



HORACE N. GILBERT (1901-1990)

**INTERVIEWED BY
MARY TERRALL**

February 10, 14, 21 & 28, 1978

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Pasadena, California**



Subject area

Economics

Abstract

Interview in 1978 with Horace N. Gilbert, emeritus professor of economics. Gilbert joined Caltech's Humanities Division in 1929, having previously been an instructor at his alma mater, the Harvard Business School. He specialized in business economics and industrial policy, particularly the aircraft industry, and his familiarity with aircraft manufacture led him into defense-related work during and immediately after World War II. This interview contains his recollections of Harvard Business School in the 1920s, the early years of Caltech's Humanities Division under Clinton Judy and William Bennett Munro, the leadership of Robert A. Millikan, and Gilbert's trips to Western Europe and Russia in the 1930s. He discusses extensively his war-related work, including a 1940-42 leave of absence to teach in Harvard Business School's industrial mobilization program, the 1945 U.S. Strategic Bombing Survey, consulting for the Air Materiel Command, and his work on the postwar Allied High Commission in Germany with John J. McCloy. Upon his return to Caltech in 1951, Professor Gilbert joined the Vista Project, a Caltech study of tactical nuclear warfare for the Defense Department. He comments on the effects of the McCarthy era at Caltech as exemplified by the cases of Tsien, Pauling, and Oppenheimer, and the responses of President Lee A. Dubridge and Dean Ernest Watson. Recalls his

work on Caltech's Committee for Foreign Students and his return visit to the U.S.S.R. in the late 1950s. Evaluates DuBridge's presidency as contrasted with the administration of Caltech by the Executive Council under R. A. Millikan.

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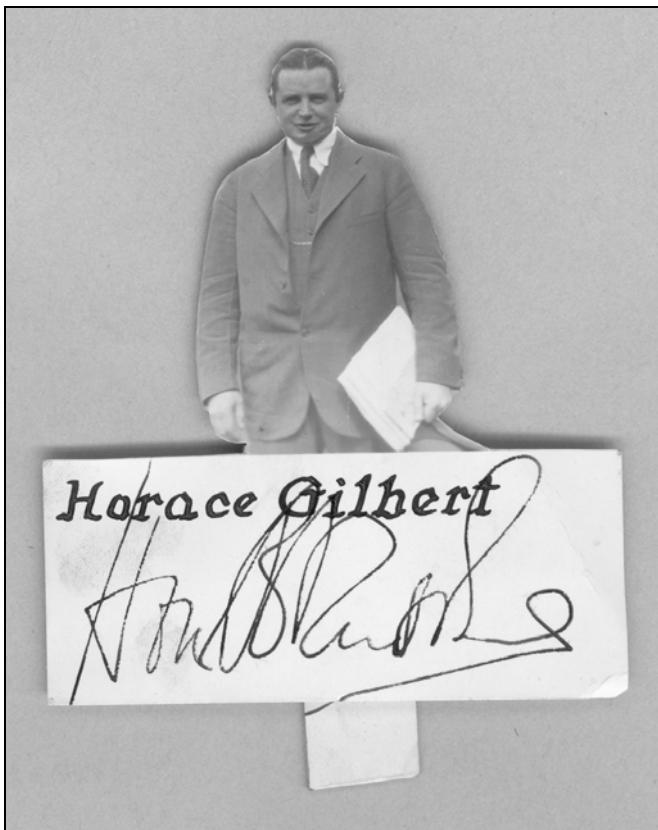
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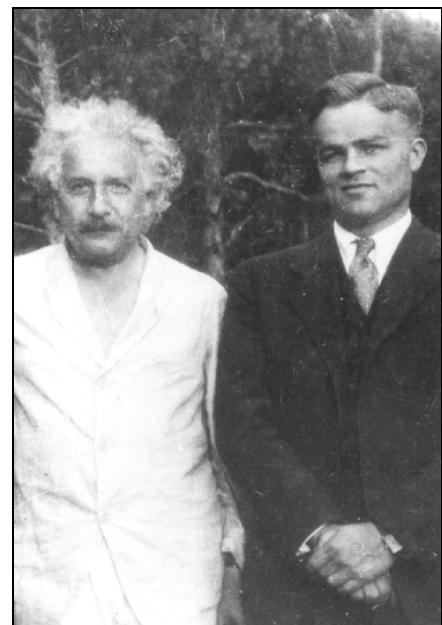
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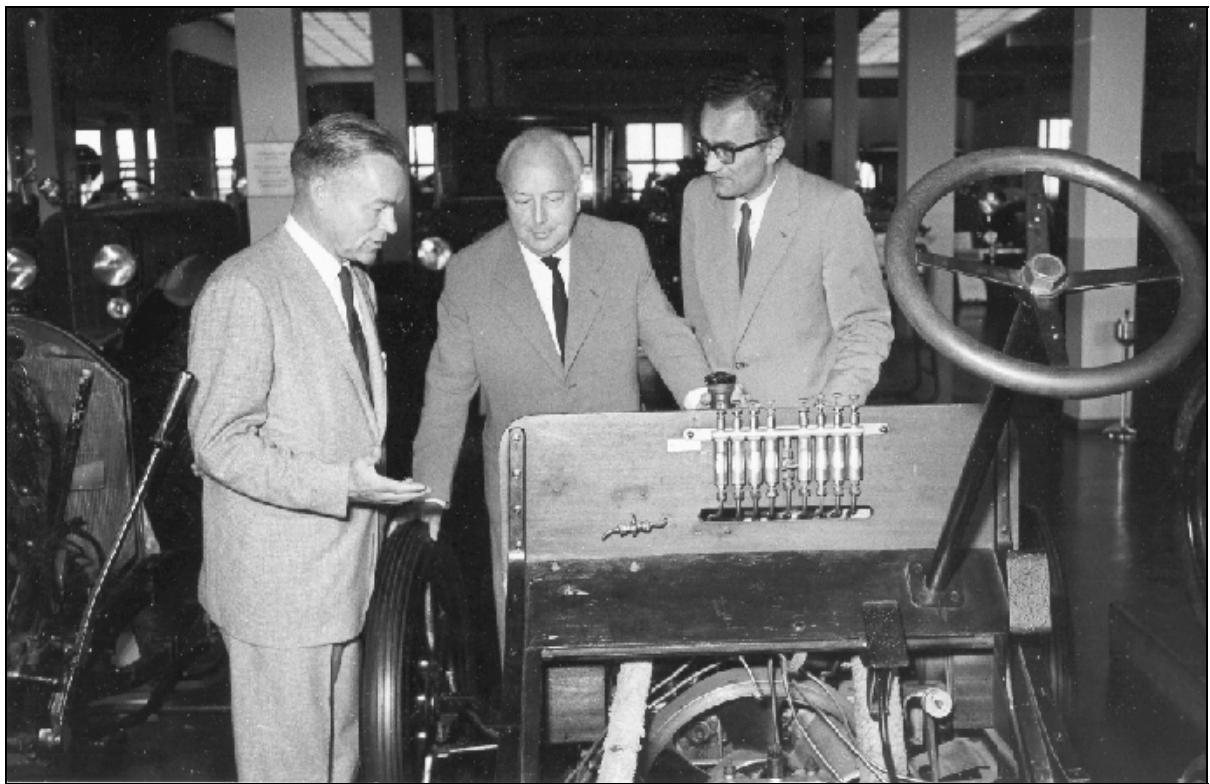
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Horace Gilbert's place card,
Harvard Business School, late
1920s.



Albert Einstein and Horace
Gilbert, July 1931, at the
Einstein villa outside Berlin.
Photograph by Ingeborg Stern.



