on the ground and making decisions, that many of the decisions that were made were driven by the enormous, crushing concern for what would happen if the United States did not prevail over the Soviet Union. And I think that most of the people whom I knew who had any real awareness and consciousness of this at all felt that that concern must dominate our actions and others could be dealt with later when we had that stabilized. I think that required us to take that position, required I think a strong faith that in part because we knew we were right, we [00:05:00] would prevail. I don't know what—well, there's term for that. It's destiny and it's our confidence in what is, what we believe to be our destiny. Somewhere in there a personal religion, a religion of commitment to right over wrong, to truth over falsehood, to care for rather than just care about. These principles in some form I believe exist in the mind and soul of every man. How they come forth and when, how they are provoked and invoked, and then how we choose and how much we're willing to give of ourselves and maybe our wellbeing to preserve that concept is for me one of the most important measures of the person. I don't know if that answers what you're asking me.

You did answer what I was asking you. So let me move to something else that's related to this, based on what you just told me in the last hour, which is it'd be wonderful in the time that we have left, this last session of this wonderful long weekend you've given me, is to have a clear sense of the kinds of specific activities that you did in service to this moral obligation you felt to the islanders. For example, I know that there was a trip, because I think it was Dotty [Dorothy]

Grier who said that correspondence that you and many people took over in 1982, there was a series of things that you actually did to achieve this goal, and as much as you can just help me understand what some of those were, that would be really good.

That's one of my prouder accomplishments, by the way, because I set that trip up and managed to get it supported so that we could extend the invitation to Herb [Herbert Grier] and others.

So tell me a little bit about how that all came about.

I think I probably was talking with Bill Ogle when this idea first came about. And I told him that I thought before some of us old codgers left the scene, we needed to find out or find a way to set a course for the future such that the organizations we then represented, as they changed hands to other people, would have had the opportunity to see what was there. And to take back to their management at home, to their directors and their chiefs and so forth the message that we owe [00:10:00] these people an awful lot, and if we don't do something to start it in that direction while those of us who witnessed it are still alive, it probably won't ever happen later. I think that was the sense of the discussion that I had with Ogle in Las Vegas on one of the many evenings that he and I spent, just the two of us. Bill knew that I was in the islands quite a bit and he regretted that he had not been there for quite a while, but he had a love of the people and a consciousness of their needs. And I said, well, let's go out there, Bill, and let you get refreshed. And while we're at it and we're going to do that, let's get some others to join us. And we started scribbling names and asking others on that list to, first of all, comment on the idea, the idea being simply to refresh our memories about what the people were and what they needed and what has happened to them and what has the United States done in their behalf in the last ten years and what's to be done in the next ten or however many. That soon caught fire and we had certainly more applications that we could stand and could handle. I thought that we should shoot for a group of the order of twenty-five people. Any

more would be hard to get accommodated on an airplane and to get accommodated on the island and to move around in the island. If we got 150 people, a few would be pulled out to go and do one thing and a few something else. We didn't want that. We wanted to have an opportunity for an exchange to go on twenty-four hours a day. Go back to Building 103 on Parry Island and sit down there on the edge of a cot with the same kind of people that had been there before and after we had had a day of looking around at what was there and see who had ideas. And Herb Grier was, I suppose, pretty high on that list. I mean we picked him, we invited him very soon, and to my surprise to some extent he became quite an activist in it. He felt that it was a wonderful idea and let's do this and let's do that. We felt that we owed it to people like Norris Bradbury to invite him, although we knew that he was not in good health, not very strong as a traveler. But we felt that he deserved to be considered what he was, a caring man who had great leadership strength and if he just said something that he hoped would happen someday there, it would have a great deal more impact than if it just came from some unknown. So the list was rather arbitrary to start with and many people started to hear about it and ask if they could be accommodated.

But that's about the way the trip started. It certainly was not a picnic but it was a rewarding thing and gosh, when we got back to Honolulu where we separated then to go our [00:15:00] separate ways, the last night I'm sure we all were regretful that we weren't going to stay together and be together again for some time, but it was very clear that some of us wouldn't be there in another year or two. I was fortunate enough not to be one of those who was thinking that way, although others not very much older than I disappeared pretty soon.

It was nothing official, it was nothing very well organized. It was well organized but I defy anybody to find out who paid for it, or for that matter, where the reports went.

