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CLARE MALLORY MILLIKAN
(1915 – 2001)

INTERVIEWED BY
ALBERT F. GUNNS

January 20, 1981

ARCHIVES
CALIFORNIA INSTITUTE OF TECHNOLOGY
Pasadena, California

Subject area

Millikan family, administration, biology, physiology

Abstract

An interview in January 1981 with Clare Mallory Millikan, daughter of mountaineer George Mallory and wife of Glenn Millkan (1906-1947), second son of Robert Andrews Millikan, Caltech's first executive head.

In this interview, Mrs. Millikan recalls meeting her future husband in 1937, while she was a Cambridge university undergraduate reading history and Glenn Millikan, a Cambridge PhD, was a tutorial supervisor at Trinity College and working under E. D. Adrian in the university's Physiology Department. She discusses their mutual love of hiking and climbing. A year later, they were married, and when World War II broke out they were in the United States, where Glenn soon went to work for Detlev Bronk, at the Johnson Foundation for Medical Physics of the University of Pennsylvania, and later at Cornell Medical College in New York City. She describes their lives during the war years and something of his work with John Pappenheimer on the Millikan oximeter, with which the U.S. Army Air Force equipped its fighter pilots to keep them from blacking out at high altitudes.

She recalls their move to Vanderbilt University in Nashville, Tennessee, in 1946, where Glenn Millikan headed the Physiology Department, and his fatal accident in May 1947 while they were climbing in the Cumberland Mountains. She remarks on her impressions of and relations with her in-laws: Robert and Greta Millikan and Glenn's two brothers, Clark and Max Millikan.

Administrative information

Access

The interview is unrestricted.

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Preferred citation

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CLARE MALLORY MILLIKAN

Glenn and Clare's wedding, August 3, 1938, Godalming, Surrey, England. Photo ID RAM88.7-1

Glenn and Clare with their three sons, George, Richard, and Mark, ca 1946. Photo ID RAM92.5-3

CALIFORNIA INSTITUTE OF TECHNOLOGY ARCHIVES

ORAL HISTORY PROJECT

INTERVIEW WITH CLARE MALLORY MILLIKAN

BY ALBERT F. GUNNS

KENSINGTON, CALIFORNIA

http://resolver.caltech.edu/CaltechOH:OH_Millikan_C

CALIFORNIA INSTITUTE OF TECHNOLOGY ARCHIVES
ORAL HISTORY PROJECT

Interview with Clare Mallory Millikan **by Albert F. Gunns**
Kensington, California

JANUARY 20, 1981

Begin Tape 1, Side 1

GUNNS: I'm interviewing Clare Millikan, the wife of Glenn Millikan, here at her home in Kensington, California [in the Berkeley Hills]. The date is January 20, 1981. I was wondering if you could start out by simply telling me how you met Glenn Millikan.

MILLIKAN: Ah, it was interesting. It was the only time I really broke the rules and broke out of college. It was after the end of the term, and I had stayed late because I had lost a week in the beginning, so I had to spend this extra week. And they closed the college at nine or nine-thirty, some rather odd hour like that. Much earlier than usual, because—

GUNNS: This was in Cambridge?

MILLIKAN: Yes. Of those students in residence, there were one or two unfortunates like me who had to stay to make up their time. So I went with an American friend, and with Glenn, whom I'd never met before, to a little, very radical play somewhere. We got out around eight or eight-thirty and hadn't had supper. They could have taken me back in time, but I wouldn't have had time to eat. So they said, "Well, we'll just take you back and you can sign in and then just get out somehow and we'll go and have a meal." So we did. I got out all right. Getting in again was more of a problem, because the music room windows opened in a funny way, so you could sort of squeeze out, but if you squeezed in, they kind of closed in on you. It was a tight squeeeze. [Laughter]

Anyway, we went to Glenn's room and made an omelet or something, and stayed talking about this and that—not entirely about the play perhaps but a good deal more about our interest in outdoor things. It turned out that Glenn really—it was sort of his enthusiasm, which was very un-British at the time—talked about his love of the great outdoors. I was going to go on a climbing trip soon, and I was very keen on mountaineering of all kinds. He and Andy both expressed a good bit of interest, so I said, "Well, why not come along?" Oh, well, I didn't say *then,* "Why not come along?"—because it was not my climbing party. But a little while after that, I had a message from Geoffrey Young, the man who organized it, who was a friend of my father's—my father [the mountaineer George Mallory] was dead then—and my sister and my mother and I always went to this Easter climbing party whenever it was possible. Geoffrey Young, who was quite a well-known writer and sort of the patriarch of climbers in England at that time, wrote and asked if I could find any of my friends who might be interested in joining the climbing party. I found Holly Hill, a daughter of the physiologist. Lisa Keynes—she was interested in going—and these two young Americans. So, somehow I arranged for them to drive up to Wales. I met them there, and I felt a little responsible for them, so I arranged to climb with them sometimes. I was *very* attracted to Andy, the other American, but he was already rather involved with a close friend of mine, and I didn't want to impinge on this relationship, so I put Glenn on my rope one cold snowy day, and apparently he was seized with something as he watched me struggling to get up some miserable little chimney as we hacked away at the ice with ice axes and things. I didn't know much about ice at all. [Laughter] I mostly was just used to rain and wind and snow and cold. Anyway, then we walked home across some sort of high, rather boggy plateau with lovely marshes, and ran down the hill to the hotel. Anyway, he apparently got interested in me that day. My sister was on the trip, too, and she was a medical student [at Cambridge], and Glenn taught the medical students. He invited himself to come and visit us before the end of the vacation. So he came. He was equally pleasant to both me and my sister. I had *no* idea he was interested in me in any way. [Laughter] They dissected a pig together.

GUNNS: How romantic.

MILLIKAN: [Laughter] It was a little pig that had died at birth. And the last morning, before we went back, before he left, he took me out into the garden and said, "I have a proposal to make." And by gum, he sort of proposed. [Laughter] He said, "I know you don't know me very well, but I want you to know me better, and consider me as one of those in the running," or words to that effect—because I had rather a lot of boyfriends. There were only five hundred girls at Cambridge, so it was rather hard to be fair to everyone. [Laughter]

GUNNS: About how old was Glenn at this time?

MILLIKAN: Well, about thirty, thirty-one; something like that. I have a photograph of him, which must have been taken at just about that time, or maybe a little before.

Well, that summer, we did see quite a bit of each other. We went off on trips, which was one of the occupations that my friends and I liked to do. We went to the fen country, where there were very fine old churches—toward the coast, to the east. There used to be wool growers who were fairly wealthy and named all these churches—beautiful old churches there. We went off swimming in some ponds that had been dug out for phosphates. Someone had discovered them—I don't know where. But there was a little coterie of nude swimmers who went out there, and you could go and spend the afternoon on Sundays or something like that.

I don't know if he came and climbed in the chalk cliffs with me or not. That was one of the occupations that we did on Sundays, too—some of my friends. Cambridge is very flat country, and there were very few ways of climbing around there. There were these old chalk cliffs. You could climb up the walls of these cliffs, but you had to take out your handholds and put them back after usage, and everything came away pretty easily. So you always had to have a rope from above and some kind of protection for your head against the falling chalk.

