RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY

NEW BRUNSWICK

AN INTERVIEW WITH GEORGE T. REYNOLDS

FOR THE

RUTGERS ORAL HISTORY ARCHIVES OF WORLD WAR II

INTERVIEW CONDUCTED BY

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Shaun Illingworth: This begins an interview with Mr. George Reynolds on October 29, 1999 in Princeton, New Jersey, with Shaun Illingworth, and …

Sean Harvey: Sean Harvey.

SI: Mr. Reynolds, first I would like to thank you for consenting to this interview. And I was wondering if we could begin. … Could you tell us a little about your family, your mother and your father, and their origins, and where they came from?

George Reynolds: Well, my father was born in 1871. So he represents a link, for me, with a rather distant past. And to me it's very interesting. My mother was born in 1884. Her maiden name was Laura Lee, from a Trenton family, as was my father. My father's family had originally come from England, probably West England, and settled in farms in the Imlaystown area. Some of them, as the family got bigger and the farm didn't, moved into Trenton and became machinists. My grandfather, my father's father, was a machinist, and was seriously injured in mill accident in the Roblings Mills, and had to stop working. As a result, my father had to leave school at the age of thirteen. That was the end of his education, but he always cherished the idea of going on. It was a large family. He had three sisters, and two brothers, and he was the oldest, and went out to work as a telegraph operator. Actually, he went as a messenger boy at the age of thirteen and fourteen, in the Pennsylvania Railroad Telegraph Offices in Trenton, New Jersey, where, in his spare time, waiting for messages to be delivered, he would learn the Morse Code. One night the regular operator came in so drunk that he couldn't function, so my father took over. Of course, nobody knew who was tapping the key at the other end of the line, but reports came back that these transmissions, that particular night, were exceptionally good. So he got the job as telephone operator. From there he was transferred to Jersey City, which was more of a hub in those days, for the Pennsylvania Railroad, and he worked on the Pennsylvania Railroad until he retired in 1936 … at the age of sixty-five, having become the Assistant Freight Trainmaster in the New York Division. [He] always loved the railroad, and spent fifty-one years of his life actively on it, and left me with an appreciation of the importance of mass transit in the country, too. I'm just sorry that they are not doing more of it these days. My mother, similarly, went to what is now Riders University, but then was Riders Business School, and became a first class stenographer, worked with the New Jersey Department of Geology as a secretary, and is mentioned in several of their annual reports. In the forwards of those, her work is acknowledged. She also had a couple of siblings to help support, and did not marry until 1912, to my father, at which time he was forty-one years old. I was born in 1917, in Trenton. Soon after that, I guess I was two years old, we moved to Highland Park, New Jersey, and that's where I lived my early life. I went to NB High School. We had Franklin Junior High School in Highland Park that went through the tenth grade. I had a great time there. Had a lot of fun. I was president of Student Council, and was on a couple of teams. Never won a letter, but always in the locker room trying. Then we had to go to NBHS, New Brunswick High School, for eleventh and twelfth grades. By the time my wife came through Highland Park had it's own high school, but I spent my last two years at New Brunswick High School. My father's main ambition was to live long enough to see me through Rutgers. No other college was ever considered, for several reasons. One, that's the one he knew about, and it's the only one we could afford at the time. These were Depression years. I was particularly lucky. When I was a high school senior I learned that there was an opening for a field hand in the New Jersey

Agricultural Experiment Station in the Soil Department, and those interviews were to be started at 8:00 in the morning. These were Depression years. This was 1935. Having heard that the interviews were to start at eight o'clock in the morning, I got there at 7:30. I was first in line, and I got the job. And I had six very fine, wonderful summers working in the fields associated with the Soil Department in the New Jersey Ag School, Experiment Station it was called then. Just a field hand, but it was great stuff. I had a lot of outdoor activity, and a lot of good physical exercise. After I graduated from New Brunswick High School I entered Rutgers, supposedly to major in geology, which was a field that my uncle was very active in, in the State Department of Agriculture, and the US Department of Agriculture afterward. However, I soon ran through the undergraduate courses in geology, and by my second year I was taking graduate courses in geology. I did take the physics course, which was the toughest course that I'd ever experienced. Since it was such a good challenge, I thought, "This is for me." I liked physics. And I majored in physics, and never thought of anything else since. I came to Princeton University for graduate work in 1940, in the fall of 1940, and was assigned to a wonderful fellow here, Professor Bleekney, who was my mentor in the early days. And we started working on the mass spectrometer, which was probably one of three in the country that was turning out first class research results. I was assigned to that as a research assistant. I had to take four courses in those days, and being a research assistant at thirty hours a week, didn't leave much time except for physics. However, NJC was convenient and there were dates. But even so, the work was very demanding here. By the spring of 1940, and the fall of 1941, it was clear to the faculty here in the Physics Department that the US was going to be involved in the war. In 1940 we were involved with a program sponsored by the National Research Council, the NRC, to do bomb damage analysis, and what is called "exterior ballistics studies," that is, "What happens when a projectile hits a wall or ground?" It was called the … CPPAB, Committee for Passive Protection Against Bombing, whatever that turns out to be. … Our object was to design air raid shelters for Great Britain, which was under terrific siege at the time. This went on until about 1942, when we were doing field tests, full-scale field tests, on the effects of bombing on structures above ground. Although I still took the courses, and did a thesis, and got a PhD in 1943. The main activity of life was, to be involved with the war. We had, in 1942, a program of several months at the Aberdeen Proving Grounds, studying the effects of bombs on German structures. In 1943 the emphasis had changed, … from defense to attack. We had a program in Camp Gruber, Oklahoma, near Muskegee, Oklahoma, to study the effects of bombs or detonations on the pillboxes on the beaches of Normandy, because there was planning for the invasion by that time. At that time, 1943, I felt really, that anything I could do from then on was not likely to affect the war. There was too much of a lag time between the research in the field and the application to the war front. So I determined that I wanted to be in the US Navy. Because of connections here at Princeton, I knew of a Navy program called DOLO, which was "Demolition of Landing Obstacles," D-O-L-O, but they didn't allow civilians in it. It was classified that way. I applied and got a commission in the Navy. Through connections here, I was on my way to assignment in an amphibious warfare training program, and was looking forward to it. I liked small boats, I was young, I wanted action, I wanted involvement, I wanted immediate results. An impatient young person, that's all, and I was quite content with that assignment. However, in the meantime, back in 1943, I had been "asked" by Vannevar Bush, who was head of the OSRD [Office of Scientific Research and Development, and James B. Conant of Harvard University, who was head of the National Defense Research Council, to go West and work on a project that several of my acquaintances here had already gone to work on. Everybody knew what that was.

However, I didn't want any part of it. Not for any moral reasons, it was all right with me, but I wanted the action that the amphibious warfare training promised to me. But I made a mistake. I was summoned to Washington, and I was interviewed by Conant, and he said, "You know, you're the only one that we've been trying to get that has refused to go there. And I don't think you're very patriotic." And that's where I made my slip. I said, "It's not that I'm not patriotic. I've got myself a commission in the US Navy." Well, I had, in the meantime, married Virginia, and we were living in Trenton. She was a Library Science graduate of NJC, and a librarian in the Trenton Public Library. We were working away as a young married couple, when I got my orders that looked like I was going into the amphibious warfare training, and everything was set up. So, and the date was June 15th, or something like that. So we took a room down in the Jersey Shore somewhere to have a vacation on our last weekend together for a while. We got back to my parents' home, where we were living at the time, and there was a telegram that said, "Old orders cancelled. Proceed in four days to Santa Fe, New Mexico." So that got me to Los Alamos. I wasn't happy. I was assigned to the group that I knew were after me: a Harvard chemist, George Kistakowski, a very colorful fellow, who is well known to the history of the atomic bomb. He recognized immediately that he had an unhappy camper there. I went to his office at Los Alamos as soon as I arrived there. He said, "Hello, I'm glad to see you." And I said, "I'm not glad to be here." He said, in his Russian accent, "Oh, God! … What's wrong?" And I told him I'd gotten married, and my wife, Virginia, was down in Santa Fe on a street corner with our luggage, and I'd been taken by MPs into a car and brought up to the hill. Then I found the ruling was that military officers couldn't have wives on the site. Civilians could, and all my civilian friends were there from Princeton, among other places, and I assumed, of course, that I've have my wife with me, but I was technically a military officer, and it was against the rules. So Kisti got on the phone and called General Groves. He said, "Reynolds is here." And then he said, "No, that's not good. His wife is in Santa Fe." And then Kisti put his hand over the phone and said to me, "Any children?" And I said, "No." Then he said to Groves, "No. No children." And then he said, "Just a minute, I'll ask him." He turned to me and said, "Expecting any?" I said, "No." And he said, "No." The next day the Military Police got Virginia, and brought her up to the hill. So she was the only Navy wife there. And, of course, all the Army officers were a little unhappy, too, because they couldn't have their wives. Anyway, we got involved with the workings of what's called the "Fat Man", which is the Nagasaki bomb, and our particular assignment, or work, was to be the detonation system of the Fat Man, which was an implosion mechanism for the bomb. I was with a senior physicist from Harvard, a senior physicist from Harvard whose name was Ken Bainbridge, a very nice fellow and a good professor. We went down to Alamogordo, New Mexico, Alamogordo … later became Trinity, to decide on the site for the test, because, by then, I was considered a blast expert. Unfortunately, I'd been at Los Alamos for just a month or two, and there was a big explosion on the West Coast, the Port Chicago in the Mare Island Navy Yard, where an ammunition ship exploded. We had very few examples of large explosions. We'd done all our work with nothing bigger than 1000 pounds, half a ton. We were developing scaling laws to try to see what would happen if you got up to ten and twenty thousand tons. The ten and twenty kiloton region was the thing of interest for us, because that was the estimated effect of an atomic bomb. I went to Port Chicago, and spent about a week there doing every kind of analysis I could think of to estimate the blast effect of the ammunition ship. Using collapsed oil drums, knocked over telephone poles, windows dished in miles away, sides of railroad cars, all of which could be analyzed physically, mechanically, I came up with a ridiculous answer, which was that fifteen hundred fifty tons of