Well, that's what I was going to ask you.

I don't think anybody wrote a formal report. We had a young man whom I'd never met, and I've forgotten what agency he came from, probably from Washington, and he was taking notes all the time, and I assumed him to be not a self-appointed historian but a historian of this group.

Was it Roger Meade? Roger is the Los Alamos archivist.

I think you're right.

And in the stuff [correspondence] that Dotty sent me, I know Roger, I'll have to ask him about it, in the stuff that Dottie sent me that I sent to you, or I'm not sure I sent it to you, there was a little note from Roger to somebody, and I wonder if that's who it was.

I think you're right..

I'll ask him about it.

It's been quite a while.

Twenty-three years.

Yeah. My memory recall is not nearly as good as it ought to be for that long ago. So many wonderful things from that era.

So when you're going around the islands, you're assessing, discussing, reminiscing, all of the above?

And we met with some of the Enewetak people and with the administrators of the place at that time. I guess they were probably DNA people, Defense Nuclear Agency. But mostly we were observing and talking among ourselves. Each one of us had had some contact with the situation sort of continuously since the test days in different ways. I was on the ground quite a bit and of course was a source of information for those who had not been out there at all in twenty-five years or twenty-some years. Others were in Washington and had a firsthand knowledge of the

way the wind blew there for issues like this. I think we probably had a good distribution of bureaucrats, scientists, movers, writers.

Was there a look on this trip—I'm asking because I haven't had a chance to look at their paper to the Health Physic—was there a look on this trip of fallout effects and things like that in the islands as much as—?

I wouldn't say so, no. We'd looked at the condition of the islands and their likelihood of recovering. We went to Bikini briefly and Bikini was a shock to many. Nothing was growing. The people who were there were not raising crops. They probably couldn't. The land was so [00:20:00] denuded of vegetation that it was going to take, without a great deal of engineering help, it probably would take fifty years for it to recover. In fact I'm not sure it ever will if it's not getting that help now. And that's a whole different story and I feel bad about Bikini too, but I don't know that there's anything reasonable [that] can be done to improve it, and at least it was beyond my capacity to look at that as well as Enewetak. Enewetak was the place I felt that most deserved our attention. Even in the history books we forget that Bikini had been really devastated before our government ever started at Enewetak, before we ever started testing at Enewetak. Even before World War II was over, we had started experiments with ships there to see how they could withstand various kinds of damage, and not very long after the war we detonated a couple of atomic bombs in Bikini and sank ships there and damaged others in order to be able to look at the extent of the damage and repairability and recoverability and that sort of stuff. Navy entirely, I guess. I was not around at the time.

Sure. Let's pause. OK, we're back.

The position of chief is one that is inherited father to son. And there were two groups of people at Enewetak, very closely associated and very closely related. But I guess that it was probably

logistics and communication that led to their being two rather than one. It's a pretty big atoll. And the chief of the Enewetak people was a senior position, and his name when I was there was Joannes. His wife was Bila. Their pictures are both on that board. Joannes had a son. Originally when I first got there, he had a brother who was the chief of the Engebi people, the northern group of people. I never got to know him very well. He died early in my time there. As a matter of fact, they weren't even on the atoll in my early years there, but they were much more concerned with their own islands and their own group of people and we had not learned to communicate well with each of them, had not even learned very well their relationships to each other.

I first began to know Joannes Peter I suppose just about as we were to start the cleanup of the islands, and when we had a small group of Enewetak residents who were brought back to live [00:25:00] there and be our advisors and councilors on what was to be done. I did not have responsibility for doing any of the cleanup, but the man who did have that responsibility was an Air Force major general, Director of the Armed Forces Special Weapons Project in Arlington [Virginia]. He was later succeeded by Rear Admiral, later Vice Admiral Robert Monroe. Bob Monroe was the one that I had most dealings with because he came along just about at the time when we really had to make some commitments and decisions, and when I began to feel comfortable with my relationship to that organization, to the Defense Nuclear Agency. The Energy Department did not provide funds for the cleanup. That was entirely provided by the Congress to the Defense Nuclear Agency, somewhat to my regret later because had we shared, had we both gotten a mandate from the Congress with the dollars to go behind it, we might've had more equal shares. But that didn't bother me very much nor for very long because I wasn't part of either one. I was sort of an independent and had been turned loose by my boss in Nevada

and in Germantown, the DOE structure, and I was made a Deputy for Pacific Operations which gave me all of the authority of the Department of Energy to carry with me out to Enewetak.