GUNNS: Had you always climbed, since you were quite young?

MILLIKAN: I always climbed trees, until I went, when I was twelve, on these climbing parties, and then I climbed rocks with total enthusiasm. Oh, I had climbed rocks at the seaside a bit, too. I scrambled around, you know, but I learned how to do it properly with ropes and things then.

GUNNS: I gather Glenn was a quite good skier, too.

MILLIKAN: He wasn't very good at either skiing or climbing. He was totally enthusiastic and got around on skis. What he had done was cross-country skiing. He went to Finland, the year before I knew him, with Bryan Matthews, who was another physiologist. I forget who else was in that party. Such a pity that Gordon Sutherland has died [1980]; because he may have been on that party. He was Glenn's very close friend in Cambridge and knew him before I did and knew all those details.

I have a picture of Glenn on that trip in Finland, sitting cross-legged before a little camp stove. He showed me films of it. I still have a box of his old films, including, I think, some reels from that Finnish trip, but I don't have a projector anymore that works, so I haven't looked at them for ages. He was rather keen on amateur filmmaking. They went on a cross-country trip for, oh, a week or ten days, staying in army cabins. Apparently, they were allowed to use them; they were little emergency huts. And they were given permission to use them and travel around among the little birch trees and pines and a great deal of open space. It must have been rather lovely cross-country-skiing country. But Glenn was not one of these expert parallel-turn people who swoosh down slopes with the latest immaculate equipment. [Laughter] That kind of skiing really hadn't developed, I don't think, quite then. At least, maybe the Norwegians were good at it, or the Swiss.

GUNNS: But it hadn't become the sort of fashion show that it has since become. Do you know what kind of work Glenn was engaged in, in Cambridge?

MILLIKAN: Oh, yes. I knew about that.

GUNNS: That's one of the things, surprisingly enough, that rarely appears in his letters—any discussion of what he's doing. I'm really very puzzled, or I was. I recall being puzzled when I read the letters as to what he was doing. He would occasionally voice frustration that experiments weren't going well. And occasionally even some self-doubt as to whether he should be doing this at all.

MILLIKAN: Yes, well, he always was plagued by self-doubt. I mean, even just before he died. He was always interested in studying physiological changes *in vivo*. He didn't want to crush things up and put them through processes that altered them. Plus, when he was at Cambridge—

He had started out with a degree in math, at Harvard. Then he went to Germany and thought he could apply mathematical principles to biology and studied under—what's the man's name? Oh, a well-known German physiologist. It'll come back; he's probably mentioned in Glenn's letters somewhere. Or a biochemist, maybe. It's been so long since I've talked about all this stuff, and I have no memory of the name. Anyway, Glenn wasn't, formally, a physiologist. He was at Cambridge more as a sort of a biochemist, using what he'd learned of math in biochemistry to apply to physiology. And he got started on hemoglobin, and I think he was doing some work on snails, at one point. He worked first of all with [F. J. W.] Roughton, who was a very difficult man to work with, I gather, from the letters.

GUNNS: This was in Trinity?

MILLIKAN: Yes. It was a bit of a muddle, I think. Well, he wouldn't have had to work with somebody from his own college, I don't think, but I think Roughton was in Trinity, anyway. Roughton was more in this sort of biochemical kind of physiology, I think. And he wrote me years later, wanting Glenn's raw data from all that research, because it had been questioned. That is, Roughton's work had been questioned, and Roughton seemed to have depended a good deal on Glenn's data. I found various notebooks, but I couldn't find, apparently, the right one he wanted. I don't know whether he was ever able to sort it out or not.

Then, later on, Glenn got into mussels, which he found interesting. He did a little work on snails, too. I could tell you a lot more about his work during the war, when I was there.

GUNNS: Well, his research did result in the invention and patenting of a couple of devices.

MILLIKAN: Yes, well, that was later. That was a matter of measuring the oxygen in the blood. And that was simple, compared with the research he was trying to do, which was to find out the whole process of the cycle. When you use the blood, or the muscle, or whatever, the hemoglobin goes through a whole lot of physiological changes. But the thing he developed [the Millikan oximeter—ed.] is a very simple device really, which shone photoelectric light through the thin part of the ear, and since venous blood is darker than arterial blood, as you use up your oxygen the blood gets darker, and you measure the difference with a photocell. It's a matter of getting it all calibrated. And, you know, designing the instrument, making a neat little

physiological thing and then attaching it. He would demonstrate this thing before groups of doctors at Cornell Medical College and hold his breath—he got awfully good at holding his breath. He held it until you'd think he'd be absolutely blue in the face. You'd wait and wait, for about fifty seconds, and then between fifty and sixty seconds the oxygen would begin to go down and go down quite fast, actually. He got that device working, and the first use for it was for indoctrinating pilots into the dangers of high-altitude flying and the effects of low oxygen. How, if they were to work at that altitude, in a dogfight or something— Because fighter planes were smaller and did a lot of maneuvering; and the pilots used much more oxygen when they were in an exciting situation like that.

GUNNS: Was this used by the RAF?

MILLIKAN: Well, he went not to the air force, but either the army or the navy. They had two separate air forces in those days. He would not go into either one, because he said that if he did, then the other one would not use whatever he was working on. It was better to stay outside and be an expert from outside.

GUNNS: This was the U.S. Air Force, not the RAF?

MILLIKAN: Yes, the Americans. Well, the Americans were collaborating with the Canadians; and he went up several times to Montreal, where they had a low-pressure chamber, which they didn't have here, and did one of his first experiments up there. And then he used to go out to [the Aeromedical Research Laboratory at] Wright Field [in Dayton, Ohio] with John Pappenheimer, who was working with him then. John would know the full details of all that work at that time.

GUNNS: Where is he now—John Pappenheimer?

MILLIKAN: He's in Cambridge, Massachusetts. He's got a life research grant from the American Heart Association—very nice. A nice situation to be in. He deserves it; he's really very good. Though he hasn't done work recently directly related to the heart, I would think, though it's very interesting stuff.

Well, anyway, they used Glenn's device first for teaching purposes, and what he wanted to do was use it directly, to adjust the oxygen supply to the pilots' needs. After a bit [1941], the two air forces joined—it was the Army Air Forces, I think. There was someone out in Minnesota who was the Army Air Forces doctor and who was very conservative, and it was very hard to convince him that they needed anything more sophisticated, until they brought down a German airplane, and obviously the Germans were supplying oxygen to their pilots as needed. So then they were all gung-ho for developing one. And Glenn did. It took a while getting the machinery just right—having the right little sort of gas thing for the breathing and all that. And he worked very hard on that. We took a vacation once a year to visit the man who designed, or was responsible for making, the sort of gas-bag thing. He worked for Bendix Corporation and was an inventor himself—a bright fellow. They had a country house in Connecticut and the two men would talk shop. And his wife, who was a child psychiatrist, was just a perfect hostess. We had a wonderful time there. The children were allowed to get up as early as they liked and join our hostess, watching squirrels out in the top of the hemlocks. But the dog was not allowed to appear until nine o'clock in the morning. [Laughter] We stayed up until all hours playing bridge. Her husband didn't play bridge; he was a chess player.