TNT went off. I said, “Fifteen fifty, plus or minus fifty." Today, knowing what I know about physics and the experiences that I’ve had in the field, I would have said, “Well, it’s somewhere between 1000 and 2000.” But not me, I was very confident of my work. When it was all said and done, and they got the bill of lading out, it turned out that there were fifteen hundred forty tons, so I was immediately considered an expert, purely by accident. Anyway, they decided to have the bomb test … at Trinity. However, I didn’t go and see that test, because I was held back in Los Alamos. If the test had been a failure we would have gone back to work. If the test was a success I was to go immediately, the same night, to Tinian, where our field assembly station was, and run through the same dummy runs out of the B-29s. I took quite a few dummy runs in a B29, by the pilot who ultimately delivered the Nagasaki bomb, a fellow named Sweeney, who was a hot-pilot. For some reason after each dummy run I got to sit in the bombardier’s seat, and Sweeney, being a hot-pilot, loved to come in at about a ninety degree angle to the field, and at the last minute, swerve off. And you thought every flight was your last, but he was good. In any case, after some dummy runs out there, in Tinian, and the field tests of the firing and all, the bomb was delivered. I was to go on it, and my responsibility was to check out the detonation circuits, until the last minute. Another junior officer, a lieutenant in the Army, was associated with Professor Brode's group from Berkeley, on the proximity fuse, which was used to detonate the bomb above the ground, because our work here at Princeton had shown that you got more effect from an explosion if you exploded above the ground, rather than at the ground. And my other thesis advisor was John Van Neumann who actually did the calculations for the height that the bomb would be exploded, based on the results we got here at Princeton. In any case, the Army man was to do the proximity fuse test, I was to do the firing tests, but at the last minute some VIP wanted to ride for the glory, or the whatever, and we had to bump one of us off the flight. So we drew lots to see who would go. We would each learn the other person’s job, and there’d be one fellow, and there’d be two jobs. We each learned the other fellow's job, and we drew lots. I lost, and he went, and I didn’t go. I was due to go on number three, which never went, of course. So in due course, when the war was over, I was held on Tinian until the surrender, and then, the day after surrender, was flown into Japan. The end of a long story was, we did bomb damage analysis at Hiroshima and Nagasaki, and the results were essentially as predicted. It didn’t seem to me at that time to be the horror that it was. It was certainly a horror. It didn’t seem to me that way, because it was just a test of our scaling laws, and it worked. Pretty cruel, but that’s the way I felt at the time. In the meantime, on a bus ride from the airport to some seaside hotel at Nagasaki, I happened to sit alongside Rear Admiral Richard E. Byrd, who was along for the ride. Everybody got in on it: archbishops, gentlemen, everybody showed up in Tokyo to get his name in the paper, or something. I was sitting next to Byrd, and he said, in a polite way, “What do you do?” I said, “Well, I’m really a physicist.” And he said, “Oh, I’ve always been interested in physicists. Talk to me about this.” Well, the end of that was, that night he went to General Farell, whose group I was in, and had me transferred to be his aide for his stay in Japan, which had its perks. When we got to Nagasaki we had sidearms. Days later, I walked down the street in Tokyo. Of course, if the same had happened to us here, we would have shot every Japanese we saw, but in Tokyo all they did was hiss at you. So I had a .45. When we got to Nagasaki there were only about six of us Americans there. We were posted in a hotel, and I put the .45 under my pillow, and the next day I heard this nice, heavy, bass voice, American, swearing at somebody, and it turned out that an Army unit had landed. As a result of that, and the fact that a hospital ship came in, the Admiral got himself quarters on the air-conditioned hospital ship, and of course, his aides went with him. So I spent my time in

Nagasaki on an air-conditioned hospital ship. I had to moonlight on damage analysis for whatever I could do. But it was fun being associated with a fellow like that. He was not arrogant. He was very humble. He said, "You know, people think I'm a scientist. I'm not. I just collect the data and hand it over to them." He just wanted to talk about physics, so we did. Anyway, in due course, I came back to Los Alamos, and then began planning the future. I had several offers. I liked the one at Princeton, here. I wanted to come back because I felt that my PhD training had been accelerated because of the war, and I knew that the best way to learn something was to try to teach it. So I came back here to teach physics, and I've been here ever since 1946. We came back in February of '46, and I've taught at every level here, graduate to freshmen. Plenty of freshmen teaching. We all do here. Everybody teaches freshmen at some time or other. I retired in 1987, and so I don't teach, and I don't have to go to committee meetings, I just do research. In the meantime, here, I developed a rather big program, and had lots of support from the Department of Energy. We had this graduate student I mentioned to you before from Vineland, New Jersey. He was a top graduate student. He stayed on the project. When I retired, he became principle investigator, and I moonlighted off the project, and did the kind of research I was interested in. A couple of years ago he got an offer he couldn't refuse. He's now director of the CHESS program at Cornell University. CHESS stands for Cornell High Energy Synchrotron Source. It's a big, big activity. He's got a big group, a very important position. I can't deny he earned it. My present work is associated with condensed Master Physics, as it has been ever since I was in high-energy particle physics, which is what I got into when I got back here, starting with Cosmic Ray Physics. That went into the accelerator physics, and is in the detection of weak light signals, whether from ionization of particles in counters, or whatever. Then, about five years ago, some people having discovered the deep-sea hydrothermal vents at the bottom of the ocean, in both Atlantic and the Pacific, using a CCD, Charge Couple Device camera, found light there, a weak luminescence. The ONR, Office of Naval Research, asked me to join a panel to consider this light. And I have stayed with that. That's what I do mostly now-a-days, trying to discover more about the sources of light at the bottom of the ocean. It's very interesting stuff. So, since 1963 I've been going to the Marine Biological Laboratory in Woods Hole, Cape Cod, and the Woods Hole Oceanographic Institution there at Woods Hole, in Cape Cod. I had a lab for a number of years, but then, when my funding stopped, when I retired, I had an office there, but I talk to the people in the labs. I do my research here during the winter, and do mostly writing, and consulting with others up there during the summers, and have been doing it ever since. So that's the professional aspect.

SI: Could you tell us a little bit about your family, your wife and your children?

GTR: Well, I have the most wonderful wife in the world. There's no doubt about that. She's from good Scottish heritage. She's been a wonderful wife and mother. Very understanding when I first came here, of course, as assistant professor. There are very few people who get tenure here, especially in physics. This is a fairly well-known department. Assistant professors were working eighty and ninety hours a week. They had to teach and they also had to do research that was internationally competitive. Some of us are still here. But she put up with all that, did a wonderful job, and we have four sons. We went as a family to England on sabbatical, to the University of London, Imperial College, 1955 to '56, and we had a great year there. We had three children at that time. And then, later, we spent a year in Cambridge, in 1973-4, at which time we had four children, but three were occupied other places, so we only had one, the

youngest, with us in Cambridge. Then, later in the 1980s, we had several times at Oxford University without any children. I'm an Anglophile. I enjoy living in England. I don't like to go there for a week. I want to go there for a year; then you really sense the life, and we've had good years there. But going back to the children, when we were in Los Alamos, in spite of Kisti's remark to Groves, we did have a child. Two weeks after he was born I went overseas, to Tinian, and left Virginia there with a child: no telephone, no car, just a child. She decided not to go back to her home, but to stay, [and] stick it out. When we went overseas we were told it would take two years to train replacements for us, so we'd have to look forward to about two years away. Of course, the war ended very soon. But Virginia was there taking care, and writing to me about the child, and making me feel as good as possible, as she stuck it out there. Then, I came back in November of 1945, to Los Alamos, and then went to Princeton in 1946, February. We had our second child here in Princeton, third one here in Princeton, fourth one here in Princeton. … In the meantime, in England, we had an experience with the educational system. It turned out that, although we had expected to send our children to British schools, that particular age, they were training them for the Eleven Plus exams, and not really the kind of education we wanted. So we went to the … American School in London, in Grovenor Square. Fortunately, it turned out that the headmaster was a Princeton graduate, so he took our kids in after the date of closure. They had such a good learning experience in England, at the American School of London, that when we came back we decided that we wouldn't go back into public schools, where we had gotten wonderful reports from the children, saying were doing so well, which meant that they were clean and well behaved. It didn't mean anything about what they were learning, I think. They didn't test well in London compared to other children. I was associated with the embassy as well at that time. The embassy and Air Force kids who had been around the world getting their education, scored much higher than ours who had had Princeton public school education. So when we came back we decided that we'd go into Princeton Country Day School with them. That started a sequence in which our children had gone to private schools, except my oldest, who didn't want to leave home to go to boarding school. He said to us, "If you send me to boarding school, I'll take the next bus home." Virginia has always said, "If he said, 'I'll take the next airplane home,' we might not have believed him." But he was so determined that he would get back home that he would take a bus. So he went to Princeton High School, got to be captain of the football team, had a great time there. But when the time came for him to go college, I said, "You can't spend your whole life in one town, so you've got to go away to school." And he went to Wesleyan in Connecticut, and had a good career there, and went on to law school. Now he's a lawyer, and also teaching in St. Peter's College in Jersey City, enjoying life. He's had enough of litigations and adversarial relationships. He could afford to stop, and he did stop. The second son went to Andover Prep School and became captain of football there, and lacrosse, came back here to Princeton, majored in geology. I've always said that my kids were interested in science, but with all these zombie graduate students I bring home from physics, they were discouraged. Our kids were athletic, and interested in social activities, and didn't really respect the physicists. So the … number one son, at Wesleyan, majored in history, and then went to law school. Number two came here to Princeton to major in history. He was interested in foreign service, and that sort of thing. He had to take a science course, so he took a geology course, which was a gut course, really. It was called "Rocks for Jocks." Our Geology Department here [has] very fine men. They are field men, and they impressed my son very much. So he decided to major in geology, which he did. Then he went to Colorado to get his PhD, University of Colorado, and he's with the US Geological Survey, USGS, there in

Boulder, Colorado, for a number of years. Number three went to Andover, football captain, lacrosse, came here during the Vietnam War. He had a low draft number, very low. He came here, to this office, and we had a talk. He was majoring in biology, and he said, "I'm finding that biology is taking up all of my time. I play lacrosse, and I want to have more time at the club. I would like to switch to history." And I thought, "Gee whiz, here's a kid. I make him grind his nose here in some science or other, and he goes to Vietnam, gets killed, and how will I feel?" So I said, "Do whatever you want." And he had a great time here. He was captain of the lacrosse team. Graduated. We, in the meantime, had been in Woods Hole every summer. He was very fortunate. He had gotten a job as a crewman on a supply ship there, which goes out to get specimens for the laboratory, a great job, the best job there for summer employees. The oldest son, incidentally, who went to law school, was a summer cop at Woods Hole. But this number three boy got out on a boat practically every day. When he graduated, there is a little amusing story. Because he was graduating I went to the academic procession, which I had never done before. And I was along side a philosopher named Stuart Hampshire. Stuart Hampshire was a well-known philosopher. He's now master of one of the Oxford Colleges. He was alongside me, and out of the side of his mouth said, "I never saw you at one of these before." I said, "Well, my son is graduating." He said, "What's he majoring in?" I said, "History." He said, "How do you feel about that? That's not science." I said, "Well, I don't know whether to be glad that I didn't unduly influence him, or sorry that I didn't really get across to him how exciting science is." And Stuart Hampshire, the philosopher, said, "Yes, the parent is always guilty. Never clear what the charge is, but he's always guilty." He went to EG & G, which was a big international thing around Boston, got to be a contract manager, didn't like commuting, went back to Woods Hole. Found a nice little company, ended up vice president of the company. The president was Pete Lowell of the Boston Lowells, Harvard graduate, and Rob had a great time in this company. About two or three years ago … they sold the company. He joined another fellow, and they formed a new company. They're doing corings to study the environmental effects of various emissions in estuaries, which is what he likes. … They call their company TG&B, which stands for "Two Guys and a Boat," and he's having a great time. Number four son was interviewed for Andover. The interviewer said, "Well, David, we've got your uniforms ready. Hope you follow in your brother's footsteps." David said, "I'm not going to follow in anybody's footsteps." So he went to Lawrenceville. He came to Princeton and majored in geology, also. Now he's a senior geophysicist at the Exxon Research Labs in Houston. So that takes care of the family. Each one of them is married, and we have four grandchildren, five grandchildren, and everyone seems to be okay. They're very independent. We try not to let them worry about us, and we worry about them.

SH: Your wife told an interesting story, but only briefly, about how you met on a bus going to Dean Read's dinner party.

GTR: Yes.

SH: Would you discuss that a little bit?

GTR: Yes.