Horace Gilbert (left), with company executives, in the Mercedes-Benz Museum, Stuttgart, 1958.

CALIFORNIA INSTITUTE OF TECHNOLOGY
ORAL HISTORY PROJECT

INTERVIEW WITH HORACE N. GILBERT
by Mary Terrall

Pasadena, California

Caltech Archives, 1979
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CALIFORNIA INSTITUTE OF TECHNOLOGY
ORAL HISTORY PROJECT

INTERVIEW WITH HORACE GILBERT

by Mary Terrall

Pasadena, California

Session 1 February 10, 1978

Session 2 February 14, 1978

Session 3 February 21, 1978

Session 4 February 28, 1978

SESSION 1

Begin Tape 1, Side 1

TERRALL: I would just like to start with your background. I know you were born in Yakima, Washington, and you went to the public schools there. I would like to ask you about your occupation.

GILBERT: My father came from Illinois in 1898 with his family, and he became a leader in the development of the apple business in the Pacific Northwest, especially as it was supported by irrigation. This brought in the Bureau of Reclamation in Washington, so he was closely associated with our senators, who were able to get the legislation through to provide the irrigation for the development of the orchard business of the Pacific Northwest.

TERRALL: Now, did he come to Washington with that in mind?

GILBERT: Yes. He had a background in northern Illinois in farming. He and my mother were

both graduates of Knox College, in Galesburg, Illinois. But they were adventurous to the extent that they were quite willing to leave behind them the prosaic life of farming in northern Illinois. Father came out first by himself to case the joint, and then a year later he brought the family. He had in mind, one might say, advanced agriculture, which developed into horticulture and especially the apple business. Not only did he take a leading role in the apple business but in the development of agricultural land in the irrigated areas, including the Yakima Indian reservation. However, that is another story and I'd better not go into it.

TERRALL: Growing up in Washington, was it unusual for students from your high school to go on to college?

GILBERT: No, not at all. I would say that that part of Washington was not a dirt-farming community at all. I don't remember how many of the high school graduating class went on, but in the class before me was William Douglas [associate justice, U.S. Supreme Court], who went to Whitman. His younger brother Arthur Douglas I think also went to Whitman. Arthur became the head of the Statler Hotel system. There were quite a number of people who went on to universities, so it was not at all unusual.

TERRALL: How did you end up choosing the University of Washington?

GILBERT: Well, that goes back to the membership of our family. There were seven children, and because both Mother and Father were college graduates they believed in it, and all seven of us graduated from universities. In my case, I was the youngest of three brothers; my two older brothers had gone to the University of Washington. I must say that I don't apologize for being somewhat passive in my attitude, but I was quite willing to follow in the steps of my brothers.

TERRALL: They had been happy there.

GILBERT: Yes, they had been happy there. My next older brother was president of the student body at the university. I might say also—this affects my subsequent, you might say, economic philosophy—all seven of us children went through universities without working; we were

supported by our parents. This may have caused a bias in my attitude; I hope not, but we all know that nobody can claim to be completely objective. The fact that Father put us through the university permitted us to give full time to our studies and we benefited from that.

TERRALL: Was it a substantial drain on his resources? It must have been, for seven children. Of course, the costs weren't anything like what they are now.

GILBERT: No, the costs were very small at that time and Father was not earthbound in the sense of being too careful about spending money. For example, in 1913, he and Mother took all seven of us on a trip around the world beginning in San Francisco, which by present standards would seem to be very expensive. But no, this was something that Father thought was a good thing to do, and he had the funds somewhere with which to pay for it.

TERRALL: That's wonderful. This brings us to your college. In college, had you decided which direction you were going, career-wise?

GILBERT: That goes back again to my family. Father, without having ever said it, was ambitious to have his sons carry on in the business, in the orcharding business. I never realized that this was sort of a tacit destiny for myself, but when I came to the successive stages—namely, graduating from the University of Washington and later from the Harvard Business School—it was rather assumed that I would carry on in the family business. So actually when I finished the University of Washington, for a period of some six months I worked in the family business. By that time it was orcharding and the Richey & Gilbert Co., which was a sales organization for packing and distributing the apples and other fruits. So I didn't go to Harvard University until the mid-term, February 1924. The reason I did it was that things were too easy for me at home. Everything was laid out for me. I was the third son and groomed to be a member of the Rotary Club and all; but, with a smile, I couldn't stand it. Incidentally, my next older brother had gone to the Harvard Business School; again, it was easy for me to follow in his footsteps.

TERRALL: Had your older brothers declined to take over the family business and that's why it was left to you?

GILBERT: No, no. My older brothers were actively doing the main things. My oldest brother was active in the orcharding end, and my middle brother, about four years older than I, was active in the packing and sales end. There's a third natural niche for me. My brothers were very friendly and they would have been glad to have me work along with them. But again, with a smile on my face, it wasn't for me.

TERRALL: So, did you get encouragement from your father to go to business school, or was it a real break?

GILBERT: Well, yes, I won't say that I got encouragement from him, but then that's an interesting little detail. He put me on the caboose of a freight train in February of 1924 taking two cars of apples across the continent. Not that we didn't have the money to pay the fare, but I thought it was an interesting experience, and it did turn out to be a very interesting experience, going from caboose to caboose taking care of these two carloads of apples. The railroads have this arrangement that the owners of the property can take care of the property if they wish, and go along with it, traveling in the successive cabooses.

TERRALL: Your decision to go to the business school was really a decision to go on and do something different?

GILBERT: Partly, although at the university I had majored in economics and business administration. The two were at that time rather interrelated. So the next natural step was to go into a business school. I considered for a while going to the Wharton School, and I was offered a scholarship there, but my brother, who was at Harvard, wouldn't have anything of it. He insisted that I come on to the Harvard Business School.

TERRALL: Once you got to the business school, or after you had been there for a while, did you have clear ideas about what you wanted to do afterwards professionally?

GILBERT: Well, that's a natural question, and the answer is no, because, again, I was in the slot

to carry on in the family business in some way. And again, when I graduated from the Harvard Business School I came home and enjoyed life at home, but during the summer I had a telegram from the Harvard Business School asking me to come as an instructor. Well, I wasn't all that excited about it, but it was an out, and especially for my father, because being respectful of the academic, why, it was something which he could accept without any deep regret.

TERRALL: But you hadn't approached the business school about the possibility of teaching? It was unsolicited?

GILBERT: No, I hadn't approached the school. The thing is, I graduated with distinction, and so I was among the group so graduating from which they decided to make the choice. I don't know how many others they asked before they asked me—maybe nobody. So that was the beginning of my work at Harvard as a member of the faculty, September 1926.

TERRALL: What did you teach when you went there?

GILBERT: What did I teach? At Harvard University, for a young person such as I, my assignment was to assist a senior professor in his course. The course to which I was assigned was business policy, and the assignment I was given as an instructor was to prepare case material for use in that course. As you might know, the Harvard Business School makes a big thing of the case method of instruction. But I remember going immediately down into the shoe manufacturing area, outside of Boston, to get a case—I remember it was the Crosset Shoe Company—for use in the class. So for two years I was an instructor in business policy, in which I gathered cases and then I assisted in the class. We didn't have to do paper grading, because we had a staff of very high-grade women to read the reports of the students. However, I watched over them closely and thereby came to know the students pretty well.

TERRALL: So did you get to use the same cases the second year, or did you have to keep going out and getting more cases?