GUNNS: This was during the war?

MILLIKAN: This was during the war, yes. We had no vacations, really, and they worked six days a week, at least two or three nights a week until two o'clock in the morning when they were doing experiments. [At first, at] the Johnson Foundation [for Medical Physics, at the University of Pennsylvania], which Detlev Bronk headed up. *They* did an awful lot of useful research during the war. And it was good, because Bronk was working directly under the president in, I don't know, in some defense office or something, so it didn't have to go through all kinds of military channels. They got the problems immediately and got to work on them. They were really very effective.

GUNNS: Were all the problems they worked on related to this invention?

MILLIKAN: No. No, no. This was just Glenn's particular thing he was working on. Other people were doing different things. Keffer [H. K.] Hartline was an eye specialist—optical

research. He was asked to develop a sandproof goggle of some kind for the people in the desert—they had to be able to go to high altitude, too, I remember. People were working on different aspects. There was a little interim, before the war-related problem came through, when the cold war was going on in England, when we were both sort of dissatisfied, because we weren't able to help or do anything useful. Glenn was working [at the Johnson Foundation] with Britton Chance, who was a young fellow who had just come into the lab then, on bioluminescence, also trying to get mathematical curves for the things going on—same kind of principles. Britt Chance carried on with that later on and made quite a name for himself, but using quite a lot of Glenn's data, actually. I don't think Glenn ever got much credit for it.

GUNNS: When did Glenn go to Vanderbilt?

MILLIKAN: That was after the end of the war, but not quite immediately. He and John Pappenheimer were writing up the aviation handbook—the physiology of high-altitude aviation. They wrote a complete handbook on it, which took them just about two years, I think. You should ask John Pappenheimer about that. Toward the end of the war, before they started on the handbook, Glenn was given this special problem that the army wanted him to solve—designing a bail-out system. Because the planes were pressurized by that time, and if the pilot had to bail out suddenly, it was kind of bad. They wanted something that he could have with him, with his parachute, and just kind of pull a lever or something and get oxygen. Glenn used ferric chloride—which gives off oxygen as it burns—and put this in a little bag and arranged some system to ignite it, so they just had to pull a string or something and it would do the job. The people who would have made this were people who made mine safety devices. Glenn would talk to them about the construction, and he got the heads of every department there and outlined how they were to proceed. They wanted it in a big hurry. He just took over the whole organization of the administration. Everyone was so impressed with the way he did this that afterward they wanted him to head up the whole chemical research project, in Maryland. But I had Quaker leanings, and I could not go along with that. [Laughter] If someone else was going to do it they could do it, but it wasn't going to be *us*, you know.

So, he really wanted to go on doing research, and they tried for two years to get him to go down to Vanderbilt, and finally Detlev Bronk kicked him out. He said, "You should do this.

You should be head of that department—you've really been doing that kind of thing." But Glenn felt he wanted to make his name in research before he took on a big administrative job.

GUNNS: Was his task at Vanderbilt largely administration?

MILLIKAN: Well, he was head of the Physiology Department there, in a big medical school. It was considerably administrative, especially in the beginning. Because the second in charge, who had been running the place while they were waiting to find the right person, got a stroke, and they really didn't have very good teachers there. But Glenn got doctors to come and lecture on their special fields, and filled in one assistant who had worked in the right field. But they were kind of short-handed that first year [1946]. He had very good relations with the doctors, and they got very keen on using the Millikan oximeter on their cardiac cases. Oh, and there were endless troubles with the manufacturer. We had to fire him. He had the patent and he wouldn't let anyone else make the thing, and he wasn't producing them. [This was] right after the war. A lot of people wanted this thing. He became very obstructive and difficult, and Cornell wasn't very good about pressuring him. Glenn wanted to turn the whole thing over to Research Corporation**.** And in the end he didn't, because he died. But his father and I managed to get through the necessary paperwork to get it from Cornell over to Research Corporation, which is used to handling manufacturers. It was a useful invention.

GUNNS: Is that device still being used?

MILLIKAN: Oh, yes. I've had royalties on it for years. I think it's probably in every anesthesia place in— Nowadays, they need to check on people's blood supply, oxygen supply. It's used for cardiac cases and blue babies.

GUNNS: It was contested at one point, wasn't it?

MILLIKAN: Oh, maybe [when we were at] Cornell. I don't know. I didn't know about that.

GUNNS: I think there was some problem with someone producing a similar sort of device.

MILLIKAN: Was there? Oh. Well, who would be contesting it was the Research Corporation, I suppose. They didn't inform me about that. That's odd.

GUNNS: Well, as I say, I may be mistaken about that.

MILLIKAN: Maybe so. There was no one else working on that particular thing at that time. But he was a gadgeteer, and he considered that that was gadgeteering. He wanted to do basic science, and sort of crack the secrets of the universe—that was the generation he came from. It's so strange, really—kind of a deep idealism, I find it. I'm not sure that there is so much now. My middle son [Richard Millikan] went into chemistry. He was working on, actually, the physiology of frog legs. It was almost the same problem that Glenn was working on, but with somewhat different equipment. Over at UC Medical. He found it intensely boring. He liked to make things, like Glenn did, and kind of invent new gadgets. There they were so poorly equipped, after doing his PhD with a rad lab at his disposal, he just found the medical school didn't have the equipment to make the instruments that he wanted to make, in some instances of his project. He gave up science altogether. He couldn't get a job in a nice, small liberal-arts college. He'd have been a first-rate teacher. He was even more organized than Glenn—in fact, better organized in his mind. Glenn really worked on his lectures. I mean he went over them and I would listen to them, and I'd ask questions. And he found that very useful, because if I didn't understand some technical words, his students probably wouldn't either. And so I got to know a good deal about the effects of carbon monoxide in your blood and things like that.

GUNNS: Was Vanderbilt Glenn's first teaching job?

MILLIKAN: Oh, no. He was teaching in Cambridge.

GUNNS: Oh, he was.

MILLIKAN: Oh, yes. That was where he was teaching my sister, I suppose. No, he got his PhD there, and then got a job as a tutor at Harvard. When he was on the way back to America, they asked him in Cambridge to return on the faculty as a teacher, so he went back the next year and stayed there.

GUNNS: This was in the mid-thirties?

MILLIKAN: Yes. It would be, well, early thirties, I suppose. Because, let's see, there'd be the three years of the PhD and then there'd be the year at Harvard, that would be four years. I knew him in 1937.

GUNNS: Yes. So he was a tutor in Trinity College also?