SH: She said you tell the story better than she does. [Laughter]

GTR: Well, I tell it just the way it happened. Unbeknownst to me, she was a friend of Dean Read's daughter. In fact, I think she was her junior sister at NJC. I was a friend of the Dean's son, Thornton Read. The Dean's son was an unusual person, in the sense that he was mostly self-educated. Very, very bright. First degree he ever got, I think, was a Master's in Math, from Brown. Anyway, I liked boxing a lot, and had been a fairly serious boxer in high school. In fact, I got to the end of the tournament, the final in what was the heavy weight class, and got knocked out. But even so, I liked boxing, and so did Thornton Read. We boxed together quite a lot. He … became rather good. He went into the Newark Golden Gloves. The *Newark Daily News* had a Golden Gloves tournament. He did very well in that. He was a good boxer, and we boxed a lot. Well, one night I was invited, because of Thornton, to Dean Read's house for dinner. Unbeknownst to me Virginia had been invited also, because of her friendship with the daughter. It was wartime, and we had very little gas, so we used the bus. I got on at one stop, and on the next stop this girl got on. I thought, "My gosh, I've never picked up a girl, but if I ever do, that's the girl I'd pick up." She went behind me in the bus, sat down, and I kept thinking, "Shall I go back there or not? What'll I do?" Well, time ran out, finally, while I was still debating. I got out of the bus, and got there first, because I was seated ahead. There was Thornton Read, overjoyed apparently to see me. And I thought, "Why in the world was he so pleased to see me, for goodness sake?" But he stepped around me, and was welcoming Virginia, who he thought very highly of. … He was welcoming Virginia, not me. There I was, to spend an evening, at a dinner party with this girl. I really saw nothing else from the time she got on that bus. I mean, I didn't see anything else. So, we had that dinner together. Then, because it was war, and no gas, the Dean's wife said, "Well, Virginia lives near you. Would you see her home so she doesn't have to go alone on the bus?" I said, "Well, I guess I can manage that." [Laughter] We got off at her stop, and it turned out she lived only about two blocks from me, from my parents in Highland Park. But because our ages were so different, we'd never been in the same school system together. I had never seen her until that night. On the way home, somehow or other, I managed to get hold of her left hand, and did a survey. I said, "I notice you're not wearing a ring." Now the only reason I said that was I wanted to know if I could date her or not. She claims it was a proposal. However, it did result in a proposal. So that's the way we met.

SI: From reading your wife's interview, it seems like your actual marriage ceremony was affected by the war.

GTR: Yes. It was forced to be scheduled around the fact that people were working all the time. The fact was, in my mind, although Virginia didn't know it, I'm sorry to say, I was determined to be a Navy officer during the war. That led to a relatively early marriage. We had known each other for about two years, but we decided to get married during the war. And everybody was getting married. It had to be on a Friday night because everybody worked, and it was a brief honeymoon in the Poconos. In that sense, it was affected by the war. Then we had an apartment in Trenton, and she was a librarian in Trenton, at the Public Library, until we were ordered to go to Los Alamos.

SH: So your interest in becoming a Navy officer, and seeing that action, outweighed your interest in physics enough to make you give up the science long enough to go?

GTR: Yes. Yes, it wasn't actually giving up science. I really thought I could make a contribution. The landing obstacles that faced our troops in the Pacific were devastating. Having this experience in what's called "exterior ballistics in bombing and detonations," I felt that I could do something about neutralizing these landing obstacles. I was young, very egotistical, but really thought it could make a difference. Since they weren't letting civilians in this particular program, and of course, we thought the civilians knew more than the … Navy, that was the way I could get into it. So, it wasn't really giving up science as much as it was in applying it.

SI: When you went to DOLO, were you going to work on how to effect the underwater demolition process?

GTR: Yes. Studying the nature of them, and based on our experience and tests here on land, we could try to see if shaped charges could do something that was related to the research that we had done. Probably very egotistical, unrealistic, but it was the idea. I was young, not very experienced.

SI: … My grandfather later went into that same field as a frogman, in the Pacific.

GTR: Really?

SI: Actually he was sent there at the end of the war. But he had a real sense of how dangerous it was and the casualties. At that time, did you have a sense of how that would be?

GTR: Oh, yes. Yes. But when you're young you're immortal. I had never felt vulnerable. But I admire your grandfather.

SI: Actually it was a mix up with the Navy. He didn't want that at all.

GTR: Oh, I see. Well, in any case that was the interest that I had at the time. Young, just the same way, healthy, didn't want to spend the war on a shady, green campus. I got away, but then, I was put back in research, and in the end, maybe did as much as I would have.

SI: Before you went to Los Alamos and you worked with the British to build the bomb shelters, had you worked with any British scientists?

GTR: Not at that time. This was a contract from some British ministry or other, to the US National Research Council, which in turn formed a committee for the passive protection against bombing, and then farmed out jobs to the different universities. We had a job here on air, Harvard had the underwater stuff, and I think Berkeley was involved also. It was strictly passive work, but we studied explosions.

SI: … When you were doing blast analysis on Nagasaki, Hiroshima, and Port Chicago, were you able to also get a sense of the effects it had on the people there?

GTR: Yes.

SI: Did you talk to any of the people who were bombed?

GTR: Yes. I saw people taken out of the water at Port Chicago, for example. There was one little amusing episode. The Navy had a court of inquiry. "How could this thing happen?" And some of my evidence, was involved. But I got to read the records at the court of inquiry. A particularly amusing one, (you ask how it affected people): there was a sergeant guarding the end of the dock where the ship was, hundreds of feet out, and they asked him, "What happened?" He said, "Well, there was this big noise and I found myself on the ground. So I turned to the corporal and I said, 'What in the world was that?' or words to that effect." That was in the Navy records. But I did talk to people. I went to the people whose windows were blown in, but it wasn't a social business. I didn't … talk to anybody like the television interviewers do. "Did you feel bad when you saw your baby burning up?" or something like that. You know, the way they interview now. I just went to talk to people to ask what the structure was like beforehand, or, "In what sequence did it happen?" But I didn't say, "Well, are you sorry that your little girl was killed in this, or not?" I wasn't a present day TV interviewer.

SH: You went to both Hiroshima and Nagasaki?

GTR: Yes.

SH: One was an implosion bomb and the other one was a gun method bomb. Is that right?

GTR: Yes.

SH: Did you see a difference in the effects between those two? Could you discuss the function of the two?

GTR: Well, the best way to get a feeling for this, really, is for you to read Richard Rhodes' book, The Making of the Atomic Bomb. The gun method, which was the Hiroshima bomb, was originally named "The Thin Man." It was really big and awkward to load into a B-29, so work went [on] under Captain Parsons in the Navy. He was the senior person in charge of the gun method, as far as the armed forces went. He was a fine man. They worked to shorten it, and they got it down so that it wasn't as long. Then they called it "The Little Boy." I've got a shelf full of reports and stuff like that, that I've never looked at. The Hiroshima bomb was not as high energy as the Nagasaki bomb. There was never a doubt that the Hiroshima bomb would work. It was never tested, it just worked. The Nagasaki bomb, the implosion method, was much more questionable. Much more questionable. That's why they had to have a test. In fact, they weren't even sure that it would work, and that's why I was held back. Because if it hadn't worked I wouldn't have gone to Tinian, but since it did, I went. It was more effective. It's all there on the shelf. … I'm not ashamed of it, or anything like that. It was the way to end the war. And it worked.

---------- END TAPE ONE, SIDE ONE ----------

GTR: … Walter Kautzman was at Los Alamos. I didn't know it at the time. He also was in another branch of Kisti's operation. Another physicist, here at Princeton, was on the initiator for the "Fat Man." I was concerned with the implosion electronics. We didn't know what the other was doing. We knew enough to know we should keep quiet. We did have meetings, Oppenheimer arranged meetings. So, we knew enough to know where we fit. Well, there were many interesting aspects to security. For example, … Virginia and I had a rare chance to get off the hill one time. We didn't have a car there, which was a great pity, really. Very few people did, but they had a much better time than we did. But we had a chance to get a ride down to Albuquerque one time. As soon as we got there and checked into a hotel, and noticed that we were not alone. There were a couple of people obviously watching us. So we went to the hotel, and at two o'clock that morning there was a fire in Albuquerque, and, "Oh, boy, here's real excitement." So we got up, and we were going to go to the fire. We got in the elevator. These two guys were in the elevator. So we figured we'd give them a little chase at two a.m. That sort of security was apparent. … We knew enough to know why we were there, and what the progress was, and all of that. There were a lot of things that we didn't know. For example, I played string quartets with Klaus Fuchs. … He was a very good friend of the people who lived in the other half of the house from us, who were British, from Birmingham. She was a violinist. She was first violin, I was second violin. They were close friends of Klaus Fuchs. That sort of thing was a surprise afterward. At the time though, he knew a lot, as we all did. We all could have transmitted information, anyone of us, particularly on schedules. For example, one time, because of the blast business, I would get orders that said, … (here's a typical order, but it's a particularly interesting one) "Proceed, vicinity Salt Lake City. Upon completion of duty, return." That's all it said. I knew there was a proving ground near Salt Lake City. It was called Dugway, that had Japanese houses. They were studying the structure of those houses. I was sent there to estimate what would happen to Japanese houses if a bomb went off ten miles away, or something like that. But I was told, "Don't reveal your orders." Because the fact that Los Alamos was interested in Japan was important, and that the time schedule was such that we were so interested that we were actually looking at Japanese houses. "That's classified information, so don't show your orders." Well, I went to the guard house at Dugway proving ground, which was an Army installation, and I'm a Naval officer. I said, "I'm to see So-and-So." "Let me see your orders," the corporal said. I said, "Can't show them to you." He said, "Got to see them." I said, "Can't show them to you." "Can't get in." "Gotta get in." I ended up in a jail cell, literally in jail. We had been told on these trips, "If you ever get in deep trouble, call this number." We memorized that number. So I thought, "Well, this is deep enough trouble." So I asked the guard, "Will you please get an officer to come visit me?" And in due course a captain or a major came. I said, "Would you please call this number and say that you've got Ensign Reynolds in custody?" Well, in about twenty minutes he came back and said, "Sorry, sir. Very sorry about this inconvenience. We have a jeep and a driver outside at your disposal." I never knew where the number went, but that's what happened; lots of little incidents like that.

SI: You mentioned that you were looking at Japan. Did you have any fear that you were competing with the German bomb project?

GTR: Oh, yes. Yes. We thought the Germans were a very serious threat at that time. We knew that there was Heisenberg there. I got to know Heisenberg after the war. He was interested in cosmic rays, and so was I. There was a lot of uncertainty, and enigma, about Heisenberg, and his

role during the war. But we did not have any way of knowing that they weren't well along in this. Many of the participants in the project, both at Chicago and at Los Alamos, were mainly concerned about Germany. A fair number of them were refugees, refugee scientists. They were very concerned about Germany. It turned out later that the Germans were not very far along, and that their main interest was in a reactor. But if they had gotten a reactor, they certainly would have gotten plutonium, … and so on. So we were in a race. And as far as I knew, it was a hot race. I was only twenty-five or [twenty-six] years old. But because of the particular status of a PhD physicist, I did know more than you might think. In fact, … I have orders here that show that a Lieutenant Commander Stevenson would be under the supervision of Ensign Reynolds in Tinian. So because of the Princeton PhD it was a little skewed. In any case, we knew, and when the Germans surrendered, a lot of the enthusiasm, especially among the refugees, and especially at the University of Chicago was very much dampened on the whole idea. But others kept going, without stopping. It was true that that threat had been removed. But, you know, when you get on a roll, you just keep going, and we did.