GILBERT: The use of cases is one that permits reuse for successive classes or not, depending on

how well they work out. However, the usual destiny of the cases is that they are put into a published casebook. My first venture in writing was to revise the book called *Problems in Business Economics*, which was principally a collection of cases, some of which I had prepared but most of which had been prepared in years past by other instructors and research assistants. Then in 1929, which was the last of my years at the business school, in collaboration with a colleague I wrote a book called *Introduction to Business*, which went through two editions and was reasonably successful as a casebook. It was a casebook rather than a textbook in the usual sense. Enough graduates of the business school were teaching out in the universities who wanted some kind of material like this that it went over quite well.

TERRALL: Were you happy there at Harvard, teaching?

GILBERT: Yes, I was immensely happy, and not because of any high salaries. The salaries were very low. I think they were \$150 a month, or something of the kind. However, I did live in a faculty house, I was a bachelor, and I had that free. I remember the full professors at Harvard at the time were receiving only \$8,000 a year, and there was no annual increase. This was something that came after World War II. No, I was very happy. I would say coming from the West, the experience of living in the Boston area was as much of an education to me as going to the school there. I responded very positively to the community there. I enjoyed it very much.

TERRALL: What were your prospects there? Was it understood that you could continue there? I'm trying to lead up to how the job offer came about from Caltech, and how you made that decision.

GILBERT: Well, I'm afraid that I didn't face that squarely, and I didn't need to. I would say my colleagues, my associates—there were a number of them—were all happy and were moving along, and I suppose if I had stopped to think, I would have assumed that I would go along as they were going along, either promotion at the school or being taken into industry. There were many industrial contacts there.

Well, this brings me to the break in 1929; I haven't given you a chance to ask me. The break came in 1929, not because of anything developing at the school, although the professor

that I was assisting at the time, a professor of business economics, had been bought off by a Wall Street firm to head a great investment fund. So he was going and was gone, and in a way this left me in the lurch. It didn't worry me, because I sort of assumed that some way I would be picked up by some other senior professor and given an assignment. However, in February 1929, while this break on the part of my senior professor was taking place, I received a telegram from Dr. [Robert A.] Millikan. And how did Dr. Millikan know about me? Now I go back a little bit, because one of the students in the class of 1927, the class following mine, was John Marble from Pasadena. He was a friend of William Bennett Munro; he had met Munro here in Pasadena while Munro was spending half his time at Caltech. That was the original arrangement. Munro was the head of the Division of History, Government, and Economics at Harvard University. I remember having dinner with Munro at the Marbles' in Cambridge. To make the whole story short, Munro knew about me, and actually he had asked me while at Harvard to assist him in the preparation of a casebook in civics, using the Harvard Business School case approach.

TERRALL: This was in Cambridge that you had met him and he had discussed this?

GILBERT: Yes, this was in Cambridge. This was during the winter I think of 1927-1928, when I met Munro. So, when Millikan had the idea of doing what he wanted to do—namely, to give to the graduate engineers here at Caltech some understanding of industry—he talked with Munro, and Munro thought of me. So Millikan wired me in February asking me to meet him at Northampton, where he was giving some lectures at Smith College. Well, I didn't know about Millikan and so I wasn't much impressed. However, I asked one of my colleagues about Millikan, and he said, "Oh, Millikan! He's the Taussig of physics!" Now, [Frank W.] Taussig was the head of our economics work at Harvard so that made it clear to me. So my reaction was, "Well, one wouldn't turn down an invitation from a person like this." So I got on the Boston & Albany train with my green bag full of books, and I went to Northampton. I was met at the station by the Smith College Cadillac, and I was taken to the guest house, and there I met Dr. Millikan and Mrs. Millikan. And again, to make a long story short, they didn't give me a chance to say whether I wanted to come. It turned out they were looking me over to see if I would fit. Well, again, that was it, and the visit to Northampton was ended with a tacit understanding that I would be coming. I don't remember later just when any formal invitation came, but it did come,

because I was clear in my mind that I was making the change from Harvard to Caltech.

TERRALL: Now, you said you hadn't heard of Millikan. Had you heard of Caltech?

GILBERT: Not much.

TERRALL: What did you know about it?

GILBERT: I knew so very little about it that I would say that was not a factor. I will say this, I had a sister who was at Mills College as a student, and when I told her about it, she went into rapture about Caltech, as to what a distinguished place it was. But again, this reflects my illiteracy regarding the prestige of this great institution. However, I hope that I was compensating for this deficiency by knowing something about what was going on in my particular field.

TERRALL: So Millikan explained to you what the institute was like and what his idea was for what you would be teaching, and so on?

GILBERT: Yes, he told me about the Humanities Division, where essentially a liberal arts education was given to the students here at Caltech, and that this was well established and was going along. However, he had observed that a good many graduates of Caltech were going into industry, and he said they ought to know something about it.

TERRALL: When you got here, were there other people teaching economics?

GILBERT: Yes—oh, yes. There was a professor of economics—Graham Laing was the individual, in particular—and Ray Untereiner, who is now a professor emeritus here. I believe at the time I came, he [Untereiner] was back at Northwestern getting his law degree, but he had come from the University of Redlands and had made contact with Caltech back in maybe 1925. So Untereiner preceded me, but I believe that because of his getting a law degree at Northwestern, he wasn't here all of that period. But Laing was the central professor in the field

of economics. Laing was a Welshman, as I recall. Wonderful man, wonderful spirit; he had a kind of divine fire burning in him, and this tended to put him a little bit on the left of center in economics. And while by hindsight we know that is refreshing, at the time it was a little bit of a concern to Dr. Millikan, because Dr. Millikan was well known to be a conservative in the field of economics. I don't know to what extent my coming from the Harvard Business School gave him a feeling of assurance that I would not be over on the left side myself, but there was a kind of balance introduced into the faculty by my coming into the economics work here at Caltech.

TERRALL: But there wasn't any problem with getting along with Laing or anything like that?

GILBERT: No, not at all. He was so gracious, and if anything I have a guilty conscience because I didn't respond as warmly as I should have. Actually we had so little in common, and so we let it be.

TERRALL: When you got here, what did you find was the relationship between the Humanities Division and the science and engineering divisions? In other words, how much contact was there between people over here and the people in science?

GILBERT: When I came, I was impressed favorably by the attitude of the students toward the Humanities Division. I had thought that they might be sort of contemptuous of the non-hard-science courses. Insofar as I could see, this was not at all the case, and the students were quite willing to give that one quarter of their time to these courses. They understood, I think, the Millikan idea and they bought it. Now, on the part of the faculty—and I will speak first not of myself but of the division—I think the faculty was quite willing to have the humanities work carry on. The fact that they let one quarter of the student time go to the humanities is an indication. But there were certain irritating points of contact on the part of the scientists. However, they were minor. I would say Dr. Munro, who was very strong in building up the Humanities Division—I don't know who got the money from Mr. Dabney for Dabney Hall, but it may have been through Munro—but Munro was somewhat abrasive to some of the faculty in science. I don't think it amounted to much, except that it stopped the interplay between the two faculties in a small way.

May I go back a minute? When I first came, in 1929, the chairman of the faculty was Arthur A. Noyes, and I remember him conducting our faculty meetings with special interest. Dr. Noyes was entirely accepting of the Millikan idea of the liberal arts. But the fact that Munro, as a co-member of the Executive Council, was apparently ambitious for the Humanities Division—I am sure that he never intended to impair the work of science and engineering. He was one of the first to appreciate it; Caltech was a great institution. But in one of the faculty meetings, I remember, an item on the agenda was the purpose of the institute. Now that seems rather silly and all, but it was natural for Caltech to look ahead and figure out what line it should be following. We had a meeting of the faculty to consider this, and there were some speeches made, I've forgotten just by whom, and I believe Dr. Munro held forth with his dream for Caltech. Well, that was the last meeting we had on that subject. In other words, we dropped it, because it was not possible to get a consensus in written form, so what was tacitly recognized was that Caltech was doing fine and it could let its existing energies proceed, but there was no formulation at all with respect to the goals at Caltech.