MILLIKAN: I think they called him a tutor—or not. Tutors are rather high up in the scale. He'd have been a lecturer in the Physiology Department of the university. What he was doing for the college—he might have been a supervisor. Tutors had a more individual responsibility for a certain number of students. They didn't have such an academic responsibility. The people whom you went to, if you were struggling with your essays or whatever, were supervisors. It's called a tutorial supervisor; they helped advise you what things to go into in a more general way. When you're taking a course, you have a supervisor for that particular course. He may have done supervision in physiology, but they mightn't have all been students from Trinity; they might have been from other colleges. My tutor in the last year I was doing Tudor economic history—that was his field, and he wasn't in my college.

GUNNS: This was a position that enabled Glenn to more or less keep body and soul together and also pursue his research.

MILLIKAN: Oh, very much so. And he was a member of the college. He had these dinners in Trinity, with all these famous professors, and some of them very interesting people, and he knew them. He was part of the college. Yes, I imagine he had a fairly good stipend for those days. He certainly seemed to be able to afford to do— [Inaudible sentence about camping] He had a hot-and-cold water tank in his car, with the heat coming out of the radiator somehow—and various ingenious devices. I remember he would shine a spotlight, and there was a mirror somewhere by the radiator cap, and he could shave in the dark, if necessary. [Laughter] But that was the Ford, which I didn't really know very well. [Showing photos] It's an earlier one. He always had Fords. He used to look at the blueprints to see where he could saw through this and that, so he could take the seats out and make it into a bed. And he liked to have one that you

would put up the top, so if it rained in the night you could be in your own little tent, lying in the car. It was ingenious. We camped all over France in one of those inventions of his. [Laughter] It caused great amazement wherever we went, I have to admit. It was hard to get gas, because as soon as they opened the bonnet—as they called it in those days—they wanted to know all about the stuff they saw under there, you know. Getting gas was all right, I guess—it was when you put water in the radiator or you tested the oil. Well, anyway, I enjoyed it. Of course he did a lot of outdoor things at Thacher School [in Ojai]. I don't know if you've ever heard of Thacher School?

GUNNS: Yes.

MILLIKAN: Well, Glenn was rather ahead of his age, I think. He was very indoors and always inventing things and keen on math. He formed a little electrical repair company with some of his friends. Anyway, when he was a kid, they liked working on those things. But he didn't really have much outdoor experience, so they [his parents, Robert A. and Greta Millikan—ed.] sent him to Thacher and hoped he would drop back a year and not go to college when he was so young. He was known there for a gate he invented, which would close itself easily. You could open and close it without getting off your horse. He was known as Archi, short for Archimedes. [Laughter] But he was always so ingenious. That's when he came to love the California mountain and desert country. He learned to love it there. And I suppose that's why he came to Wales, because he always loved mountains. The Wesh mountains were different—wetter and boggier, but he enjoyed them too.

GUNNS: Many of his letters described his trips, and—

MILLIKAN: Yes, he had great trips. And he was very keen on architecture. So my middle son finally gave up science and went into architecture. Just mid-career as it were, already with a wife and child to take care of.

GUNNS: I was going to ask, when did you marry?

MILLIKAN: In 1938.

GUNNS: That was in England?

MILLIKAN: Yes, we'd gone back. That's right, the Anschluss had taken place, and everything looked very grim in the middle of that year. I was believing we would be coming right home, and everyone said, "No, stay." The war hadn't broken out yet. We went on our honeymoon, driving down to the South of France, and then we went to a physiology conference in Zurich. And as we drove over some river between Switzerland and Germany—would it be the Rhine or the Rhone?—we were told all the bridges were mined. You know, even the Swiss were expecting that the Germans might invade them. Things were very tense. And as soon as we came back and started finishing our apartment, my mother said, "Buy your rugs now. You will not be able to buy carpets, and you will not be able to buy curtain materials, and all these things are going to disappear." Because she'd been through the First World War when she was young married, and she just knew how the army somehow laps up everything and prices go sky-high and so on. Then, of course, Chamberlain did his bit with the umbrella and it was staved off for a year. So the war didn't actually break out until the following year, when we were over here in America. And I was pregnant with George. I suffered the most *unbelievable* morning sickness. I was totally dehydrated. [Laughter]

GUNNS: You had three sons.

MILLIKAN: Yes. But we traveled about, and we got as far as the Adirondacks. That was when the war broke out. We were staying with some friends, at a lake there. And then we had to decide what to do.

GUNNS: What did you decide?

MILLIKAN: Well, Glenn had signed on with the Royal Society to help in case of war. And he wanted to go back and help in some way, in any way he could. But he didn't want me to go back. He said I wouldn't be any use driving him in my condition. And I wasn't very keen on being left. I think my morning sickness was partly due to the sheer tension of being in somebody else's house. I guess my sister might have been brought over here. She came over to finish her medical degree in America, because she had married another American, too. But she

didn't marry him then, that's right. She didn't marry him until she came over to finish her medical training here, so she could train in America, because she was in love with him. She was accepted to New Haven; that's where she went. It was a complicated situation. We were sort of about in different places. We went to Woods Hole for a little bit that summer, and I waited around, I think, while Glenn went and visited Detlev Bronk and made the arrangement to go and work with him [at the Johnson Foundation], because he had always admired him a lot. That summer, he was being interviewed for jobs by several colleges, and they all turned out to have a good deal of teaching, and he turned them all down because, although they were good jobs, he felt he should wait and just be a research scientist for a bit longer.

GUNNS: This is the summer of 1939?

MILLIKAN: Yes, 1939.

GUNNS: So this is before the war actually broke out?

MILLIKAN: Well, yes. The war didn't break out until a bit later—until September, I think. Well, it was still a cold war, you know. The Germans were doing things in Poland, but it was a while before they started bombing England. That didn't come until the following summer. Anyway, then we went and stayed with the Bronks for a little bit. And then we started looking for a new house in Philadelphia. Up and down all those stairs, and just when you decided it would do, they would say, "No children or pets." I mean, they could have seen my condition very clearly, I would have thought. [Laughter] Ah, kind of irritating. We finally found a place, which turned out to be—I think the gynecologist that I was given in New York told us about it. It was a little remodeled house, right near the 30th Street Station. And you had to walk down under the tracks to the university through a really kind of low area, which wasn't very good for walking through at nighttime. But it was a nice clean little, sort of, studio apartment, really, with a fold-out Murphy bed. It was minimal. We had no income, you see. We didn't go back [to England]. Oh, Glenn wrote to [E. D.] Adrian or somebody. That's right. He wrote and said, "Should I come back?" Or he sent a telegram. Adrian was head of the [Cambridge] Physiology Department; then he became master of Trinity; he became a lord, in the end. Anyhow, Adrian and his wife were good old climbing buddies of my family, too. Adrian just sent a telegram

back saying, “Stay in America.” Then he wrote and said that they were not going to be teaching first-year medical students—they felt that was too long-term an approach. They thought the war was going to come on very quickly, and so Glenn wasn’t needed for that. They didn’t see any very immediate problem—they said that Glenn would be more useful over here, and it turned out that he was. Within about nine months, they did send him this physiological problem, getting oxygen into the pilots; it was for the British that he was doing that research, in the beginning, not for the Americans, although they were interested, too. I don’t know quite how soon the American army and navy were collaborating with the British. It must have been rather unofficial. Maybe that’s why he went up to Canada, to that pressure chamber up there. In the beginning, though, he was working more for the project that Detlev Bronk thoroughly approved of. Bronk wanted him to work on it, but Glenn didn’t have any salary from Bronk for the first six months. Somebody else who worked in that lab, who was a Canadian, left to go to Canada. We just simply took his place in the budget and got his salary then. And also we moved into his house! It was near Media, a charming little house.