I soon found that Bob Monroe was somebody I could really talk to and that I would listen to him too. We became very fast friends in this process and still are. True, he had the dollars and controlled the dollars but, and these are his words, [that] I had the knowledge, and he always told his subordinate commanders, the intermediate commanders and those down to the those heading up the work force that any request from me, if it was legal, was a command from him. Really, truly, that was the way Bob Monroe looked at it and I accepted that very modestly but with great pleasure because I knew that it would work. And it did. And they sent some splendid people out. In fact, that was the key to our relationship, that he always made sure that he sent some very fine colonels to take that position out at Enewetak and made it clear to them that I had a very strong and important voice in what they did.

That became a very good working arrangement. I don't think we ever had a significant dispute. We had lots of fun because one of the colonels we had, they had a very short tour out there, about eight months I guess, one of these colonels was really, I hope you will either delete it or not put it on the record but—

OK, let's pause. And to this Joannes Peter, I'd like to know a little bit more about what that— you had a pretty strong relationship with this man?

Yes, I did, very, very much so. I was the senior American representative on the atoll whenever I [00:30:00] was there. I had domain over not just our own people but by virtue of a memorandum sent by Admiral Monroe to all of the DNA people, I became part of their chain of command too, and if I had reason to call them on something or to request something of them, Bob Monroe said essentially, That's a request from me. So that's pretty good horsepower to have with a

military organization. And they all knew I was a colonel when I left the Army and they knew that I understood what it meant to them. They were all extremely good people, but as always you have a few in any bunch that either don't understand or—I don't think I saw anybody defiant in that sense but just who didn't really get the big picture. And I was a permanent fixture. I was out there for almost thirteen years on this job while they were rotating in a year, and so it was very clear that I knew more about Enewetak than all of them put together on most subjects.

So you would be like the equivalent person for the hierarchy of the Marshallese?

Yes. And Joannes Peter, the chief, and his nephew who was the chief of the Engebi people always considered me the chief of the Americans. I never claimed that or even acknowledged it outside his hearing, and I think nobody resented it, even Admiral Monroe [would say], *How's it going, Chief?* to me. It was a very comfortable situation because he backed it, and they knew that I was there, had been there longer than they. I had of course been there in the test days, so my experience with Enewetak went back twenty-five years and I was there for months at a time, although most of the time I was there for a few days at a time, but I would go out for a couple of weeks and always have a senior representative there when I wasn't.

So you feel during this span of time that you accomplished the things that you had hoped to accomplish? Were there things that you wanted to do that you couldn't do or conversely things that you accomplished that you hadn't expected to accomplish?

I think there were both, but I think in the overall it was most gratifying to see that we did what we set out to do. Sometimes we took a circuitous route, sometimes we had to temporarily change our goal to one that was achievable and then take the next step, and that probably meant that the goal we had set was a little too ambitious at the time. And we did complete a forty-million-dollar project of getting all of the hazardous materials off the islands and deep-sixed in the ocean, of

restoring the land to agriculture. There was only one island that we had to leave under restriction because it would've taken an enormous amount of money to restore it and then it wouldn't have been the same island; it would've been building a new island.

Do you recall which that was?

[00:35:00] Yes. Runit was the name of the island. And it remains the repository of a lot of the contaminated materials which were buried in one of the bomb craters and covered up and put a concrete cap over to cover it and left so that it represents no hazard to a casual person who might go ashore for good or evil, just mostly to just go exploring and that nobody would inadvertently come into contact with any hazardous radiation.

But we did accomplish what we set out to do. We built houses, nice houses, with an outside contractor coming in and doing the heavy work, and then the people made their own efforts to decorate them as they wanted and have them fitted out as they wanted. And they built their gardens and settled their families in them. I think they were quite happy and quite comfortable in them. We built a school, nice, quite typical of the Marshallese school, an open-sided place with just a rain shelter for the roof, but a nice place. It was leveled and it had blinds you could roll down if the winds got too bad or the weather was otherwise unfavorable. Play areas for the children. A fine church that we built out of the profits from the PX [Post Exchange] that we established when we first went out there before the people arrived, and all those profits came of the money that the soldiers spent who were in the cleanup effort, and they knew it and they were pleased with it. And it was a very lovely church. It had a bell that was bought with those funds also, the first time they'd had a bell in the steeple of the church, I guess, and it could be heard all over the island.