TERRALL: Was the idea to expand the Humanities Division, and was that what was bothering the scientists?

GILBERT: I think it was not at all that. Munro was, I would say, modest in any plans he had for the expansion of the Humanities. If I am any student of human affairs at all, I would say it was a personal abrasiveness. He came from Harvard; he was a little bit arrogant, perhaps. Actually, he knew more than anybody else about the work of the Humanities Division here. He preempted the decision making in the division here. Clinton Judy was the nominal head of the Humanities Division, and he was the person to whom I normally would report, but actually Munro called the shots in the Humanities Division. Judy was wonderful in accepting this kind of relationship. After all, Judy didn't want to do the money raising, didn't want to do the infighting with the rest of the faculty here, and so he let Munro do it.

TERRALL: You say Munro was abrasive to the scientists. How about to the people in Humanities? Was there any problem in getting along with him among the Humanities people?

GILBERT: No. I think the people in the Humanities accepted Munro and were, in a way, glad to have a strong person representing them. You see, each of our divisions at Caltech is great because of a personality. I'd say in the case of physics it was Millikan, in the case of biology it was Thomas Hunt Morgan, and so on. And in a way you might say you can't build a great division unless you have a strong person. Well, Munro was, for his time, the strong person. No, there was no feeling on the part of the division faculty against Munro.

TERRALL: In terms of the contact between people in the humanities and people in the sciences, did you know scientists personally?

GILBERT: The faculty was so small that I would say I knew everybody pretty quickly. My particular best friend was Ernest Watson, a fellow bachelor. As you know, he became the dean of the faculty. And Tolman—I was a close friend of Richard Tolman. I was a member of a tennis foursome that met at Tom Fleming's every Thursday afternoon, and Tolman was one of them—Watson, Ralph Smythe, who is still with us, and I. So I don't recall any kind of a division in my social contacts between the other faculty and the humanities faculty.

TERRALL: That was what I was trying to get at. How about when the visiting famous physicists came—Einstein and Bohr and those people. Did you have any contact with them?

GILBERT: Well, I had a continuing contact with Einstein, not with Bohr. I was chairman of the House Committee for the Athenaeum the first year it was opened. Incidentally, in my files in the Archives there is my appointment as a member and the chairman of the House Committee.

TERRALL: That was something like 1931, wasn't it?

GILBERT: Yes, 1930 or 1931. But in this capacity, I met Dr. and Mrs. Einstein, because they were living in the Athenaeum. I helped them off and on with transportation and what not. In their second year, when they lived in a little house, I believe on South Madison, I went over to visit them. Later, in the summer of 1931, I visited the Einsteins at their villa on the Wannsee

outside of Berlin. So I had a rather interesting continuing contact with Dr. Einstein. I have quite a few Einstein stories, but I don't think they need be introduced here.

TERRALL: I'd like you to talk about Einstein a little bit, if you don't mind. I'm curious to know what kind of impression he made on you and on Caltech.

GILBERT: Well, I think you ought to get the story on the effect on Caltech from someone else besides me. The distant impression I gained with respect to this was that Einstein came at the invitation of Arthur Fleming. Arthur Fleming was not at all a scientist, but he was a wonderful person and he helped Caltech in the early years. But the story I got was that Einstein was not in so much the line of interest of the Caltech physicists as Neils Bohr was. However, people like Tolman, why, they were broad-gauged enough to be very glad. There were quite a few of them —[William V.] Houston, another of the physicists. But there were enough people at Caltech who were interested in Einstein's physics so that it was successful. Paul Epstein was another of them, of course. But the simplification of it is that Einstein came at the invitation of Arthur Fleming, and Arthur Fleming might have been motivated by the kind of publicity that was related to this. I say "might"; I believe the biographies of Einstein—I have one of them up there—make some reference to this.

Now, of course my relationship was on a personal basis. When I was at the Wannsee, Einstein asked me—I suppose to make small talk, because here he was a theoretical physicist and I was an applied economist, but we had a very nice human relationship—I remember he asked me, "What are economists concerned about? What is one of their principal problem areas?" And without hesitation I said, "The division of income among the factors of production: land, labor, capital, and enterprise." Well, he understood that. He was silent for a few moments, maybe not more than a couple, and then he shook his head and he said that he was afraid that he couldn't help me. [Laughter] Which I think is an interesting observation. I believe that this is the basic difference between the exact sciences and social sciences.

Now, so far as the little stories are concerned, I like to tell them over the luncheon table but I don't know that they are important for the record.

TERRALL: During this period of lots of visitors, were there people visiting the Humanities

Division also, giving lectures, or was that limited to the sciences, to physics?

GILBERT: I wasn't impressed by any number of visiting faculty here in the Humanities. There were a few: Munro had excellent contacts, and I do remember he had Walter Lippmann conduct a few seminars down in Dabney Lounge. I think in my file here I have the invitation by Judy to attend those. So there were a few people like that. However, they weren't like the Fairchild Scholars now, who would stay for some time. We were on a very modest budget, and as you know.... Was it in 1931 that we took the ten-percent [salary] cut? Although as an economist, I would say after the cut we were better off in buying power than we were before, because our cost of living had fallen more than that. When I came to Caltech, I asked for information on rental properties, and they sent me a list of houses that I could rent, and the rentals were between \$35 and \$45 a month. In the file also are the figures for the cost of meals at the Athenaeum—25¢, 35¢, and 50¢. So we were on a very modest scale, and I don't remember any kind of disaffection on the part of the faculty because of our modest income. The total budget at Caltech was very small. I remember the contribution of the Caltech Associates was quite a substantial part of it in those years. Being a bachelor, I was often invited to the Associates' dinners to fit in at tables where there was an excess of women, so I came to know quite a number of these people and they've been friends all my life.

TERRALL: How much contact did you have with the trustees? Were you involved in fund-raising at that time?

GILBERT: I had contact with a few trustees on a personal basis only, such as Albert Ruddock, and I was not interested in fund-raising at that time.

TERRALL: How did you get to know the trustees that you did know personally?

GILBERT: Albert Ruddock was on the governing board of the Athenaeum when it was first set up, and, as I recall, he told me that if the deficit was \$10,000 he would make it up. He and Margaret, his wife, were wonderful people; they entertained a good deal. And I had various other friends—Watson, we would go out. For instance, I met Henry M. Robinson through

Adriaan van Maanen, an astronomer. I remember it was during the Hoover administration and Robinson was a very close adviser to Hoover. I had breakfast at the Robinson place over on Grand Avenue several times with Adriaan van Maanen, and like as not the phone would ring and Washington was calling for Mr. Robinson to give his opinion about this or that. But this whole community of Caltech and its Associates.... Actually, the Athenaeum architectural style was determined in large part by the idea that it was a meeting place for Caltech faculty and these people who were helping Caltech financially, these wealthy people. Gordon Kaufmann, the architect, I think caught the idea very well in giving us what I call the most Biltmore-ish faculty club in America.

TERRALL: You would say that there was really quite a lot of social contact between the faculty and the trustees and the Associates?

GILBERT: Yes. Socially, yes, that is very true. And I'm sorry that it no longer is that way, but I'm afraid it's unavoidable. Of course, I think some of it has been the fact that as we have built up the faculty, we have brought in people from some of the larger universities who carried with them the impersonality of the larger universities, and they were not interested in relating to the Caltech community in the way we used to. I won't blame them especially, because the setting is different now, but it is unfortunate, because we did have this wonderful community. Our annual faculty dinners we had in the Dabney Lounge, and we were all there with our wives and so on, and we fitted in that lounge, maybe 200 or 250 people. But I knew everybody, and I think other members of the faculty knew everybody.