SH: You were in Captain Parson's division, and he was the head of ordnance at Los Alamos.

GTR: Yes.

SH: I know that a lot of the different jobs that they assigned were not necessarily in fields that scientists were familiar with, and you had to, kind of, develop things along the way, especially, you know, in the research that you were doing. Did you find that, with your assignments, they kept you in your field of specialty or did they branch you out into different places? What kind of jobs did you have while you were there?

GTR: The jobs I had were definitely related to physics. I'd had, of course, not just exterior ballistics and ordnance, I'd also had a good education here in nuclear physics, and was involved in gamma ray detection, or X-ray detection, and that sort of thing. I was, assigned projects directly related to what I could bring to them. Because I was basically unhappy at not being out there in the Pacific maybe a little special attention was paid to giving me stuff that was interesting. … I know there are stories about war experiences of specialized people who were given kitchen duty or something like that, but that did not apply at Los Alamos. In fact, they had this group called the SEDs, the Special Engineering Detachment, in which they would put bright young people from different universities who hadn't gotten their degrees yet, but were showing promise. They'd draft them, and send them to Los Alamos. There was a big contingent of SEDs. … Several happened to be in my group. One was a very amusing fellow. He was a physicist, hadn't finished his education, but was drafted. And he was not amenable to Army life. He was in the barracks, and he would do just about everything he could to annoy the lieutenant or captain who was in charge of his barracks. He'd get broken. He'd get promoted to corporal, he'd get broken, he'd get promoted again because he was good, and then he'd get broken for some infringement, his bed wasn't made right, or one time, he hung a bagel from the ceiling, and the officer came in, in the dark, and hit his head on it. And that didn't help. In our group I was the only officer, military person. The others were all essentially from Harvard, plus a couple of British people. In our group we were amused by this GI, and we counted up all the promotions that he had gotten. If he hadn't been broken, he would have ended up a brigadier general, if he'd gotten all the promotions and not the breaks. Well, he went on to be a full professor at New

York University, Physics Department, very important in the American Physical Society, but he was a card out there. But they did assign people jobs related to their expertise. They had to.

SH: In respect to being at Los Alamos with those British scientists, and the German refugee scientists, was there suspicion among you, or was there an ease between the scientists? And especially the fact that it was a military installation, how was that treated, as far as just suspicion in general? Especially with the later knowledge of Klaus Fuchs, and things like that?

GTR: I knew of no suspicion of Klaus Fuchs. I had some interactions with Penny, who … got to be Sir William Penny, a very well known mathematical physicist, whose wife had been killed in the blitz in London. The Moons from Birmingham, that I mentioned, were our next door neighbors. … The Army had the foresight to put the thermostat for both units in the north side. Wouldn't you? Of course.
Unfortunately two things happened. One, the prevailing winter winds were from the south, and hit us. Two, they were British, and they didn't like temperatures above fifty, apparently, and they controlled the temperature. We finally had to get together. They agreed to put up the temperature to sixty and open all the windows, and we had a bearable situation. But it was friendly. I played bridge with Penny. Boy, did we get beaten. He's a very sharp bridge player.

SH: You also played a violin in an orchestra, you said.

GTR: No, I played violin as a sonata, and as a chamber group, not an orchestra. It was a string quartet. And two of the members were British in that string quartet.

SH: What other types of entertainment did you have when you weren't working on the project?

GTR: There were other entertainments, of which, unfortunately, we didn't participate in all that much. I mean, there were very good social situations. You'd invite people to dinner, and you'd be invited to dinner, by the people in your group, mainly. There was not that much mixing among groups. But in your group there was a very good social life, and we fully participated in that. What we didn't participate in as much as I wish now that we had, for example, was skiing. Skiing was very, very popular there, of course, especially among the Germans, the refugees. We got a pair of skis for Virginia for the first Christmas, and soon thereafter discovered she was pregnant. So we sold the skis.
I had had a bad knee from athletics in high school. So I never could ski, and didn't even ice skate well. So that sort of thing we missed. But as far as dinners and social life, and the lodge, and going to movies, there were a lot of opportunities. And, yes, we did participate in those. … Of course, when I was overseas, and Virginia was alone, and all the other civilians in our group were still in Los Alamos, that was a lonely time for her. … But otherwise, things were very comfortable. We had the usual problems, but not quite the usual problems of civilians, because we had access to the PX, the commissary. We had good food. One time, one of the members of our group, from Harvard, used all their rations and got some beef steak. You could get it if you had the points. They got it, and invited the group there, and we were all sitting, talking, waiting for dinner. It turned out that their dog got to the kitchen and ate it. But there was a lot of mutual understanding.

SI: I have heard a lot of stories about Los Alamos being very difficult to live in, for example, with local draughts and inadequate quarters.

GTR: Well, it was a whole lot better than being in the trenches. I didn't have much sympathy for people who complained. And we didn't. I complained about the fact that I was there instead of somewhere else, but we didn't complain about day-to-day living conditions. We did have a freeze in which they brought water up in tanks, for example. That wasn't pleasant, but it wasn't like being bombed out in London. Our house was a real firetrap. They had some kind of gas heaters in between the two places. The Spanish American laborers would get in there at night, and smoke, and talk around these gas heaters, and talk loud. That wasn't pleasant. It was a firetrap. Well, when we were going to have the baby, I decided that my baby should have fresh air. So I went to the dumps, and hauled back a lot of lumber. I built a patio out in front of our house. We have a picture of it. It was about a week later when, and one of the Army officers came by and said, "You've got to take that patio down." I said, "Why?" He said, "It's a fire hazard." I said, "You call that a fire hazard?" "It's listed as a fire hazard. … If you don't take it down, we will." I said, "If you tear it down, I'll build it back." And that went on for a couple of weeks. Well, we went back in 1952. That porch was still there. That sort of thing, nothing serious.

SI: You were a Naval officer. I get the impression Los Alamos was mostly Army.

GTR: Yes.

SI: Was there any kind of command conflict?

GTR: Well, I didn't know about that. Groves was not an easy person to get along with. Oppenheimer had to tread a pretty fine line. Captain Parsons was the senior Navy officer. There was a colonel, Army colonel, who was Captain Parson's counterpart. You know, captain in the Navy is colonel in the Army. I'm sure there were little [things].
For example, one night coming home from the tech area, late, I'm thinking about the work with my head down. It happened that I passed … Colonel whoever it was, who was in charge, and he said, "Good evening." And I said, "Hello." I got a few paces back, and he said, "Halt!" I turned around and he said, "It's customary for a junior officer to salute a senior officer." I said, "Oh?" and walked on. Well, the next day Captain Parsons called me into his office. He only said a few words, but he said, "I know that it's difficult for you to be here, but certain conventions should be met. Dismissed." That's all he said. He was a fine gentleman. In fact, because of Captain Parsons we actually flew on the same flight from Oakland, Military Air Transport, to Hawaii, to Guam, to Tinian, together, but we were not allowed to acknowledge each other. He later sent me his handwritten log of the trip, when we left, when we got from island to island. I still have it somewhere. He was a fine gentleman. Because of him, whenever we went out, and I was along as a physicist, we always went to the senior officers' quarters, and always ate with the senior officers, which is a great anomaly. It certainly must have been mysterious to some people. For example, after the war, before we got to Hiroshima, a big typhoon hit the islands. We were on a little ship with our instruments. And this was considered serious, so we were transferred during the height of this typhoon, to the battleship *New Jersey*. It was like getting on an island, to leave this little thing that was going all over the place, with our equipment for measuring stuff. In that

situation I ate with senior officers on a Navy battleship. Very anomalous, but that was all due to Captain Parsons.

SH: When you were at Los Alamos, you mentioned briefly the locals, and the small role that they played. What other kind of contacts were there with the local people, and how did they view the project?

GTR: I have no idea how they viewed the project. But our interaction was with cleaning women, and that sort of thing. It was a crew of Spanish Americans who did a lot of work. There were rumors in Santa Fe that this was a very secret submarine manufacturing place, and through tunnels they got launched into the Pacific. I think that was strictly a local story. I don't know whether they were suspicious, interested seriously, or just sort of, "Well, it's a way to make a living."

SI: While you were working on the bomb, it was a new, untested concept. Was there speculation on what would happen? Were there any fears?

GTR: I don't think [so]. You mean cataclysmic?

SI: Yes, like how people feared the atmosphere will catch on fire.

GTR: Yes. I know those fears were expressed, but I never knew a serious scientist who shared them by any quantitative analysis. And I know Kistakowski and Bainbridge, Oppenheimer himself, Brode from Berkeley, a very senior physicist; none of that was taken very seriously.

SI: What about the radiation factor? Were you aware of its effects?

GTR: We were aware of them, but rather unintelligent about being concerned about them. There had been a death because of an accident at Los Alamos. We knew that. We knew that a couple of people had been affected for life. But we went into Hiroshima and Nagasaki and just walked around. We didn't think about it. There were Geiger counters, and things like that, but I'm sure it wasn't a good thing to do at that early stage. I got into Japan the day after the surrender. Then we languished in Tokyo for a while before getting to the bomb sites.

SH: Do you feel, as far as just, this is a question about physics, but do you feel that earlier physicists, like Earnest Rutherford, and Albert Einstein, who discouraged the pursuit of … harnessing atomic power, do you feel that they did that for reasons that they had an idea of what could occur? Or do you feel that they really felt that it was implausible?

GTR: I think in the case of Rutherford, he thought it was implausible. In the case of Einstein and Bohr, they had a real sense of morality, international concern. I think they felt that it was a very serious undertaking. I don't know that they actively discouraged it, but they certainly didn't feel it should be encouraged. Einstein, in particular, I think, felt this way. Bohr, when he came to this country in 1944, was amazed at the progress that had been made. He had no idea we'd gotten so far. But he went to Los Alamos and didn't run up any flags as far as I know. He was known as Nicholas Baker there. I think they were sincerely concerned. And I think there were

atomic physicists at Los Alamos who were seriously concerned. I remember being a junior member of a group that went to Oppenheimer one day to point out the desirability of a test over an unoccupied island in the Pacific, where civilians wouldn't be involved. But I didn't devote my life to that. I think, in retrospect, such a demonstration wasn't a good idea. I don't think a test like that would have impressed, could have ended the war. I thought at the time, it might, but I was a very young person, and I didn't go to the extreme one way or the other. I do know this, that when the afternoon that the Trinity success was known, and I was to go to Tinian, I went to Oppenheimer's office, as prearranged, for last minute words, and that sort of thing. He said to me, "You've got a good thing. You're going to have a lot of fun out there."

SI: That's a different impression than you hear of him usually.

GTR: Right. As we shook hands, that is what he said.

SH: How do you view atomic warfare? Do you feel that it's an effective type of warfare?

GTR: Effective, yes. I think the human race, exhibiting all its human characteristics is bent on killing each other, and this is a very highly effective means of killing each other. Boy, we've really achieved something here. Let me say it this way. When it was the fiftieth anniversary, 1995, I was asked to give a couple of talks, and I started those talks in this way: "We are recognizing the fiftieth anniversary of the end of World War II. And we are recognizing the anniversary of fifty years of no Third World War. And we are recognizing the fiftieth anniversary of the detonation of an atomic bomb, without which the other two celebrations would not be possible." Get it?