So that was very nice—this beautiful little house that looked down on a valley, with hills folding one behind another, and a little terraced garden. It was formed by a single group, and the people who bought the land for the houses kept some land in common, so we had some woods we could walk through, too, which belonged to everybody. It was a rather friendly little group of people there—quite a community. So that was a nice place to be. Glenn commuted into Philadelphia from there. We weren’t there very long. Detlev Bronk moved to New York City. He was offered some job as head of the Physiology Department at Cornell Medical College. He was very doubtful—couldn’t make up his mind whether to go or not. He was head of the whole show at the Johnson Foundation, but at Cornell he wouldn’t be, you know. Among all those big surgeons, he was sort of small fry. And he only stayed there a year. [Laughter] He left Britton Chance, who was the youngest scientist, in charge of the other place, to kind of hold it open so he could return to it if he wanted to. And we moved to New York City. But some of the others didn’t. Some of the other scientists just kept their— **[Tape ends]**

Begin Tape 1, Side 2

MILLIKAN: We moved, but some of the others didn’t. Some of the other scientists just kept their houses in Philadelphia. The husbands just took an apartment in New York and spent the

week there and then returned to their wives for the weekends. But I didn't want that kind of separate life at all. So we got an apartment one block from the East River. Unbelievably noisy place! It was a nice place to be, though, because you could go out and walk up by the East River, and it was close to the hospital. Glenn was building his first oximeters, and I used to go in and help him solder the wires. The janitor's wife was supposed to know the baby was alone in the apartment. I think we were very casual about children then. I hadn't really known anyone with a small baby. I didn't know we had to be in such constant attendance. I would leave the baby alone, sleeping perfectly in his basket, while I went off for a walk. Nothing ever happened—I mean, he was a healthy young child.

I don't know what more you want to know about Glenn. Let me go back to the beginning to see what we've left out.

GUNNS: Everything is grist for my mill.

MILLIKAN: I know. I mean, we only had eight years of marriage. It wasn't so long.

GUNNS: Well, there were a number of things I wanted to ask you about. Particularly on the personal side, if you don't mind. One question I'd like to know is, why did you go to Mills?

MILLIKAN: Well, it was a fluke. [Tape goes blank; machine turned off. They're both talking inaudibly when it comes back on. Clare Millikan worked as a tutor at Mills College, in Oakland, California, in 1937-1938—ed.]

MILLIKAN: I did have a really nice time with Pater [Clare Millikan's nickname for Robert A. Millikan, her father-in-law] and I enjoyed him a lot. He was completely—well, he discussed ideas with me, really, as an equal. Robert Millikan—he just discussed ideas with me as an equal! We kind of bashed them out together. And he was really fun, you know. Although he was very self-confident—and probably too much so, about his scientific work—he was a very humble man, basically.

GUNNS: That's interesting, because from his correspondence one gets the impression that he's very strait-laced.

MILLIKAN: Oh, well, he is strait-laced, yes. They were. I mean, somewhere back in the family there must have been an alcoholic, because they would have no alcohol in the house. And at one point he finally got a headache when he didn't have coffee, so he decided he'd become addicted to caffeine, and the coffee they had looked like weak tea. [Laughter] He wasn't quite as strait-laced as he seemed, though. I mean, he could loosen up. But there were certain areas in which they were fairly puritanical, one would say. I remember a bit of horror that I had, because we were talking about our camping trip across the country, and Mrs. Millikan was telling me about Glenn's gallbladder operation. And I said, "Yes, the scar must be at least eight inches long!" Then I said to myself, "My God. I probably shouldn't have said that." [Laughter] She didn't bat an eye. [Laughter] And later on we sent pictures from our honeymoon, and she showed them without looking through them first. Well, they were mostly old churches and scenery, but there was one of me emerging from the Loire in the altogether. [Laughter] So, you know, we probably should have taken that out before we sent it to them.

GUNNS: Did she ever mention that?

MILLIKAN: Oh, I'm not sure.

GUNNS: Well, Greta [Mrs. R. A. Millikan] gives me the impression, from reading the correspondence, that she is a quite formidable lady.

MILLIKAN: She had a coterie of friends who thought she was absolutely wonderful, some of whom were closet gays, I would imagine. But in those days, you know, they sort of had their little—

GUNNS: These are female friends?

MILLIKAN: No, male friends. Max told me this—Glenn's younger brother. Because I was very worried about someone who'd made a homosexual approach to, did things with, my eldest son [George Millikan]. And [I was afraid it would] wreck him for life. And Max said, "Oh, no. It happens much more often than you know. One of my mother's best friends—" [Laughter]

GUNNS: Not to worry, huh?

MILLIKAN: Not to worry. "I've had a happy married life in spite of it," and so on. Yes. And I guess most English public schools have a good deal of that going on, too. So, anyway, Greta was much admired. She had good musical taste and befriended people. She was admired by people who used to go to the house—students; they entertained a lot of students. All the freshman students came to their house, in a body. They had the whole lot of them over and had simple meals, but they fed them well. She was good at managing all that kind of thing. She was a good organizer, and she was very good to her maids. They didn't overwork. She wouldn't let them do anything extra, over and above what was sort of planned for. If there were more people, she'd get in some extra help, and when my children went to live there, the maids shouldn't do their washing. It would have to be sent out, which was very embarrassing, because my children didn't have fifteen pairs of blue jeans. [Laughter] So they usually looked pretty grubby when they were there. The maids were not to just throw them in the washing machine.

GUNNS: You found Greta generally fairly easy to get along with?

MILLIKAN: Oh, no. I found it difficult. But we all found it difficult. The summer that we were all there together, there was a lovely family friend, Elizabeth Wallace, who'd been with them in Chicago and they loved her, and she kind of eased things over. But there was a dreadful time when we planned a very special celebration of her [Greta's] birthday. We bought all kinds of little knick-knacks and made rhymes to go with them and it was all fine, except her dear sons had got the date wrong—unlike them. And suddenly the atmosphere in that house became just so that you could cut it with a knife. She poked around looking totally disgruntled, and no one knew what was wrong. She didn't say a word. And finally it came out that the seventh, or whatever it was, was their father's birthday and hers was maybe the twelfth or something. I mean, we had the date three days wrong, and so we all went up and had the celebration at the right time, and she was mollified.

But she had a tendency to retreat to her room with migraine headaches, you know. Things were tense. Her mother had had rather a terrible temper, and I think she had the same problem—or the same sort of self-willed nature—but was determined that it should always be under control. And it was. But—

GUNNS: There were side effects.