TERRALL: Did you know Fleming?

GILBERT: Arthur Fleming? Now, Arthur Fleming, incidentally, is this benefactor and not the Tom Fleming with whom I played tennis, although Tom was an Associate.

TERRALL: Were they related?

GILBERT: No. And what was your question?

TERRALL: Whether you knew Arthur Fleming.

GILBERT: Oh, I knew him well.

TERRALL: He was around a lot in those days, wasn't he?

GILBERT: Oh, not a lot. He was in off and on. I don't think that he was around the campus enough to breathe down the neck of Dr. Millikan or anything of the kind. No, I think it was a fairly distant relationship. He kept his arm's length. I don't know whether it is in the record, but every Sunday morning he had a group of freshmen come to his home. He had a beautiful Swiss chalet type of mansion on Orange Grove Avenue, and Dr. [John R.] MacArthur, who was dean of the freshmen here, would take six freshmen over each Sunday morning to have oatmeal and so on with Arthur Fleming. I think it was a rather terrifying experience for them, because while Dr. MacArthur was so genial, Dr. Fleming by nature was not an easy person with whom to communicate.

TERRALL: But he obviously wanted to keep in touch with Caltech.

GILBERT: Yes.

TERRALL: What about Millikan? You must have known him personally pretty well.

GILBERT: Yes, I knew him very well. I was in his home many times, and I knew Greta, his wife, and the three boys very well—three men. And we went to church; I often picked him up to take him to church. In his last years, he was somewhat difficult on campus, so I was told. There were certain frictions that had developed, and so I was urged to go over to visit with him, because they knew that I was *persona grata* to Millikan. And I remember him telling me various things—for instance, he told me about Max Planck and his ideas on religion. But I remember once Dr. Millikan challenged me. He said, "Why are you coming to see me?" He suspected. And I don't know, we dropped it some way. I didn't let him know that I had been asked to come over to see

him. But, yes, I was quite close to him.

TERRALL: And you obviously had a good working relationship with him.

GILBERT: Well, working—not in the sense of my class or anything like that.

TERRALL: No, but in terms of his asking your advice.

GILBERT: Yes. He nominated me to be the president of half a dozen colleges and universities or so, because Millikan was a key man in national affairs, you see. It was quite normal for inquiries to come to people like Millikan. Actually that's why I went to Germany, because John J. McCloy, the head of the U.S. High Commission—this comes later—but McCloy knew of Millikan, and he phoned him and asked him if there was anybody on campus who knew about Germany. Well, just so with respect to these offers of consideration. I rather doubt if any of them would have gone through, but at least I did not wish to be in the administration field.

TERRALL: To get back to Caltech's economic situation, what effect did the 1929 stock market crash have on Caltech finances?

GILBERT: The '29 crash undoubtedly had a brutal effect on the building up of the financial resources of Caltech, but Caltech by 1929 had arrived at a point where it could take that blow. There were various incidents that stopped gifts from wealthy people who intended to give money to Caltech, but with the collapse of the market they were no longer able to do it. The [Allan C.] Balches, who gave us the Athenaeum, had made the commitment at the peak of the stock market or shortly before, and apparently the funds had been put in liquid form, so they didn't go down. The Balches undoubtedly had a terrible decline in their—[interruption] I was close enough to the finances of Caltech during this period to know. All I know is that Caltech carried on in business very actively, and there was no outcry of pain because they weren't able to do what they wanted to do. Incidentally, Carl Anderson, have you gotten his oral history?

TERRALL: Someone has done an interview with him—not here, but we're going to get a copy of

it for the Archives.¹

GILBERT: I see. Because Carl would know the flow well, in fields that I didn't know.

TERRALL: I thought that you might have had some contact with that. We talked a little bit about the social life, in terms of the institute being so small and knowing everybody. Were there many young faculty members who were also bachelors who did things together?

GILBERT: There were a few, not many—I'd say the normal distribution of young men coming along. I recall three of them, because they became the resident associates in the new student houses. I was one of them, and then Harvey Eagleson in English and William Huse in English and Donald Clark. Donald Clark was with us until just two or three years ago, when he died. The others have died also. They were all bachelors. But we blended into the total picture.

TERRALL: Where did you meet your wife?

GILBERT: I met her on the tennis courts, playing tennis in the community here. I met her soon after I arrived—and incidentally she lived within a block of Caltech and certain people make mean remarks about that, that I didn't go very far out of my way. But, yes, she lived close enough and she was part of a little social community here, people that still keep good friendly relations.

TERRALL: So she knew people at Caltech?

GILBERT: Yes. I don't remember a precise contact that she had with Caltech that brought her in touch with me. Actually it might have been—you've heard of the Commonwealth Fund Scholars, the Carnegie people? In my first year, I rented a house on South Oak Knoll, and my sister Dorothy was with me the first term, but she got tired of being my housekeeper and went to the university up at Berkeley. Then I took in two Commonwealth Fund Scholars to live with me. One of them was Harry Warren, now professor emeritus at the University of British Columbia;

¹ Carl Anderson was interviewed for the Oral History Project. — Ed.

the other one was Richard Wooley, who became the Astronomer Royal and was knighted. Well, Harry Warren was very much of an extrovert; he had the young people playing field hockey and what not, getting everybody doing things. He was an Oxford scholar, and I think it was through Harry Warren that I met my wife in sports.

TERRALL: To get back to campus, when you came here were you teaching a graduate course?

GILBERT: Yes, I came here with the understanding that the course would be a graduate course, Econ 100. It was clear that that would be the case, and actually I think I had only fifth-year students in my first years. It was only later that I had three or four undergraduates. At the end, in the sixties, I had to close the undergraduates entirely, because I had so many graduate students that even with two sections it was crowded.

TERRALL: What fields did these students come from?

GILBERT: The students came mostly from the engineering options. I would say that when I came here I had the advantage of high expectation on the part of the engineering option faculty, that their students would benefit from a course in business economics. So they recommended it, because the students, when they arrived here, didn't know me, but the various options assigned them to my course. This kept on right along, and I would say it existed right up to my retirement.

TERRALL: Now, when you first got here, would this have been just because they thought it was a good idea, or did you go and talk to them about it?

GILBERT: No, I didn't talk with anybody. They thought it was a good idea. I remember Franklin Thomas, after whom Thomas Lab is named, saying it was a great relief to him to find someone on the campus who was teaching these engineers something about money, and the money that is involved, the capital involved in great irrigation projects, water supply projects, and so on. Another angle when I came—I went to them to ask for introductions to people in industry to whom I could go to make contact. They responded, because they knew enough

people around here. On my own, however, I started going to the aircraft companies—not that I have ever been bitten in an emotional sense by the airplane glamour but I knew that it was a big industry here. So every year I went to the aircraft companies here to talk with the people about things that I was interested in. And it was this that led me into the Air Force Air Materiel Command and into the [U.S. Strategic] Bombing Survey later.

TERRALL: In your contact with the aircraft industry, were you then using information you got from them in your course?

GILBERT: Yes, only lightly, because this would have been out of proportion. While there were always quite a few aeronautical engineers in the class, I was broadminded, and I talked as much about automotive and civil engineering as I did about the aircraft industry.

TERRALL: Did the students you were getting in this class have any economics or business background?