SH: Yes.

SI: Yes.

GTR: That's the way I feel. I feel like the average, semi-intelligent, uninformed citizen of this country, that if somebody else had gotten it, it would be very bad. With us, it was bad enough.

SH: When you say someone else, you mean the Russians?

GTR: I mean, Germans, or Russians, or Iraq.

SI: It sounds like you have a very pacifistic view towards nuclear weapons, which seems to grow out of a whole movement of the youth of your generation in the '30s. There seems to have been a lot of pacifistic sentiment, in people organizing Peace Days, and those sorts of things in high schools.

GTR: I was never part of that. Never. My only experience with war is what I've described. I was never against it ahead of time. I didn't respond or resonate to that sort of thing. I was too busy making a living.

SI: Were you aware of it?

GTR: Oh, we were aware. I remember going to a High Y conference when I was in high school, and my roommate, who later went to Rutgers, Bob Jobbins, from New Brunswick High School, was talking to me one day, before 1935. I remember him saying one night, "You know, there's going to be a big war in Europe. And we're going to be a part of it." And all I said was, "Oh?" But he was aware. Seriously aware. I wasn't a part of that. I was more interested in working on the farm, and in the summer getting down to the Shore to surf fish.

SI: You talked earlier about how you were eager to get out into the Pacific and get involved in the war?

GTR: Yes.

SI: When you were making these dummy flights with the B-29s, did that fulfill some of those desires?

GTR: Not really. Not really. You knew you were safe enough, except for an accident. You were mainly interested in seeing whether this stuff worked. It was just part of being there. We flew out of Wendover Field, Utah, which we called "one inch from desolation." I spent quite a lot of time at Wendover Field, Utah, before going to Tinian. Well, before the Trinity test. We were making dummy runs to test the ballistics of the "Fat Man," see how it behaved, and, "Did the proximity fuses work?" and, "did our ignitions systems work at the right times?" That was the job. I remember one time my setup developed a malfunction, and we were at 25,000 feet, pressurized, but to get at the stuff I had to go out in the bomb bay. No parachute, but we went down to about 15,000 feet, so that we could depressurize for a few minuets at that altitude. I went out into the bomb bay and worked with the connections, and I looked down at the ground through the open doors of the bomb bay, because we were just about ready to drop, and that gave me a feeling of reality. But I didn't pretend I was attacking the enemy.

SI: … You did not get to actually go on the bomb flight?

GTR: No, I was to go on number three. I was to do the jobs on number three. In fact, I stayed outside by the airplane as it was warming up. But Truman, correctly, said, "No more."

SI: … Were you aware of the destination of that? What were you supposed to hit?

GTR: Oh, yes. Well, we knew the primary target was, what, Kokura. I think it was Kokura arsenal. It's all in Rhodes' book. I knew it at the time. I forget the exact name now. And we learned as the day went on, that Kokura had been weathered in, and they had to take the secondary target, which was Nagasaki. Nagasaki wasn't the best target, just for physical reasons. There was too much water around to stop the spread of the fire.

SH: As far as the testing goes, a few days before the actual Trinity test on July 10th, there was a faulty wire, ground wire or something, that 'caused a premature detonation of some kind.

GTR: I wasn't at Trinity at that time. We had already done all our work at Trinity. We chose the site, made the estimates of what would happen, and I was not in the final wiring up at Trinity. We had done our job.

SH: So you don't know anything about it?

GTR: I have heard, but I don't know. I'll tell you one story. Maybe we better leave this one out. I don't know

SI: You can always take it out.

GTR: … Okay, leave it in and see what you think about it. Let me see it first. In Richard Rhodes' book he quotes from the autobiography of one Bernard J. O'Keefe. That character is Barney O'Keefe, a good friend of mine. We shared a tent at Tinian. My orders also, in addition to saying, "Lieutenant Commander So-and-So will be that, Ensign B.J. O'Keefe will serve under the direction of G.T. Reynolds." Well, the night of the delivery of the Nagasaki bomb we had worked and we had worked hard. Now Barney says in his autobiography, he was lying there in the tent, and he got worried, "Was everything going to be all right?" So he got a technician to go over to the house where the bomb was sitting to check out some circuits. And, lo and behold, he found that the connectors weren't right. He goes on with, "I was thinking of all those Marines out there in the Pacific losing their lives, and how important this was to … " Well, Barney O'Keefe was a hail-fellow-well-met. I didn't drink any alcohol in those days, didn't drink. But Barney wasn't like that. And one night, just before the delivery, I was lying in bed and I thought, "I'd like to ring out those circuits one more time." So I went over and I said, "Barney, let's go. We're going to check them." And by golly, we did find one wire was wrong. Not a whole connector, just one wire was interchanged. Well, we corrected it, and then we spent hours checking and then checking, and then checking, and then checking. It was a near thing, but it wasn't like Barney said. But he went on to be CEO of EG&G, a big company, and wrote an autobiography. I called this to Richard Rhodes' attention one time, and he said, "Sorry, about that. If I ever redo the book, I'll do it right." I think: "The older we get, the better we were."

SI: What is your opinion of all the different documentation that has been done on Los Alamos since the bomb?

GTR: Well, I haven't read them all, but I certainly got a lot out of Richard Rhodes' book. He did a very careful job; went to a lot of work. There are many little anecdotes that have been published. All of them have some basis in fact. I think many of them get embellished a little bit, which is easy to do. But I haven't been a student of it. In fact, until the fiftieth anniversary I never gave it a thought again. I do carry with me the experiences of being in Japan after the war, (and having an arm patch, which sort of distinguished us) and having Marines come up to me, and say, "Thank you very much. We were scheduled to go into Ford Beach," or something like that, "in November, and I'm alive because of you guys." I went down to Guam one day, because I heard that an ex-roommate of my mine from Princeton, who was in the civilian, was there. He was doing bomb damage analysis on photographs, continuing his work here. So I hitched a ride on a B-26 and went down to Guam to see him. He said, "I've got an interesting picture here. I wonder if you know anything about it?" And by golly, he showed me a photograph of the "Fat

Man," in flight, having been dropped. We did dummy runs. Now, he had security clearance, and I said, "Norm, don't show anybody that picture, please." I went to Admiral Halsey, or whoever it was on Guam at that time, through the introductions that Captain Parsons always arranged for me. Otherwise he never would have met with an ensign. I said, "There's a picture in the tent of Norman Dahl that ought to be confiscated." Later, Norm told me that about twenty minutes later they came and took the picture. He didn't know what it was. He knew it was something unusual. Well, on that same trip I was at headquarters, and pinned on a tent post there, there was a poem that ran, (this was the Air Force) all they were doing, all our casualties. We were the 509th Bombing Group and every verse ended with, "But the 509th will end the war, so what the hell are we fighting for?" They knew something was up. There was a lot of special treatment to the 509th. Everybody said we were there to end the war. They didn't know how, but that poem always ended up, "Why are we fighting?" "The 509th will … win the war." So there were those little anecdotes. I haven't thought about that until you fellows walked into the office. I just don't think about it. It's not any mental problem with it, it's just that I've got too much else to do.

SI: While you were at Los Alamos, were you able to get updated information about the progress of the war?

GTR: Yes, the *New York Times*. Stalingrad, and all. Oh, yes. I followed it very anxiously.

SI: … Were you able to communicate with family members and such?

GTR: The mail was censored. You were told the mail was censored. You were told, and the people you corresponded with were told that their letters would be censored, and they all came with a censor seal on them. You knew that your mail was to be censored.
A couple interesting stories about that. Richard Feynman, who was a graduate student here with me, was there. And his wife, whom he loved dearly, he was a very devoted person, not the wild guy you read about later, was in a sanitarium out in Albuquerque, because she had a terminal illness. To make life interesting for her, he would write a letter and cut it up like a jigsaw puzzle, so she'd have something to do by putting it back together. Well, this went on a few times, and the censors finally wrote Dick Feynman and said, "Will you please not cut up your letters. It takes too much time to put them back [together] Put them in, we'll cut them up." That's one, for example.
Another one, when I knew I was going overseas, since I was the only child of elderly parents I knew they were worried. I was allowed to write one letter. The letter could say, "I will have to leave the country on business soon." I was allowed to say that. But I had to do more than that. I wanted my father, who taught me how to fish and was an avid salt-water fisherman to know more than that, so I wrote him a separate letter which said, "I'm glad that you're going to get a vacation, and go fishing. If I were you I would take the following lures. And I listed some lures that you would use for fishing in the Pacific Ocean. That letter never reached him, because, unknown to me, Oppenheimer had written to I.I. Rabi, who was at Columbia. Rabi wanted to desperately see the test, as a physicist, and Oppenheimer would arrange that he would come and see the test, but the question was, "When?" I learned from Richard Rhodes, I think, that Oppenheimer wrote to Rabi and said, "I think in about three days will be a good time to come out and see our fishing expedition." Fishing meaning fission, and that letter was in the mail

about the same time as mine to my father. So they thought I was a lot more clever than I was. I wasn't thinking about fission, I was thinking about fishing.

SI: What do you think of history's treatment of figures like Oppenhiemer, and, for example, accusations against him?

GTR: Oppenheimer, of course, was a very complex individual. I have to say at the outset, he was very, very kind to me and to Virginia, both there at Los Alamos, because he knew my feelings, also when we got back here, and he was head of the Institute. He went out of his way to be kind. I was an experimentalist, and of course, he was an outstanding theorist. But it so happened that at the time, our experiments were in cosmic rays, and so was Oppie's interest in cosmic rays. He had some very good, young Chinese physicists, Leo and Yang. Frank Yang was at the Institute and was interested in experimental results, so we had some good interactions because we had some data, and he wanted the data. We weren't key to his success, but he was interested in us, and Oppie fostered that. I think that Oppie was naïve, and certainly others … found him arrogant. To me he was always okay. I cringed at some of the things he said and did. For example, one time I was at a meeting in New York and some poor young graduate student was giving a paper, and Oppie was in the audience. The graduate student wasn't awfully articulate. But Oppie said loud and clear, "Should you get to tell us anything we don't already know, will you speak more clearly, please." I mean, he could be like that. The person that I liked, and Virginia liked very much, was PMS Blackett who was an outstanding British scientist. Blackett arranged for me to have a writing professorship with Imperial College for a year in 1955-6, when he was chairman of the Physics Department there, and we had a very good year there. And he and his wife Costanza were very good to us. Blackett and I were at opposite ends of the political spectrum. You couldn't get much further apart. But we had physics to talk about, and I was interested in his ideas about "continental drift," as it was called. It's now called "plate tectonics." Earlier not believed, he held to it, and he was right, to a degree. We had good relationships. … I'd go to talks that he gave in public in which he would exaggerate US positrons, so that afterward I would have to come and say, "Look, Professor Blackett, you know that's not so." He said, "Yes, but it has to make an effect." So, he was put on the blacklist here at one time. He was making a flight from Cuba, I think, to Canada, and the plane had to come down in Miami. He was "persona non grata" in the US because of the things he'd been saying, and they interred him, essentially, in the Miami Airport, with his wife. That was outrageous, I thought. Well, when he finally did get clearance, and he came here to see Oppenheimer. This was the sort of thing McCarthy liked to point to. Virginia and I decided, "We'll show them." So we invited the Oppenheimers and the Blacketts to dinner. And they came. We were just standing up to all of this stupidity, we felt. Now the AEC investigation of Oppeheimer that led to the canceling of his security was a very sad thing. No doubt, as I said, people found Oppenheimer naïve. He did very naïve things with the people he associated with, who had known communist histories. His brother, Frank, was fired from the University of Minnesota, not for being a communist, but for having lied about it. It was clear where his sympathies lay, and he didn't try to hide it. But the AEC thing was rigged. Professor Harry Smyth was here, but also on the AEC at the time. Now Harry Smyth was, I think, about the wisest person I ever knew. This is his desk. That's his chair. He was a wonderful person. He gave me a lot of good advice when I came here as a young assistant professor. Very wise, careful thinker. Didn't like Oppenheimer at all because of his personal performance and his arrogance, I think. Smyth was

just the opposite. He was the only one who voted to sustain the clearance in the "trial." I know it was hard on him because Mary Smite had talked with Virginia and told us how hard it [was].