MILLIKAN: Oh, yes! The side effects—terrible arthritis when she got older. And then the last time she came to stay with us, in Nashville, she was practically paranoid. Nothing anybody said was right. Even Glenn, who had been, really, the son who always used to go up with cups of tea when she had headaches, whom she was very close to—nothing he could say was right. Nothing I would say. She misread things. She took different meanings. I got, later on, absolutely paralyzed. I could hardly speak to her, because I just knew that whatever I said, she would read some other meaning into it which was hostile. And so I began to feel intensely hostile and could hardly speak in a normal tone of voice to her. It was really difficult—but then she was getting old. Before that, though—no, round about that time [just after Glenn's death]—her youngest son [Max] said that no other woman can possibly live in the house with her, just don't do it, couldn't work. And they [Robert and Greta] were urging me to go out and live with them. So I went out and stayed for a while with the older brother. I allowed the children to go with them, and it was kind of a mistake, too, because the wife of the older brother wouldn't have them.

GUNNS: This is Clark Millikan?

MILLIKAN: Clark Millikan's wife, yes. You know about her, then.

GUNNS: No, I didn't know.

MILLIKAN: She was very sweet to me for about two days, and then she froze up again. She had generous instincts, but she was basically so incredibly self-centered. She couldn't really entertain—

GUNNS: This is Clark Millikan's wife?

MILLIKAN: Yes, Helen Millikan.

GUNNS: Is Max Millikan still alive?

MILLIKAN: No, no. He died a long time ago [1969]. He had diabetes. Overworked himself.

GUNNS: He was an economist.

MILLIKAN: He was an economist. He was just awfully nice at this time. It was a difficult time, because he was somehow involved with the CIA, too [1951-1952], and those MIT students got very antagonistic and felt that he was doing some of those dirty tricks. He wrote on underdeveloped countries. I always found him *completely* the most easy person to get along with—because I was interested in economics and the economic side of history anyway. We just had so many ideas in common, and we talked—even though I was totally against his point of view on the Vietnam War. You could always talk to Max, even if you had a totally different point of view from his. It never was a barrier to talking things out. And he was very good at getting people to talk together who had opposite points of view. That summer, when we were together, we'd have tremendous after-breakfast discussions. I mean, as far as Pater was concerned, Roosevelt was *that* man in the White House. As far as Max was concerned, he was a hero, because he understood economics and used the Keynesian theory, and Glenn admired him greatly, too. But we'd have these very amicable discussions, because Max would sort of say, "Well, on this hand that, and on the other hand the other," and he always broke things up into a sort of intellectual problem rather than an emotional confrontation. He was a really easy person to disagree with. He thought that Vietnamization was going to work, and I didn't think it would. So! [Laughter]

GUNNS: And you were right!

MILLIKAN: I was right! I was against the Vietnam War from the beginning, because I'd done a little League of Women Voters study on Indochina and the French there, and I just felt that it was not a viable situation. I didn't see that the Americans could take over jungle warfare. American soldiers were not really designed for that kind of thing.

GUNNS: That certainly shows you to be right. Was it possible to disagree with Robert Millikan?

MILLIKAN: But they were right, too, you see—I mean, in a way. You could disagree with him. I'm not sure you would get anywhere. [Laughter] He would just go calmly on and sort of carry on as though you hadn't very much, I think. That was my impression. He rather tended—in his old age, mind you—he tended to slip into a commencement address.

GUNNS: You mean the same message over again?

MILLIKAN: Well, you would find yourself listening to a peroration before you knew where you were. There wasn't a great deal of back-and-forth discussion. He gave so many commencement addresses that he got a bit set in a groove.

GUNNS: In his later years, he was very concerned about reconciling science with Christianity, as I recall. Did you get a lot of that?

MILLIKAN: Oh, yes, he was—his father was a minister, after all. Oh yes. And his sons felt he shouldn't write about religion. I think he had a perfect right to write about religion if he wanted to, but they felt that his scientific name gave a sort of weight to his opinions over and above what his personal opinion would have had. So it wasn't sort of kosher, as a scientist, to talk about it. But it seemed to me he had a perfect right to do that if he wanted to.

GUNNS: But of the three sons, would you talk about.... I guess what I am really asking is which was the brightest, in your opinion? Or do you consider them really equal?

MILLIKAN: I never thought of one as being brighter than the other. They were all just so incredibly bright. Clark was perhaps a little more well-rounded. He was this gourmet, and he had more musical sense than the others. Max was an incredibly good actor. He could have been on Broadway. He would have been a star if he'd wanted to be. He decided it would be too boring a life to do the same old, you know, "Et tu, Brute?" over and over again, one hundred times or something. [Laughter] Glenn had an incredible memory. I mean, I was a historian. But he took one course in constitutional history at Harvard—English constitutional history, in the summer, for some unknown reason. And he could carry on a conversation with the historian, whatever his name was—I've forgotten it. And he knew more—he remembered

more—of his constitutional history than I did. He just had a completely prehensile sort of memory and could bring it up. I don't know if they all had as good a memory as he did, but I think they might have. Max might have been more clear and logical, in some ways. But Glenn was very logical, very mathematically logical. Glenn was more naïve. Max was suave and sophisticated, I would say. Glenn was utterly.... He plunged in where angels feared to tread. There were several categories of secrecy around the work they were doing—sort of secret and supersecret and all that. But Glenn was at the opposite end of the spectrum. His whisper could be heard at the other end of the hall. [Laughter] He just thought all this secrecy was ridiculous and balderdash—that it did more harm to our own research, because scientists couldn't exchange ideas freely enough, and what we needed to do was get ahead and get the ideas into action and not worry about other people discovering something we were doing. It wasn't important. The same idea he held later on, when the Russians were supposed to be looking at [our atomic research].

I was just very fond of all three boys, each in their own way. They were very different. I could have married all three of them. [Laughter] It's really true.

GUNNS: One of the impressions I have from having read Clark's correspondence was that somehow he seemed to be much more lively than the other two.

MILLIKAN: Well, he was much more uninhibited. He was totally ebullient. He didn't mind making a fool of himself. He knew all these ballads and he would sing them a lot, slightly out of tune, but with great enjoyment.

GUNNS: Great gusto.

MILLIKAN: He always added to a party tremendously, yes. But he was quite introspective, too. I came across some of the little things he wrote later on, describing the kind of girl he wanted to marry, various things like this. He had his own ideas—I think we matched up fairly well. [Laughter]

GUNNS: I recall vaguely some sort of lists of moral precepts, I think—advice that his father sent him [Glenn] while he was in Cambridge, about correct moral conduct.

MILLIKAN: Oh, yes, yes. Glenn was one for analyzing his conduct and making these great New Year resolutions, I'm sure, and all that—you know, self-improvement. I think that generation of people did more.

GUNNS: You mean, agonized over proper conduct?