GILBERT: No, and I told them that I didn't care very much whether they had had economics or not, because in a way I began at a different point. The courses in elementary economics as they are taught are an interesting part of a liberal education, but they aren't very relevant to a course in business economics. Now, this is a complex matter, and I don't want to elaborate on it, but this has been true of the Harvard Business School, for instance, too. Students going to the Harvard Business School don't necessarily come with undergraduate courses in economics. It is a nice thing to have had economics, but it is in another kind of area.

TERRALL: How did the students react to the course?

GILBERT: This is difficult for me to say. I can point to the record—namely, when I first came I taught four days a week, and I always had two or three sections. Very few dropped out between Econ 100 a, b, and c; in other words, they continued their interest. Actually, the course began with an emphasis upon industrial finance, then it went into advanced manufacturing practices. Throughout the course, I brought in business economics topics, especially as they were hitting

the headlines. So there was a flow-through of the three terms that apparently held their attention. I have had many graduates comment that they were very happy with it.

TERRALL: Did you have feedback from students in later years who came back and said it was useful?

GILBERT: Oh, yes, from all over the world. Do you know the story that T. [Thornton A.] Wilson told when he was named a distinguished alumnus? T. Wilson is now chairman of the board of Boeing. He got his master's degree in '48. When he arrived—he came from Iowa, as I recall, Iowa State University—Ernie Sechler, who registered him, said, "Well, here are the courses." And among them was business economics. Wilson said, "I don't want to take a course in business economics. I came here to study aeronautical engineering." Well, as T. Wilson told it at this dinner at the Huntington, he said the first term he got A in aeronautics and C in my course, in business economics, but at the end he got C in aeronautics and A in my course. This indicated what his field of interest was, and so it ended up. He's been the key man—he's led the Minuteman, for instance, up at Boeing, and then the B-47, the B-52, and the 747; he took me through the mockup of the 747 in 1966. And I remember at the same time he took me through the mockup of the Boeing SST—which never got off the ground, of course. But there are other people. Stanley Rawn, for instance, who is a member of our [board of] trustees, came in to see me within a few weeks, and reported glowingly about the course. In some ways, these reports disappoint me, because I don't think my course deserved that kind of emphasis in relation to their engineering courses. After all, they were here and most of their time was in engineering. I don't think that it means that the engineering was deficient. My thought has been that the first job that these students take will be in their engineering options, but as time passes they see opportunities in the broader fields of management decision making. This has been the story of so many. The vice-president of Volvo, the Swedish automobile company, was one of my students. The vice-president of Flygmotor, which is the big Swedish company making the jet engines for the Swedish fighter, was one of my students. All over the world there are people who have had my course who have broken into the broader field of decision making in industry. It gives me very great satisfaction.

TERRALL: In terms of courses, were there other courses that they could go on to from your course?

GILBERT: No. This was a terminal course, and only a few of them went on for their doctorate. In other words, if their motivation was in industry they were out in industry taking jobs.

TERRALL: So these were primarily people in the five-year engineering course.

GILBERT: Yes, the degree [program].

TERRALL: So you weren't getting people who went on for their PhD's?

GILBERT: Oh, yes, there was a sprinkling of people. Right here on the faculty there have been some. A good many of them are gone now—Bruce Sage, Donald Clark, and Vito Vanoni were in my first class. Paul Jennings—well, I could name quite a few of them. And in my introductory lecture I commented that if there were students who were not interested in going into industry, the course might have some value in giving them a feeling of understanding regarding business and industry. And I think that is what they got out of it.

TERRALL: Were you encouraged to do your own research while you were teaching?

GILBERT: Research in my case was not quite the kind of research that Caltech is famous for. And by that much some of my colleagues might turn up their noses. The kind of research I did was keeping my teaching material up to date. I used a special variation of the case method in teaching here, but this meant that I had to work hard to prepare teaching material that was up to date. And in this connection I was quite active in the Industrial Associates program, in visiting our Industrial Associates. Over a period of years I did this. I would go to them with a theme of interest that I had that I wanted to find out about—for instance, with respect to automation, then with respect to computer applications in management. So my files were full of material that I prepared. If you call this research, OK. I call it just preparing teaching material that was up to date. And it becomes obsolete rather quickly. My file is gone, but I put a few of them on that

lower shelf. I haven't thrown them all away. I thought some day there might be someone who would come to Caltech who would teach a kind of course such as I taught who might want to know the type of material that I used. It won't be directly useful but, I repeat, it is a type of thing that could be useful.

When I first liquidated part of my files, I circulated a list of material that I had to my colleagues here, telling them if they were interested I would be glad to have them take it. Well, Peter Fay came to me and with admiration said, "I didn't know that you taught that kind of course." In other words, to him it was a revelation to see the kind of material I was using in keeping a course up to date with respect to things that you might say every educated person should know something about.

TERRALL: So this is why you had to keep industrial contacts going over the years?

GILBERT: Yes. You say I had to—I enjoyed it. This is the way I did it.

TERRALL: I think we're up to the AAUP [American Association of University Professors]. You mentioned something about that the other day. I wonder if you could tell me that story again.

GILBERT: Yes. I would say as a preliminary I am not a labor union man. However, the origins [of the AAUP] here at Caltech were quite interesting. I believe Dr. Munro back in 1930 was the national president, and so in that capacity it was not very appropriate for Caltech not to have a chapter. So Dr. Munro hosted what I suppose were most of the faculty at a luncheon at the Athenaeum one day, and we formed a chapter. He told us about it. Incidentally, Hardin Craig, who was a professor from Princeton, was visiting here at the time, and Hardin I think was a vice-president of the AAUP. So we were under pressure to establish a chapter. We did, and at that meeting Dr. Tolman took the initiative to nominate the beginning officers of the chapter. Because of some of the sensitivities that I referred to before—Dr. Munro was our host, but most of the faculty there were from the field of science and engineering—Dr. Tolman nominated as president Eric Temple Bell, who was one of the most vibrant iconoclasts in the faculty, a mathematician, a wonderful person. And he personified the independent scientist in the faculty who was aloof to the Munro influence. And Tolman nominated me as secretary, because

essentially I was a Munro man, having come to Caltech through Munro. These two officers were approved unanimously, and for I think twenty-two years we continued as officers, and we never had a meeting. I would say that was one of the reasons the chapter was strong, because the normal thing here at Caltech, we don't like to go to meetings of this type. I only recall one little incident. By some accident, Linus Pauling was quoted in the press in a way that indicated that he was speaking for the faculty at Caltech. Bell and I went to see him afterwards and we said, "Now, lookee here, Linus, we don't want to be included in this way." Well, Linus was very apologetic and of course he hadn't meant to be careless that way.

I was a member of the National Council of the AAUP for a series of years—I have forgotten whether it was three or five—and as such, I gained a perspective on the operation of the AAUP. I was always pleased that at the top the officers and the general secretary were really professional. They were not labor union people. But as we had our annual meetings around the country, every now and then we would find chapters that were as militant as any labor union. They wanted to have the AAUP use its muscle to force better, higher salaries, lower loads, and so on. But I repeat, I was always pleased that the top people were professional, and I hope this continues, because if it becomes a labor union I think it will be the end of the AAUP as we have known it.

TERRALL: What did you see as the organization's role at a place like Caltech?

GILBERT: That's a good question because I would say at Caltech there was no squaring off, no confrontation between the faculty and the administration. One of the reasons might have been the Executive Council form of organization that we had. So I would say the reason for a chapter here at Caltech, in my own thinking, was that it stood for a good thing nationally, and we wanted to be on the line with respect to good things. Now, of course, the main force of the AAUP has been its Committee A, which has had to do with tenure problems and dismissal because of ideological conflicts. I would say in this respect the AAUP has done a wonderful job in taking cases and listing certain institutions for their violation. There's quite a list today, every quarter they're published. But I would say thus far the work of Committee A has not been tainted by what I would call labor union brute force. It has been really professional, and they have upheld the status of the teaching profession in a way that I think is commendable.