And we had a ceremony there to dedicate it on the same day as the formal turnover of the administration and operation of Enewetak passed from U.S. Government to the Enewetak government. And I was fortunate enough to be on the platform for that, as was my boss and my Washington boss also and then we had the Assistant Secretary of the Interior, a couple of other Washington people, and then many of the senior people in the administration of our effort.

I have come back only one time since that time, and I wish I could go again. It seemed to me in a very short visit that we made that they were doing well, they were comfortable, and they were happy. I know nothing about the economy, nothing about how much the Trust Territory must put into their economy to make it work. That was beyond our responsibility, although it certainly was within our sphere of interest because whatever local economy they had had to come from the fact that we built piers and that we helped to fix up their boats and made a boatyard for them to do their own repairs, we built a power plant to operate that and also to operate their community facilities up in the town. A lot was done with volunteer work from our [00:40:00] people and their people, and a lot was done with donated funds.

I think the whole thing was done with a spirit that our country could be pleased about. Whether it was sufficient to offset the hurt that we did to them over thirty years, that's for them to decide and others to decide. And I think I know the answer, no, it isn't, but I don't think there would be a way to do that. That was the hand that Fate dealt them, in some ways of looking at it. I think that those of us who were down closest to it during the test days and then during the cleanup days had a warm feeling when we turned away from it, walked away from it and said, well, we've done about all we can right now. It's still up to the Trust Territory to keep an eye on it. It's still up to the government of the Marshall Islands which had just been created, their new president and their legislature. I knew the president, I knew many of the members of

the legislature, spoke with them, and spoke to them on more than one occasion, and invited their participation in every serious decision-making meeting that we had.

I think we can never do for the people of Enewetak or the people of Bikini enough to repay them for what they did for us. I think it's just not humanly possible to plan efforts to make up to these people who are there now for the hurt that came to their parents and their grandparents who are long since gone. I think there's plenty more that should be done, could be done, throughout the Marshall Islands, in fact throughout the Pacific, but that's a much bigger problem than I was able to get my arms around in the short time that I was there. I think that we did honorable things with the resources we were given, and I guess that's the most I would ever dare claim.

Let me go and introduce you to Joannes Peter.

OK.

At this point, Roger Ray shows Mary Palevsky his collection of photographs and artifacts related to Joannes Peter.

[00:43:08] End of Track 2, Disc 4.

[End of interview]

BLUEGILL. . . PRIME?

Oh Johnston's lights have seen strange sights
But the strangest they'll ever see,
Was the night when Thor would fly no more
And scattered us with debris

There was no moon the nineteenth of June
No white cap marred the sea,
And for old Iwo it was time to go
When we manned the JCP

The minutes rolled and the hours tolled
In April Weather's song,
And the count looked good but we knocked on wood
For now it wouldn't be long

The pods were hung and tight they clung
And the missile stood proud in the night,
With never a pang the telemetry sang
And promised a glorious flight

The ships at sea and the planes were free
And the sky was crystal clear,
And at minus fifteen all lights were green
As liftoff time drew near

The tracker here on the Johnston Pier
Had her radars both in tune,
And hovering high in Johnston's sky
Was the Navy's big balloon

Then out of the night came a wondrous sight
And "Lift Off" echoed far,
And a rumble came with the orange flame
As the Thor picked out its star

And straight it flew to the inky blue
And we knew we had finally won,
For the Thor would fly to the top of the sky
And light it up like the sun

But then as we watched our hopes were scotched.
And the blood ran cold in our hearts,
With a hell of a roar there was no more Thor
But a sky full of shattered parts

There were sheets and struts and bolts and nuts
And pieces that weighed a ton,
They scattered down on our little town
And the Lord must have steered each one

For though we feared when the dust had cleared
We'd find a corpse or two,
The worst thing there was a proper scare
And a laundry job to do

Oh Johnston's lights have seen strange sights
But the strangest they'll ever see,
Was the night when Thor would fly no more
And scattered us with debris