MILLIKAN: I think we were more.... Well, nowadays people do it in different ways. People are trying to improve themselves now in rather different ways than we did then, that's all. Psychoanalysis is rather a new "in" thing. I don't think it ever got promoted in any way. Some of my Cambridge friends have been psychoanalyzed. I always felt that perhaps they were a little empty—that everything really deep and personal might have been completely washed out in this process. [Laughter] I think he would have been interested in a more psychological approach, if he happened to live twenty-five years later, probably. He seemed an extrovert in one sense, but he was also looking in on himself quite a lot. He enjoyed poetry, too. Not quite the kind of way I would enjoy it. He liked the sort of things that bounced along, with lots of rhythm. Swinburne he could quote. My God! He knew the whole "Hunting of the Snark." [Laughter] Again, it's that incredible memory, you know.

GUNNS: Did he write poetry?

MILLIKAN: Oh, no. I wrote poetry, but he memorized it. [Laughter] I don't think he ever wrote any. No. I think he was a good prose writer.

GUNNS: Might I ask you about the accident? This was in 1947, wasn't it?

MILLIKAN: Yes.

GUNNS: It's not clear to me what happened.

MILLIKAN: Yes, well. We had made very good friends with this family, and the man was a bird enthusiast. The two would drive in together to work at Vanderbilt. They drove together. We knew the family, went on long hikes with them. It turned out that this man, Walter Spofford,

had been quite a climber. We were rather eager to start climbing again. And because of his love of birds, he knew all the wild places in Tennessee, and he said there was a great gorge over at the other end of Tennessee where there was all kinds of rock climbing. So we formed a little group. And we took along a young woman who was sort of a newspaperwoman, I think, and one of the medical students, who was the son of the head of the university—Sally Spofford and myself, and Glenn and Walter. We camped overnight in the rain in a tent. It was very, very wet the next morning. We walked for a long way along the top—a kind of plateau above where this gorge cut through. It was very beautiful. The azaleas were in flower. And then we came to a good place for climbing that Walter knew about. Spent some time. We had a brand new army-surplus nylon rope. We had never climbed with nylon before; we always had the stiff old manila ropes. And this was our undoing, because it was so easy to handle that we didn't bother to coil it up and throw it clear. Well, we climbed without incident all day, up and down various places we found, instructing the beginners here and there. Oh, there was one incident. We were going along—I think I was in front and making a little traverse along around into some buttresses, and my hands were out on the ledge, above my eye level, and Walter, being taller, came along after me and he could see there was a coral snake coiled up on that ledge.

GUNNS: Ooh!

MILLIKAN: [Laughter] So I was lucky. Anyway, at the very end of the day, we could have just gone up this easy gully we'd gone down, but because we had these beginners with us we decided we better rope them up and take them up properly. And the wind had come up. Glenn was climbing down it. And Walter spotted this [inaudible] from above. There was considerable danger that he would loosen rocks, because it was an unclimbed wall and all the loose stuff hadn't been taken off. And I remember I was watching, and I moved everyone away from that wall, because of the danger of falling rock. I said, "Don't go closer." And normally Walter would have just pulled up the rope and we would have gone home. But we had these beginners with us, so we shouted to him to send down the rope—the whole thing—so that Glenn could tie on the one end and tie these beginners on at the other end and take them up this easy way. But he didn't hear for a while, so Glenn kind of moved closer to this cliff as he was shouting to him, to get nearer to [Walter so he could] hear. So Walter threw the rope over. Instead of coiling it

and throwing it clear of the cliff, he just sort of let one end go. And Glenn bent over to coil it a little bit and get it organized. So he was bent over, with his back to this cliff; and as the rope came over, it hooked on a ledge and knocked off a big rock the size of a brick or a little bigger, which hit him on the back of the head. I was watching it all. And he went rolling down through the woods, and I dashed down after him, and he was completely knocked out. Then he just— I felt his pulse. There was just a little flutter of a pulse, but I just knew he had a major head injury, and I really thought he would survive and would be, you know, stupid. He would hate that. I couldn't imagine that his mental powers would survive. Actually, I didn't know enough physiology. It was on the back of the head, [not] the front of his head. That had come out all right—probably his poor brain would have [inaudible]. We just don't know. But I suppose it affected the heart and breathing and all those things. So we stayed there giving him artificial respiration, because this young medic said we should, while Walter and this young newspaperwoman went out to get help—to bring in a doctor and some people with a stretcher. They were gone for hours. It went on and on, until his body got completely cold. And it got to this point, so we finally stopped, I think. The [newspaper] woman, I think she went up because she was sort of hysterical. She was awful, because she called up her newspaper and got this news in. It was put on radio, so the Millikans heard before we could send them a telegram or anything. It was really an immoral thing to do. They had the shock of hearing that their son was killed before we were even out of the mountains. We stayed in there overnight—the rest of us. The doctors and the ambulance people, whatever, came in and carried him out, to Nashville, but we camped there that night. It was too late to go out. It was getting dark.

GUNNS: How old were your children at this time?

MILLIKAN: George was seven. Richard must have been five or something; not quite five. Mark about two and a quarter or something.

GUNNS: They were not along?

MILLIKAN: No, they were not along. We had some untried babysitters, actually. But the news got back on account of this newspaperwoman, and there was a very nice teacher, a nursery school teacher, who had helped Glenn and me start a cooperative nursery school—a problem

after the war; [people] had had children, and the little apartments were really too small on campus. So she came over and took the children out of the house and told them, so I didn't have to tell them, which was a blessing.

GUNNS: Thereafter you went to California?

MILLIKAN: Well, not immediately. I took the beginning of a teacher-training course at Peabody [Vanderbilt's College of Education—ed.]. Wait: The first thing was, the History Department tried to let me do some lecturing. I was so dumb; I didn't look up my old notes or anything. I didn't refresh my mind at all, and they asked me something about who was foremost—no, they asked me, did I know Dietz? Well, in my mind's eye I saw D-e-a-t-s. And they were talking about D-i-e-t-z [F. C. Dietz], who, of course, was the authority on my period. Because I have such an extremely mental kind of image, rather than an oral kind of image, you know, I just didn't make the connection. So, Deats? They must have thought— I don't know *what* they thought. Don't ask me what a fool I made of myself, because somehow I don't pronounce those German-looking "ie" things quite like that, or maybe I don't pronounce them to myself at all. I just think sort of visually. So I didn't get a job lecturing in history at Vanderbilt, which is a pity, because I really think it would have been good for me to get back into my own field and do something like that. So I decided to go to the teacher-training college, though I was panic-stricken that I would be bored teaching American high school kids, because I thought they'd be very wild, unlike the well-behaved English children.

GUNNS: I'd say they probably would be.