---------- END TAPE ONE, SIDE TWO ----------

SI: This continues an interview with Mr. George Reynolds on October 29, 1999 in Princeton, New Jersey. Please continue.

GTR: I was saying that this "trial," the Oppenheimer clearance hearing at the AEC, was very hard on Professor Smyth. Because it involved a person he didn't, in the full extent, respect, but in his objective thinking, did not see the case against him. He voted accordingly. It just increased my admiration for Harry Smyth. I think he did a lot for me, and he did a lot for many people.

SI: This is jumping ahead a bit in your career, but the McCarthy "Communist Witch Hunt" affected higher education a great deal. You were at Princeton at the time.

GTR: Yes. Well, Princeton was in a tough situation then. I did not enter into the fighting on it, in any sense. Again, I guess I was a little bit oblivious, and more concerned with me than anybody else. But I had an office next to David Boehm, a very bright physicist who was being crucified. Professor Shenstone, was the chairman of the department, because Harry Smyth was down in Washington, Shenstone was a Canadian, who never gave up his Canadian citizenship, never accepted US citizenship. He was, of course, extremely vocal and agitated by the way "these stupid Americans" were acting. Actually, he wasn't British, he was Canadian, but he was very British. He was very upset at the treatment that Princeton University gave David Boehm. They essentially put him out, and he went to South America. Now there are many of my colleagues who are extremely upset about that. There are many others who, like me, were onlookers. I just was more concentrated on my own physics. I guess I just didn't care about people enough to be concerned. I lived for physics.

SI: Were you ever made to sign anything?

GTR: Oh, no.

SI: No?

GTR: What would have happened? I never asked myself what would have happened. Oh, you would often get interviewed by the FBI, often about people, and I had one answer, and that was the only answer I gave, "I know nothing against him." "Well, what else can you tell us?" "Nothing. I've said it all." And I'm sure I got bad marks in the dossiers because of that. I was never a fanatic in their defense, but I never thought of them other than physicists. I got in trouble once from a bunch of Class of 1935 alumni here, with whom I used to go to football games, tailgates. They were old-style Princetonians. The issue came up, "What about co-education?" They asked me, "How do you feel about co-education?" because they were against it, of course. I just gave an answer that, "I hadn't thought about it before," but they said, "How do you feel, after all these years of teaching boys, and you look out there, and you see girls?" I gave an off

the top of the head reaction. I said, "Well, I don't think of them as people. They're just students." [Laughs] Well, that didn't go over very well either. But that's characteristic of me. I think I don't think of them as people. Always, if a girl comes in here, I leave the door open. I'm that much aware of the difficulty of, even in the elevators, of saying, "You're looking good this morning," or something like that. I don't do that. I think it stupid, but it doesn't matter to me all that much. Virginia, on the other hand, is making the best of both worlds. I mean, she was brought up traditionally. She was a great mother, good wife, and now she's doing things that are interesting to me, too. We very seldom see each other, especially for lunch, because she's doing so much. She's a member of the Altar Guild of the Church, the council of the public library, … she's in a book group, a study group, and other things I don't even know about probably. Not much bridge, though. Some of these wives play bridge all day long. She gives maybe an afternoon every two or three weeks, but she's doing a lot of good things. Finally I am getting to know how important women are, and how especially important she is. I'm all for it. I have no problem with that. I'm happy for her. And we have more to talk about, too. She always used to have to listen to me talking about physics. I wasn't interested in much else. But now I'm really interested in what she does. I finally got educated, I guess.

SI: Besides Princeton going co-ed, what other changes have you seen in the university in your very long tenure here?

GTR: Well, there was a time when I felt I was very much involved. I was on several committees. I was on the research board. I got interested in the environment and had offers for other universities. Virginia would have made a very good dean's wife somewhere. I wasn't at all interested. This word got to President Goheen and he said, "Look, if you want more than physics to do, I can suggest something." He was very impressed with the two cultures at the time. GP Snow … came here, and I was introduced to him, and we talked, and Goheen said, essentially, "If you want more than just teaching physics, why don't you make use of this work that you've been doing on the environment?" Now I had gotten interested in the environment from a very selfish standpoint. I saw this darn smog coming from New York and Philadelphia, and I thought, "This is terrible." So I got interested, and I went down to Washington, and talked to Senator Muskie's aides. I never got to meet any Senator or Congressmen, but I talked to their aides. There was a Senator Jackson, from Washington, and Congressman DiDario, from Connecticut, I talked to their staff. At every cocktail party we went to, I'd be unpopular, saying how bad the environment was getting. Finally Virginia said, "Look, if you're going to do that sort of thing, and make yourself uncomfortable, do something about it." So, I designed a course in air quality and water quality. And the University said, "Go ahead." I found out that people weren't willing to take the course because they were afraid of the grade they'd get. It was listed as Physics 303. So I said, "In Rutgers they have a pass/fail system. Why couldn't we do that here?" The administration said, "Okay. Try it." So I gave the first pass/fail course here. Then we formed the Center for Environmental Studies, and I made the unfortunate move of becoming the first director, which was really a great distraction in an important part in my career, and I hurt myself a great deal among physicists for being in this generalized, therefore, suspicious area. So I spent two and a half years as director of that and paid the price. But the Center went on, and now they've got another program in environment also. Professor John Wheeler, here, gave a course which other places were giving as, "Physics for Poets." Well, I was departmental representative. I hated that term. I said, "I would never … assign one of our physics majors to a

course called, 'Poetry for Physicists.' Why in the world are we doing this?" So John Wheeler developed a course called "Physics for the non-scientist." Again people were afraid to take it over. When he had other more important things to do, I took on that course and taught it for a couple of years. Again, this is a very serious department. We've got Nobel Prize winners, we've got people who are international figures, and as one of their membership to be teaching "Physics for the non-scientist," you pay a price. But now, under the present administration, courses in science for non-science majors are very important, and they're being staffed by the best professors they can get. That certainly is a good change. But it wasn't so easy in the earliest days. So that change is significant. I think I'm concerned about the reputation Princeton gets as a drinking school. I don't see it. My kids were all members of clubs here. Cap & Gown, Cottage, and the worst one, Tiger Inn. We never had any trouble that way. It's got a reputation from F. Scott Fitzgerald, I think. But it's been able to change.

SI: As a Rutgers man from the period when there was a big rivalry between Rutgers and Princeton, did you ever have any kind of conflict there?

GTR: … Because of the students I've had, and the persons I've met here, and know, I'm a Princeton fan now. If you want to talk about the Rutgers program, I'll talk to you, but in the earliest days that I came here, the first two or three years, as a faculty member, of course, I got seats on Princeton's side. There have been occasions when Princeton played Rutgers when there would be calls from the stands, "Get that Rutgers' man out of here." But that time has passed. As far as I'm concerned, Rutgers ought to be in the Patriot League, and have a satisfying program. But I'm a Princeton man. Rutgers is professional as far as I'm concerned. I'm not interested in them. It's too bad these kids are going through what they're going through, but they are out of their league. It's not like living in Okalahoma or Nebraska where it's the State University and everybody is for you. It just not like that in this state.

SI: You are from Highland Park.

GTR: Yes.

SI: We have interviewed a lot of people who lived in Highland Park, and it was kind of like a tradition that you go to Rutgers.

GTR: Yes. Well, it was for several reasons. Just economically. I was valedictorian at NBHS, and that's the way it went. It was never thought to be anything else. We lived in the neighborhood where professors lived, and everybody went there. It was the Depression. Virginia wanted very much to go to Wellsley, very much, and could have done it. Intellectually, socially, she is made for a place like … Wellsley. It was just too bad that it wasn't in the books.

SH: Aside from college, how did the Depression affect your family in the early years, when you were growing up?

GTR: I was very lucky, in the following sense. My father was a long-time railroad employee. He had to work very hard. The railroad was cutting back drastically. He never lost his job. That's a big thing. Neighbors, one was vice president of the Carrier Air Conditioners, or

something, another one was big in public service. They went to poverty. But we always had that few hundred dollars coming in. Never more than two hundred dollars, but that was enough. And I was lucky in that I had a job all the time. I got this job. Well, I cut grass, for example. I delivered magazines. I'm no hero. I mean, everybody did this sort of thing, anything they could. I was just lucky all the way through. I had this job, and then I was getting thirty cents an hour as a field hand in the Rutgers Experiment Station, and glad to get it. Also, the big break of the year was the bankers meetings at Rutgers, where Virginia got to be a waitress. I didn't know her then. But I was in the mailroom. It was big pay. It must have been forty-five cents, or so, an hour. And then, … when I was a junior, majoring in physics, two graduate students flunked out. So they had no student assistant for the sophomore lab, which I had just taken. So Professor Winchester called me into his office and said, "We need somebody to take two or so afternoons of laboratory, as a teaching assistant. We can only pay you seventy-five cents an hour, but if you're willing?" I thought, "Boy, I'm more than willing." [Laughter] I was out in the field all day for thirty cents an hour. So it was just plain luck. Certainly the Depression affected us. What we ate, what we could afford to do. I got out of going to the movies, and I still don't like to go to the movies, 'cause I never did. I talked my family into getting a radio, and they did. … I was an only child, who had a job. We were better off than most people. So, yes, it affected you. In fact, one of my colleagues here came to me the other day, and has a son in high school. And he said, "My son had an assignment. Would you be willing to be interviewed by him? He has to interview somebody whose had a tough life." [Laughs] So, that's the reputation I've got, I guess, having come up through the Depression. Most of the people here are younger than I. They didn't have that. But it was terribly tough. My father had this pass on the railroad, 'cause of work, and once in a while he'd get a Saturday off and he'd take me as a school kid, or a high school kid, to New York. And we'd see people selling apples. He made sure that I saw that. He'd take me to the Bowery where he once worked, as a matter-of-fact, as a ticket agent for the Coney Island Railroad, and he showed me that side of life. We would go to the Automat, and for five cents you got a cup of coffee, and for fifteen cents you got a beef pie, and that was a good lunch. People would beg you on the street for five cents to get a cup of coffee. And they didn't use it for alcohol, or drugs. They used it for coffee. And, on a good day, we could spend a dime and get a cinnamon roll at the Automat. That was a big day. But you didn't feel bad about it. You felt good! You felt good. But it was a desperate time. People suffered.

SH: So your father put forth the effort to make sure you knew what was going on?

GTR: Yes.

SH: To really make you conscious of the situation?