TERRALL: Have they been successful in reinstating people who lose their jobs unfairly?

GILBERT: Yes, yes. Wherever this would appear to be the best solution, they have gotten people back in. Whether this is always the best way to do it is another question.

TERRALL: There was never any such incident or need at Caltech?

GILBERT: Not that I know of through the AAUP. We have had our little problems, but I don't think that they have gone through the AAUP machinery. I think that the fact that we have a local chapter that we know is strong has backed up the status of the faculty. But I think the faculty committee on tenure has taken the place of any kind of AAUP action that might have been taken here.

TERRALL: We mentioned the salary cut in 1931. Was the AAUP chapter consulted about that or did they object to that?

GILBERT: No, I don't think it even occurred to us. That is, I am sure—because this came about the time that the chapter was formed, and both Bell and myself hadn't any idea of challenging anything. No.

TERRALL: Was that salary cut universally accepted among the faculty?

GILBERT: So far as I know, there was no objection. Nobody liked it, but there was no objection. The conditions of the Depression were such that they provided a background that made ten percent a rather modest impairment of the income of the faculty.

TERRALL: Was that ever restored per se?

GILBERT: It wasn't restored per se. But World War II came along and threw the whole picture into disarray. Then after the war we had a whole succession of escalations, and we are still in it.

TERRALL: I see. What about the Industrial Relations Section, which was established in 1939? Whose idea was that?

GILBERT: The Industrial Relations Section—I believe it was established before 1939, I think maybe in 1937, and the first director was Dwight Palmer, and the next one was Everett Hawkins, and then came Bob Gray. As to who started it, now what I say may be interpreted as being a little bit cynical, but this is the way I saw it. The Rockefeller people had this national program of funding Industrial Relations Sections at various universities. And a fellow by the name of [Clarence J.] Hicks was administering that program for the Rockefellers. Apparently Caltech was approached to take some of the money for a program in Industrial Relations. Now, as to just what the successive steps were, I don't know, but I make a cynical intimation that the information came to Harry Chandler, the owner of the *Los Angeles Times*, who was a Caltech trustee. It may be that Chandler wanted to do a good thing rather than to do it in a self-serving sense. But it could have been interpreted that Chandler urged Millikan to take the Hicks money in order—and I use this phrase—in order to bring the prestige of Caltech on his side in the battle against labor. Because ever since the bombing of the *Times* in 1912, there was bad feeling; it was an armed camp. So the money was taken and there may have been some other underwriting at the time. It started off with good intentions. As Munro told me, all we need to do in the case of labor problems is to bring out the facts, and as soon as the facts are laid before the people concerned, they will come to an agreement. Well, this is the only overt case of lack of wisdom that I could ever ascribe to Dr. Munro, because, yes, the scientific method that Caltech uses is a wonderful method, but when it applies to labor disputes, it's another thing. I remember attending the organization meetings for the section. I remember the Association of General Contractors coming in on it. I think they thought this was a sure way to bring Caltech into the problem of the construction unions, which was pretty active then. Dean [Edwin F.] Gay—he was the head of research at the Huntington Library, former professor of economic history at Harvard. Gay didn't drive his own car—I took him to and from these meetings—and I remember after one of them Dean Gay saying, "I want you to know I will have nothing of this." In other words, he saw what was going on—namely, that while on the surface this might seem to be something that would be a contribution on the part of Caltech, it just wouldn't work.

Well, they tried, and in the first years the labor unions gave certain lip service, certain participation in it, but this soon petered out. What it became was another thing, and it could be said what it became is a great success, but against another background. It's no longer using the prestige of Caltech against the labor unions. It's a very successful service organization for the many top companies in Southern California with respect to some of their management problems. The biggest one is the personnel field, training of their managers in the field of personnel. The section has developed an excellent library of labor contracts in this field. It runs seminars to which the middle management people from supporting companies come. And by this much, the supporters get value received for the rather substantial amounts of money they contribute.

TERRALL: But originally it was something quite different? Originally the unions were supposed to be involved.

GILBERT: Originally it was supposed to be a contribution to better labor relations here in the Southern California area.

TERRALL: Were you involved in the section at all?

GILBERT: No, only in sitting in on the organization and knowing the people very well—Dwight Palmer and Everett Hawkins. We still keep in touch with Hawkins's first wife, who lives in Washington, D.C. No. Now then, the section, in addition to serving the supporting companies, has carried on as a kind of sideline a teaching function here at Caltech in the field of personnel management. This has broadened out since Bob Gray has retired as director, but he is still a member of the faculty and he is giving courses to Caltech students which I understand are very popular. These are more in the broader field of management, and as such he is carrying on what I would call about one third of the work that I gave in my course.

TERRALL: So there isn't anyone giving a course like yours now?

GILBERT: No, when I retired in 1969 there was no careful thought given to a follow-up. There were several improvisations, but they didn't work, so essentially it was dropped. David

Morrisroe has carried on with a course or two in a particular kind of business economics situation as he visualizes it, but he is a CPA, and this is a rather narrow insight into the field of industry and business management. Now Si [Simon] Ramo, one of our trustees, is giving lectures, I understand, and of course Si would be a wonderful person, because he is one of the top executives of the country. As to how well that's going over I don't know, but I'm afraid that just a distinguished individual would have a hard time running a course here at Caltech. So thus far there has been no one to carry on the kind of mission that Dr. Millikan gave me—namely, to give a course which would help the graduates of Caltech who were going into industry to know something about it.

HORACE N. GILBERT**SESSION 2**

February 14, 1978

Begin Tape 2, Side 1

GILBERT: As I remarked earlier, our father and mother took the family around the world in 1913, and this may have inspired my particular interest in the rest of the world. In 1930, I decided to go to Europe during the summer—this was after my first year at Caltech—and I elected to go to Sweden this time. I had a very good friend in Sweden, a classmate at the Harvard Business School, and I visited him there. To consolidate my adventures in Sweden, I was introduced to the leading private banker of Sweden, Marcus Wallenberg, who would correspond to J. P. Morgan in this country. When I visited him and told him of my interest in industrialization—this was my theme of study in practically all of my foreign travels—when I told him of my interest in industrialization, without hesitation he took out several of his personal cards and wrote on the back of them introducing me to the companies that the House of Wallenberg controlled. For several weeks I traveled in Sweden visiting these factories and being given a royal treatment at each of them, and getting a better understanding of Swedish industry. This was a highly profitable experience.

I then went down to Germany. I had met at Harvard a friend, Dr. [Gustav] Pauli, who was the director of the art gallery in Hamburg. He introduced me to the place in the German Alps where he summered, Bad Oberdorf bei Hindelang in the Algäuer Alps. This was one of the hunting lodges of King Leopold in the nineteenth century, a small place—only seven guests, but an ideal place for a person such as I. I was the only American there, the rest were all Germans like Dr. Pauli. For the next two months, I enjoyed life there in this idyllic setting, a small village. I had a lederhosen costume tailored for me. But my problem soon developed. I intended to work on the third revision of my textbook, *Introduction to Business*, and I started on it, but then I looked out of the window, and whenever the weather was pleasant, which it was a good deal of the time, I couldn't resist the temptation to get out and walk in the mountains. So I got very little done during that summer, but it was a most enjoyable experience.

TERRALL: Did you get to look around at German companies as well?

GILBERT: At this time, there was no contact at all with industry. The people at the hunting lodge were Germans, but they were not industrialists. So it was entirely a social experience.