MILLIKAN: Yes. I thought the teaching course was rather idiotic. They'd make you memorize whole lots of hopeless little facts and then do a true-false test. The first two I didn't do very well on, and then I kind of got the system and looked over the material at the last minute before I went in, which is a little difficult with eight o'clock classes. I managed to do all right. But then, when I went back to England, I really wanted to teach. And one of the teachers was rather inspiring—kind of gave me an idea of ways to get children interested in school—and was great. But before that, I went out to stay— Well, I just didn't fancy waiting to sell the house, and then when I did sell it, I told them they'd have to wait until the end of the semester before I could

move out. It was an awful job moving, because I had to put everything into storage. It would have been better just to have let the house in Nashville and then come back and move to somewhere else if I wanted to. I didn't know where I'd go, at all, because I didn't think I wanted to live in Nashville. I didn't like the schools in the South for the children very much. I would have wanted to go back to where we'd been, in Pennsylvania, where we had many friends, but I had a really nasty letter from someone I tried to let. She was a really disturbed, mentally ill woman. I should have taken no notice. But she wrote and relayed all kinds of nasty gossip about me. And said how she'd defended me and how someone said I was so standoffish and I was the daughter of a lord—or *because* I was the daughter of a lord. It was just crazy stuff. And how I'd neglected my children when Glenn and I used to go down and play tennis when he came home from work. How I left the child alone in a crib. It said all these horrible things, and I began to feel uneasy about going back to Pennsylvania. And also, the winters are very hard there, out in that farmhouse. You really needed a man to put the chains on. I could have gone back to the same house, but I couldn't imagine being in that particular place and struggling with the winters in the country. I have no doubt I would have managed, if I had gone back. But I really thought I might go to England and stay there. I was really all set to stay. But then an incredibly nice letter came from their grandfather, and he wanted me to bring the children back, at least for a visit—sort of try out being in America again.

GUNNS: This is from Robert Millikan?

MILLIKAN: Yes, yes. And I talked, too, with Gordon Sutherland about it. He said, "Well, we're going to be in Berkeley, teaching a summer session." And I had some other friends who were here, and I thought, "Well, I'll have at least two people I know. Why don't I go to Berkeley? That's near enough to Pasadena." You know, the children can go on little visits and have contacts with their grandparents—we don't need to be right on their doorstep. And so we rented a house for a year. Came on a sort of trial year. I loved Berkeley, as I really thought I probably would—because I used to come over from Mills College to Berkeley quite a lot to audit lectures [on economics]—I felt I needed to know more about economics. Beyond all things, I wanted to see California in the spring and go into that place between Livermore and Mount Hamilton, where there used to be an incredible open area. There were a few cattle around, but you didn't

see a sign of anything, except just meadows and meadows full of lupines and other flowers. And then these brown hills and dark pines and the sun shining through the orange-brown grass. It was the most beautiful place, and I thought that was the nearest thing to Heaven on Earth that I knew, and I wanted to see it again before I died. [Laughter] And show it to the children, too. I was very much in love with the California countryside.

GUNNS: And you've been here ever since.

MILLIKAN: Yes, I have been.

GUNNS: Do you still have family in England?

MILLIKAN: Some family, yes. Some cousins. One of my mother's sisters is still alive—not for much longer I think. I'm going back this summer. Some college friends—just a few people. The best friend I have in England, really, is someone who came to Quaker meetings here—a physicist from New Zealand. I got very fond of him and his wife. I always go and stay with them whenever I go back to England, and he always comes and stays with me. In fact, they brought their whole family over one time. In a way, I'm closer to him because he's experienced the same sort of shift in culture, because he's gone from New Zealand to England and he also knows Berkeley. He's got a lot of ideas and things to share. He's a very good, moving sort of person. He's very interested in making transnational friendships with scientists—like in Russia and so on. He's had some very close ties and friends in Russia.

GUNNS: To change the subject slightly, were Robert and Greta quite supportive after Glenn died?

MILLIKAN: Ah, yes. Too much so. I mean, they just wanted to take us under their bosom, you know. They rather wanted to solve all the problems then and there—that week that they came to visit us, right after his death. I felt it was too soon to be really planning things—though I was very calm. I was very controlled. I didn't manage to let out my feelings at the time. I was sort of stunned, really. I hoped my sister would come later, because I knew that I would let down

when she came. Then, too, because the children were going through measles, one after the other. But they [the Millikans] were very helpful.

I *was* in a bind, because we had a joint bank account and it was frozen. I had literally not a penny that I could spend. Now, that's a rather odd thing to do to a widow, it seems to me. So I couldn't use any money out of that account until the will had been through probate, or something ridiculous like that. They allowed me after a bit—they allowed me something. The Millikans decided I could probably take training as a librarian. He [Robert] had ideas quite soon about things like that. He thought I should go out and live with them, but Max advised me not to do that—pretty clearly and firmly. And I said, "Well, we had been planning to go to England pretty soon"—except that with research, etc., Glenn needed time to do that that summer, so we had decided not to go. I thought I should go there, but Pater practically made me promise not to stay there with the children—he thought they had more future in America. But it turns out they didn't. With the draft hanging over people's heads for so many years, they would have been better off in England.

GUNNS: How did Greta take the death?

MILLIKAN: Oh, it was a terrific blow to both of them. They were very gallant, you know. She was someone who didn't let out her feelings very much. The thing they did want was for Richard to go back with them, when they went back to California. So I permitted that to happen. Because for some reason he was the one that reminded them of Glenn the most. He was, in fact, very like Pater. So he visited them, and then Clark brought him back East. It's really a pity that she never got to know Mark. Because he was absolutely wonderful with old ladies as a little boy. He could milk candies out of them like— [Laughter] Old ladies in England always traveled about with little bags of candy. They didn't really need them, but they took them because it was "the ration." And so they were always popping candies into the hands of children. Mark somehow knew just which old lady to go and sit next to and talk to in a little fairy-like voice, with his golden curls and blue eyes and looking rather delicate. He's turned into a real husky father now. [Laughter]

GUNNS: Do all of your sons live in California?

MILLIKAN: No. Mark has a farm in Oregon, near Salem—a completely unviable little farm. He's not living a very self-sufficient life, and he could just survive, sort of, on what he grew and little, small investments. But now he's married, and it's not so easy to survive with two, somehow. His wife is an artist, and she's always survived on rather little as well. But if anything's there, she would use it up. She's rather impulsive, with no idea on planning things out ahead. But they do a lot of things themselves. They ran out of mustard one day, so she made mustard. She's developed a wonderful recipe for making her own mustard. She could do things like that, I suppose. Of course, I don't think art is the way to make much of a living anymore.

GUNNS: There aren't many ways to make a living in art.

MILLIKAN: There really aren't, no. Mark's going back pretty soon to do some apple-tree pruning. They have a big orchard. He's quite good at pruning.

GUNNS: Well, I have kept you talking a long time.

MILLIKAN: I really haven't got enough details of Glenn's life before I knew him in Cambridge—that's probably what you really want.

GUNNS: Well, as I said, everything is grist for the mill at the moment.

MILLIKAN: When you get back to the letters, you'll probably have questions.

GUNNS: Can you think of people who are still living who might have some information about Glenn's work, or anything related to his life?

MILLIKAN: Well, I think John Pappenheimer would be quite a resource. It's just really a pity that Gordon's died. The other one is Keffer Hartline, who was also at the Johnson Foundation. J. P. Hervey. There must be people around in Cambridge, but I don't know who really would know about his work there now. I think Roughton died. And now Gordon has died. Those are two people who would have known the most about it.

[Further brief conversation regarding people's whereabouts or addresses. Tape ends.]