GTR: Yes. And he was a surf fisherman. He'd never gone to college. He'd never gone to high school. So, the people that he associated with were, what he would call, "real men." I would go surf fishing out of Trenton. We'd go to Trenton on the train, and somebody would have a car, and we'd go down to Seaside Park, surf fishing. A typical bunch would be an ex-prize fighter, a tavern owner, and a conductor on the railroad. They were his friends. They were the ones I, sort of, grew up with. Other people, like college professors, and others, although he wanted me to go to college, these people who didn't do things like he did, didn't bowl, for example, didn't fish, they were "pantywaists." That's what he would call them, pantywaists. Once he introduced me

to some fisherman friend down there. When I went to college, then I didn't have the free time to go fishing. But once I did go down there, and he introduced me to some of his friends. "This is my son. He goes to college, but he's all right." [Laughs]

SH: You didn't go to the movies you said, as a young man?

GTR: Well, I went to a few.

SH: What type of other activities did you do for entertainment?

GTR: Well, in high school I was very interested in athletics. I wasn't good like my sons have been good, but I was interested. I liked baseball, and I never made the basketball team in high school. I wasn't good enough. I was getting along very well in baseball, but never won a letter in athletics. My kids have got walls covered with them. In a track meet. I had three events, and I liked track meets. I had high jump, shot-put, and two-twenty yard dashes. I got several three-place ribbons. Never won anything, but I could do third place. One time in a high jump I came down wrong, and I ruined my knee, and it's still ruined. Nowadays they do an orthoscopy of some sort, and fix it. But in those days, they didn't do that. And that knee is weak ever since. I had to give up ice skating because of that knee. I can't walk across ice without it going out. I've learned how to get it back by myself. One time I had to be given a general anesthetic so that the doctor could get it back. It's been a weakness that I resent. But I did like athletics. I still like athletics. In particular, I found out I could still box, and I like boxing. And Rutgers had a boxing team. I never made it, but I sparred with some of the guys. I had friends on the boxing team, I'd go to the meets, and I'd watch them. I liked that. Music's always been a big thing. I played in the Rutgers Symphony. I played in the Summer School Symphony. That sort of thing. Never awfully good, but enjoyed the music. I think music and fishing are my two biggest interests, outside of physics. I'm only happy when I'm here, really. [Laughs] That's not true, but I do like … being in here. I remember something Harry Smyth said. I had to write his obituary for the Academy, so I went through the archives here. And he had had some interviews. And somebody asked, "What is it like to be retired?" Well, he had an office up the hall from here, with the stuff in here, and he was sitting. And he said, "Well, I like it. I like the excitement. I leave my door open." As I do, too. "I like to hear the young people arguing about their work, talking about their theories. Talking about their experiments. I don't know, understand, a word they're saying, but I like it." And I feel the same way. You walk down the halls here in the normal times, and you hear people talking to each other in some language or other, or English even, and you see people running down the halls to get somewhere. It's a very active place. It's almost too active. It's almost frenetic here, but I get caught up in it. Right now, I can hardly wait to get downstairs in that lab. I've got something going, and it's really very interesting. It's not anything that you get a prize for. It's not anything that you can publish in a highly respected journals, but I can publish it in some journals, and will. It's a new thing. It's fun, and I can do it, and nobody else has ever seen it, and that sort of stuff. But, it's not really important. It's not like String Theory, it's not like Black Holes. We have a very strong cosmology and astrophysics group here. It's fascinating. I went to a colloquium two weeks ago, given by one of our newly appointed associate professors. Unbelievable stuff. The cosmic background radiation. The analysis that they're into now is to try to figure out how in the world the first galaxies could form. I love it. I love it. And we've got the world's experts right here. Rutgers has a good

Physics Department. Really good. Close friend. Had dinner with him recently. Peter Lindenfield. Physics professor, recently retired, a good man. The Physics Department at Rutgers has a little history associated with it. One of our best known physicists here, Don Hamilton, because of his reputation, was asked to be the advisor to the Physics Department. This is way back. This is way back. And he retired to become Dean of the Faculty here, and gave up the Rutgers, but asked me if I would. So I went on to that position. And that's about the time that Mason Gross had this idea that every college should have a History Department, every college should have a Sociology Department, they should have four biology departments. When it came to physics, Don Hamilton and I said, "No! That would never do." So I was not a friend of Mason Gross. He didn't like that, but we stuck to it. And, as a result, I think the Physics Department is good, not the best in the world, but it's good. Because we didn't split it up it has a place, and it's essential that they interact with each other, everyday, every hour. And I think that's one of the reasons it's a reasonably good department. The same way with math. Their advisors stuck to it, also. But I think this other, did they call it the "Federated Student," or something?

SI: Yes, that's it.

GTR: I was never for that. … Never.

SI: I was in a class the other day, and someone was actually arguing for the federated system, because they did away with it recently. I think under the Lawrence administration.

SI: You were active on the Board of Trustees at Rutgers.

GTR: Yes.

SI: When?

GTR: It was when Bloustein was president. … It was just before Alec Pond came to be Provost. Alec Pond was a graduate student in this department, when I was teaching here. Alec went to New York State. When he became Provost I went to Bloustein and said, "You don't need me on the board anymore. This fellow represents everything I want to see represented." But Bloustein asked me to stay on. And I did. Then Lawrence came. …

SI: Is there anything else that you'd like to say about the Board of Trustees time?

GTR: It was very satisfying. With Bloustein there it was very satisfying. I never got to be on the Board of Governors. Although Bloustein used to say, "Someday I've got to get you on the Board of Governors." And I would have been if he'd stayed there. But I was on one committee that was joint with … the Board of Governors, and the Board of Trustees, and that was the Committee on Policy, or something. And Adrienne Anderson was chairman at the time. Well, there was another one prior to her. That was the committee I gave the most attention to. I tried never to miss a meeting to that joint committee. "Policy and Planning," I think it was called. I don't know whether they still have that, but in any case it was a good committee. It was an active committee. It did something. And under those two ladies, I forget the first one's name,

she lived in Red Bank. A very fine woman. When she retired, Adrienne Anderson … took over. Adrian Anderson got an Honorary Degree from Rutgers on her deathbed. I don't know whether you know that, or not. But she deserved it. She was a fine chairman. And I enjoyed that work with Bloustein. I was all for it. And I was so glad to see Alec there, and so sorry to see him edged out.

SH: Stepping back a few years, to your actual years in college at Rutgers. You lived in Highland Park, but you were, active, very active on the campus.

GTR: Yes.

SH: Did you commute, or did you live on campus?

GTR: I commuted. The answer to your question of whether I was active is, yes. I was. Insofar as physics gave me time to be. As a member of a fraternity, TKU. I played in the orchestra. I enjoyed communicating with the boxers. Went to all the athletic events. I enjoyed the life, but I was a commuter. I ate lunch in Winants. And we had a group there. They were Barbarians. But I ate with them because it was close to the Physics Department. I didn't go out to College Avenue, to the fraternity, all that often. I went there evenings. But for lunch, just time out from the lab, we had a good group, a very congenial group. … Several of them from South River, a couple from New Brunswick, and some from the area of Elizabeth, or Roselle Park, or something like that. I had one particularly good friend who lived in the dorm. He didn't belong to a fraternity. Fred Wesche. Fred Wesche and I were particular friends. He was the only other physics major, and he struggled. He struggled. But we decided between us, "The war is coming. When we graduate we're going to join the Air Force." I was always doing something. So we both applied for the Air Force, Class of '39, when we graduated. I got turned down because of vision. I wrote a letter to somebody who never got it, or never opened it, saying, "Well, look air pilots have to wear goggles. I'll pay for goggles in my prescription if you'll let me in." Of course, nobody ever paid any attention to that, but Fred got in, and he was a B-17 pilot the whole war.

SH: Oh, okay.

GTR: I've met him once since the war, but that's it. But he and I were particularly close friends. He played in the jazz orchestra, trumpet, and was a very good musician. He could arrange music, jazz music. And he got me to play in the, what do you call it, the "Varsity Show?" What do you call it? It's the "Triangle Show" here, but it's …

SI: I think it's the Varsity Show.

GTR: … It's like the Triangle Show is here. I think they called it the Varsity Show. I played in the orchestra for that, and enjoyed the music a lot. And associated with athletes, though not being one. Fraternity, as much time as I could give to it. It's was very busy to be a physics major. It was very busy. It's too bad in a way. We get very few good athletes in the Physics Department there. I once had a Junior who was (stook?) on the crew, and he and I got along just fine. But he struggled in the courses. I had another student who was an outstanding star on the

freshman football team. His father had been a great player for Pittsburgh, and wanted this fella, John Futhey, to be a good athlete here. And John was on the freshman team. I used to go to the freshman games, too, saw him one day. I used him as a babysitter he was such a fine fellow. I was departmental representative, and he came to me one day, and he coined this phrase. Other people have copied it, but this fellow coined it. He said, "You know, taking physics at Princeton is like trying to take a sip out of a fire hose." [Laughter] And other people have used it since, 'cause I've passed it on, but he's the guy that started it. He flunked out. It's too bad.

SI: Going, again, back to Rutgers days. … In the classes before the war, we hear a lot about certain rituals in each class. Like, when you're a freshman you get hazed a bit. What was your hazing experience at Rutgers?

GTR: Oh, nothing unpleasant. You had to wear white socks, and put your pants inside them. You had to wear the dinky cap. You had to be highly respectful to any sophomore on the campus. I don't know what the kids in the dorms experienced, but I didn't have any unpleasant things. It was just part of the game, that's all. It was sort of fun. … I didn't have [anything] unpleasant. As I say, maybe the fellas who lived in the dorms, but I never heard anybody complain of any serious incidents. But it was all good.

SH: Social life, it always seems in reading the *Targum*, like it's very segregated between the Barbs and the fraternities.

GTR: Yes.

SH: How did both sides view you, considering you were in a fraternity, but associated with the Barbs at the lunches?

GTR: I just got along with both. In my fraternity there was Paul Harvey, the captain of the football team, and a fella named Craig, who was a tackle. Craig, unbelievably fat, and slow. He weighed two-hundred five. We used to tease him. But we also had good wrestlers in my fraternity: Tom Woershing and John Woershing. I was even an officer for a while. I finally had to give up somewhere during my senior year. The work just got too demanding. I was tutoring, and I was an assistant in the laboratory, and I was a research assistant to one of the professors, and I was trying to keep up with the courses. I was already taking a graduate course, and so I had to give up the fraternity somewhere during my senior year. But I enjoyed it while I was there. It wasn't the top fraternity. It wasn't Delta Phi or Phi Gamma Delta, but it was a good fraternity.

SI: It's still there.

SH: Yes, it's still there.

GTR: And it's still there, yes. And Teke is big around the country.

SH: Yes. Absolutely.

GTR: It's just that we were poor guys.

SI: One thing we read about a lot is mandatory chapel.

GTR: Well, I told you about my father, and the associates that he had. My mother was at the other end of the spectrum. A choir singer, a very religious Baptist. I was destined to be a minister. But because I don't like people, I knew that I wouldn't be a good one. But I did attend church in Highland Park, Baptist church, and I played the violin for the hymns. I don't know the words of many hymns, but I sure know the tunes. Well, I went to Rutgers and compulsory chapel. And there was a dean, then Dean Marvin. He was from Vermont. And boy, he was a Vermont Christian. I went to him one day, and I said, "Dean Marvin, I would like not to go to chapel. I would like to go to my church in Highland Park." He said, "What church is that?" He asked me some questions. He said, "I'll tell you what to do. You only have to go to half the chapels." Well, I think that was the rule for everybody. You had to go to half the chapels. So I went to half the chapels.
My reasons, I thought, were good ones. But he was strict, Dean Martin. And Dean Marvin, and President Clothier, these were people you could respect. They've got 500 times the number of administrators now that we need, I think.

SI: Did you ever have any run-ins with any deans, like Dean Metzger or President Clothier?

GTR: No run-ins. It was very cordial. Well, Virginia was a particular friend of one of the Clothier girls. So she knew, of course, that's another generation. She wasn't in college when I was in college. But she got to know President Clothier, and his wife, and his daughters very well. And I think he was a good gentleman. I never had close associations with him, but I always respected him. The deans I respected highly. The Dean of Chemistry, Read, was a very impressive, imposing figure. I took most of my electives, incidentally, in courses that had cash prizes.

SI: Cash prizes?

GTR: Yes, I needed money.

SI: I haven't heard of that before.

GTR: Well, there used to be a prize in chemistry, a prize in math: twenty dollars, or twenty-five dollars, ten dollars. I think there was one in psychology, one in economics. I took those as electives. I needed the money. And I got it. [Laughs] I did all my psychology studying at lunchtime, the day before the tests. It was simple, easy. [Laughs]

SI: I know there sometimes were guest speakers at chapel. Do you remember any?

GTR: I don't remember any important chapel speakers particularly. Except I remember one, Senator A. Harry Moore, gave one of the talks. Yes, he must have been a typical politician. And I remember that other distinguished people were there, but I don't remember their names or what they said now. I just remember that did happen. We were very respectful. Very respectful. I

still respect Kirkpatrick Chapel. I was impressed. It was so much better than the Baptist Church in Highland Park, in the sense that it was nicely built. It had nice curtains, and that sort of thing. It was a good place to be. I remember particularly, one day, Dean Metzger called us in to one of our weekly chapel meetings. One of our classmates had died. We were freshman. He was in ill health when he came. And Metzger gave a very moving eulogy of this young man who came to try to make something of his life, never really got the chance, but gave it everything he had, and was now dead. And I was very impressed. I remember that chapel. I'm not sure those things happen anymore.

SI: Not now. Did you have to go to ROTC?

GTR: Yes. Another story. [Laughs] Went to … ROTC. The best part of my week. I got outside. Didn't have to worry about physics or math. I liked it. I remember many incidents, and drill squads, and target practices, and things like that, with pleasure. I liked it. I happened to like it so much, that I did sort of well. The captain, Colonel Coonquist, or whoever it was at the time, asked me if I'd go onto to senior ROTC. And I said, "Sure." I'd like to be in Scabbard and Blade, and all that stuff. Sure." Got turned down because of my eyes. So I had only the first two years, but I got a prize in it, because I enjoyed it. It was fun to be out there, marching around in the fresh air. I didn't resent that at all. I'm your typical, unthinking undergraduate. [Laughs] I just took things as they came.

SI: How did the presence of NJC affect life on College Avenue?

GTR: … It affected me quite a lot. Yes. I liked that association very much. I'm not going into details here. [Laughter]

SI: They were joint affairs, like dances?

GTR: Oh, yes. Yes. Oh, it was great. The only trouble was, you had to be back by eleven o'clock. [Laughter]

SH: Was that a curfew for the men, or more for the women?

GTR: The women. The women. The men didn't have it.

SH: No curfews at all?

GTR: Anyway, I lived at home. No, I'm not going to go into it. But that was a good factor.

SH: Did you have a car back then?

GTR: I got a car in my junior year, finally. My father had always worked on the railroad, and had a pass anywhere in the country, and I had a pass anywhere in the East, and he didn't see any need for a car, and anyway, we couldn't afford it. But as time went on, and I rode my bicycle from the Highland Park to the Ag farm, to get to work in the summer, but sometime early in the junior year, I finally said, "I really want a car." I had friends at the farm who were on WPA.

They were mechanics, out of work, and that sort of thing. So, I bought a car for sixty dollars. … I didn't know a thing about cars. I learned fast. It had, kind of a spare. It had five wheels, and they were four different sizes in those wheels. It was an early V-8. And I literally had to drive with a case of Sears Roebuck oil in the back seat. I had to put oil in every fifty miles. It was terrible, it was awful, well, but I used it. I mean, if one of the girls needed a ride home to Elizabeth after a date, we went to Elizabeth in that car. One night the fuse burned out, and I had no lights, and I put a penny in the fuse box to make the contact. It was my car. Well, it got so bad that finally I sold it to some poor high school kid for sixty dollars, and used that money to buy a car that my uncle was turning in. Another Ford. Mine was a '32 Ford, the first V-8. His car was a '33 Ford, and he sold to me for $75.00. So then I had a real car. Now that car, unfortunately, couldn't make the trip to Los Alamos. That's why we didn't have a car, but we garaged it. I bought a new car in 1949, but that '33 V-8 was our car until 1949. The new '49 Fords came out, and I got one of them because I was a veteran. You had to be on a list to get new cars, unless you had a lot of money. So I was able to get a car in 1949. We had that car for seventeen years. But I got my first car as a junior. And I really was glad of it. I could go down the beach fishing. I took my parents down. The only trouble I had with NJC was, during the autumn I was usually busy on Saturdays, because my father liked to fish, and I liked to fish. And I'd take my father and mother down to the Shore, and we'd fish. So I'd have a date on Friday night. And they'd all leave you hints, you know? "Saturday night's the big night." "I'm sorry. I'm busy on Saturday." And each girl thought it was for some other girl. You see? [Laughs] Whereas, I'd really take my parents down fishing. But after fishing season, then I also had Saturday nights. But I did have a car.

SI: After the war, you mentioned one small GI benefit. Were you ever able to use any other part of the GI Bill?

GTR: No, I never used the GI Bill. I already had my PhD.

SI: Like the VA mortgage, something like that?

GTR: No. I did apply here for the Harrison Street Project Housing. But I was overqualified to get it. I could have it because of being a veteran. But I couldn't have it because I was faculty, and they were saving it for graduates students. We don't have to go on much longer, do we?

SI: Oh, no. Well, one thing I wanted to ask. Were you able to see the 1938 Rutgers/ Princeton football game?

GTR: You bet. I took my father. The captain, named Harvey, Paul Harvey, I think, and a fella named Craig, were on the team. They were in my fraternity. So, you bet. Went to that game, saw it, made myself hoarse. It was twenty to eighteen, I think, or something like that.

SI: Were you able to take part in any celebrations afterwards? It was crazy.

GTR: Well, it was crazy, but I'm sure I wasn't in the middle of it. I got to the fraternity later. But first of all I went home, had supper, and came back. But I don't remember anything particularly outrageous. But it was just because I was left out, I guess, because I did have to go

home afterward. But I remember the game, with great pleasure, at that time. Now, it's different. [Laughs] I've had too many students come through the athletic programs here, and I know that they're really students. Those guys go out there after their labs. It's tough here. It's very tough. It's tough to get people to come here if they're good. And we're having a bad year. I'll see the Columbia game tomorrow. One of my sons got his PhD from Columbia, but he's down in Texas now. But I like the athletics. I think it's important.

---------- END TAPE TWO, SIDE ONE ----------

SI: I just have one more question we usually ask. What was your impression, growing up in the Great Depression, of Franklin Roosevelt, and his New Deal programs, and just his whole vision of it?

GTR: Roosevelt, yes. I grew up in a neighborhood that was strictly Republican. The word in our neighborhood was, "The Democrats drank." And it's clear that Roosevelt drank. Well, that was the feeling of the elders around, and in the church. And the more wealthy people felt that he was a traitor to his class. As a student, I was very interested in what was going on there. On the farm, Ag farm, I worked with people who were there because they belonged to the WPA, and I knew their problems. And I was on what was called, NYA. National Youth Administration, I think, was paying me. These things gave us a sense that something was being done. We were just kids, but at least something was being done. And, of course, on my trips to New York I saw how desperate things were. And, "Somebody better do something." My mother, fortunately, had sensed what was going to happen, and before the banks failed took her money out of the banks, in just a matter of six months ahead. And so, we at least, didn't suffer from that. It wasn't much, but it was there. And, in retrospect, I think the only thing that ended the Depression was World War II. I don't think, just as I think Roosevelt gave the country the feeling that somebody cared, and something was being done, but I don't think it worked very well. But the war, unfortunately, is what it took. I always felt that Hoover was maligned, for being blamed for so much that wasn't under his control. He didn't grasp the moment, and try to do something. He thought that things would straighten themselves out. I remember an amusing [story]. I used to consult for some of the companies south of San Francisco. I stayed around Stanford, and talked with people. There's a Hoover Tower at Stanford. And the story is that, late in life out there, some Stanford person interviewed him. He grew to be very old, you know? And just before he died somebody interviewed him, and asked, "What do you think of all the criticisms that were levied at you by so many people in your presidency?" He said, "I outlived the bastards." [Laughter] But we were aware of politics, of course, and aware that things were bad, and things had to be done. But I'm sure there were students on campus who were better informed than I, and even more concerned. I was just working away, sort of minding my own business, in a selfish sort of way.

SI: I just have one last question. Sorry.

GTR: Another last question?

SI: Do you remember where you were and how you heard the news of Pearl Harbor being bombed?

GTR: Yes. I was home. It was a Sunday afternoon. I was a graduate student here. I worked here all the time. And on Saturday night, since there were no classes the next day, I'd work until two or three a. m. And I'd go home on Sunday, to get away from the noise. I lived in the graduate college. To get away from that, so I could sleep. And I slept. And I was on the sofa at home when the announcement came, "Pearl Harbor was bombed." And I said, "Where's Pearl Harbor?" And my father said, "Oh, it's some rock in the Pacific, I think." Well, the next morning, Monday morning, I came driving down, as always up Washington Road, to get to Palmer, the Physics Department. And Army trucks were all over the highways. And, of course, then we knew. And I remember, I had a radio in my room there, and at noontime I went back. We ate at the graduate college, too. I had the radio on when Roosevelt made the Declaration of War. That I remember very well. This was it. And that's when we were glad we were involved with stuff, here in the Physics Department, which we were involved with six months before Pearl Harbor. Everything, all the intelligent, especially the physicists here, and the chemists, knew that things were going to get desperate. And they committed early. They did commit early, and completely gave up their research, and went into this stuff. We never knew who was going to teach a course, because somebody would be in England. They got to England by way of Brazil, and the Azores, and then up. And they'd be away. As a result, we had visiting professors, to some degree, who were outstanding. Very good. But I had a nuclear physics with Wigner, who was here until he went to Chicago, and Van Neumann, who was at the Institute until he got terribly tied up in the war. We knew what was going on sooner than most. I realized it later than many people, but still sooner than a lot of people. And it was bad.

SH: Is there anything you'd like to add? Questions maybe we forgot to ask you?

GTR: I don't think of a thing. I've talked too much already. Yes.

SH: Thank you very much for your time.

GTR: You're welcome. It's good to meet you fellas. I'm glad to see that Rutgers still has students like you. [Laughs]

SH: Thank you.

SI: … This concludes an interview with Professor George T. Reynolds on October 29, 1999, in Princeton, New Jersey.

---------- END OF INTERVIEW ----------

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