In 1931, I went first to Leiden University; I went at the invitation of Dr. [Paul] Ehrenfest. Dr. Ehrenfest was a physicist who had been visiting here at Caltech; he and I became close friends and his daughter also. I took her to [see] the wonders of Southern California. He invited me as a guest to stay in his home in Leiden and use that as a base for getting better acquainted with Dutch industry. I took a leave of absence and left in April. The next two months I spent in Leiden and, again, it was a most interesting experience. I got acquainted with the work in Rotterdam in the field of business school instruction, or that which would correspond to the Harvard Business School kind of work. And I traveled around in Holland. I went to the Philips plant in Eindhoven and I went to the coal mines of Limburg. Again, this was an interesting experience.

Then the rest of the summer of 1931 I spent in Russia. This was as a member of the American Economic Association group. The arrangements had been made by the American Economic Association, of which I was a member. I had paid my money beforehand. We at that time did not recognize Russia, and so I got my visa in Finland. The strange part of that experience was that only one other member of the American Economic Association took advantage of this tour—John Mueller of the University of Oregon. So he and I were the sole persons to go on this tour, and I must say we were treated wonderfully well by the Russian guides, but it seems to me a strange thing that there was no more interest on the part of American economists in a study of Russia.

TERRALL: Was it something that was suggested by the Russians or was it something that the American Economic Association had sought out?

GILBERT: I think the initiative had come from the American Economic Association. My own motivation was this: that while I called myself a Hoover Republican, and as such not at all leaning toward the Russian kind of ideology, I said, "Here is a great country that is in the

laboratory dedicated to a new way of doing things in the field of economics," and I considered it my duty to study it. It proved to be a very good opportunity to study a complete socialist organization of the economy and to understand the Communist ideology.

TERRALL: How open were they about showing you things?

GILBERT: Russia was reasonably open. This was the time of the first Five-Year Plan. The first Five-Year Plan started in 1928, three years before, and so they were well along with it. In the accomplishment of the first Five-Year Plan, they imported quite a number of foreign technicians. Incidentally, they were paid in gold in those days, which was quite an incentive for foreigners to do work. I, of course, was a tourist and not at all in the employ of any Russian agency. For two months, John Mueller and I travelled around Russia, beginning in Leningrad and then going to Moscow and then over to the Volga to what is now called Gorki, then Nizhni Novgorod. Then we went down the Volga in a river ship for about four days, stopping at many ports along the way. I must say, it was an exposure to Russia that was unique in the sense that there was as yet no development. I remember stopping in Kazan, the capital of Tartary, and seeing something which was still a large city but where camels were being used a good deal for transportation. We had caviar and black bread every day on this simple ship.

Well, the Volga trip ended in Stalingrad. But I'd better hurry along. We came back through Rostov-on-Don to Kharkov, which was heavily industrialized, and then to Kiev, which is a city that represents many of the sentimental values of Russia because of its high culture. I just want to make one comment. Our Intourist guide, who accompanied us on all of this trip, was an Armenian and accordingly enjoyed a little bit higher educational level than usual Russians. During our trip we had argued a good deal; I had prepared myself with the capitalist arguments against Marx and so on. But we got along very well. At the end, as we parted in Kiev and I got on the railroad train to come back through Warsaw, he volunteered this comment. He said that nothing I had said had converted him or had impressed him at all. But the fact that I seemed to be happy and that I was free to come to Russia made a very great impression on him.

But I did get an insight into Russian industrialization during the first Five-Year Plan, and I could make many comments about that. My summary comment would be that they were undertaking a tremendous task in converting a capitalist society into a socialist one, and I was

impressed by the difficulty of it; I felt sorry for them for the very low level at which they were starting.

TERRALL: Was it successful at that point or couldn't you get a sense of that?

GILBERT: The start that had been made was a successful start in emphasizing heavy industry. For instance, down in Stalingrad they had this tractor plant, and they had imported 300 Philadelphia workers—foremen and skilled laborers—to start the plant off. They were in a special apartment complex, which was something that would be necessary for American workers. So they had the skills, but I remember talking with a foreman with respect to the work in the foundry, and his comment was, "You know, we have some young [Russian] girls working here and they are the best workers that I have." Which to me meant that the men were not so flexibly minded, were not so alert. But we would never use girls in a foundry—that is, this heavy work—not at all.

We visited many other factories. My card identified me as an associate professor of business economics, so wherever I went and my card was presented, the usual situation was that my host figuratively embraced me and said, "For Heaven's sake, help me, because I've got to make my quota." And the making of the quota was essentially an impossible job, because of the frictions in starting a new industrial pattern.

TERRALL: Did they have specific questions that they wanted to ask you for help with?

GILBERT: Yes, they had specific questions and general questions. I soon found that I was not able to respond, and so my problem was how to be courteous and say that I couldn't help them. There was a shoe factory, for instance, in Rostov—Rostov is at the mouth of the Don River—but I couldn't help them. And then there was an agricultural implement plant in Kharkov. Again, I could talk with them generally about certain points. In Stalingrad at the tractor plant I think I did help, because when I came into this plant—and this was brand new and equipped with the best modern American machine tools—the mistake had been made in lining up all of the machines in tandem, without any flexibility. So that if one machine broke down, the whole plant was paralyzed. I recall when I arrived the plant wasn't operating, and I asked why, and I was told

that, well, they were having a meeting of the trade union to find the reasons for the shutdown. To me it was rather obvious that if the workers weren't there, why, they wouldn't be able to operate. But actually a couple of machines in this closely articulated sequence had broken down and they didn't have any backup. Incidentally, I put this case in the second edition of my book *Introduction to Business*. What I recommended was that they loosen up the complete articulation and put in periods of accumulation along the way, so that if anything broke down, for a couple of days they could have the assembly line continue. At that time they were making a four-wheel tractor copied from the International Harvester Company. Well, this is an example, and I'd say the only example, where I felt that I did give them a little help. They made the comment after I had made this suggestion—they said, "Well, in the United States the worker is slave to the machine, and that's why you have things so tightly organized, but in Russia the machine is slave to the worker." Well, this is an interesting point, and I rather like the idea, but I couldn't help but feel that they were making a big sacrifice in not adjusting the worker to the demands of a modern industrial setup.

I think that is all I should say about that Russian summer, although I did come back through England and one of my former professors at the Harvard Business School, Professor Sprague, was then adviser to Montague Norman, the governor of the Bank of England. I had the opportunity of sitting in Dr. Sprague's office next door to Montague Norman and watching the, you might say, the disintegration of the Western European economy. This was the time when the German banks were closed, when England went off gold, and, well, it was an interesting experience.

TERRALL: Now, you hadn't been to Germany on this trip?

GILBERT: Yes, I had been in Germany, the fact is, just before I went to Russia. I was in Holland, then in England, then I came to Germany, and that was the time that I visited Dr. Einstein on the Wannsee. Incidentally, I have a picture of myself with Einstein which I might show you, at least, to give documentary evidence. This was the first weeks of July of 1931; this was the time when Germany collapsed financially. I had a very interesting opportunity to observe the collapse, because a former student at the Harvard Business School was with one of the German private bankers. I remember having lunch with him and the German banker the day the banks

closed. I remember offering to pay the bill, because I thought my host might not be able to get any money with which to pay the bill. Well, I at least made the gesture, but he was able to arrange it—this was Prince Hohenlohe, of the Bank of Seligman, as I recall. And then also when I was chairman of the House Committee of the Athenaeum, I had met Dr. Hjalmar Schacht, who had been the miracle worker in bringing Germany back in economic respects after World War I. In 1923, he had guided the liquidation of the inflated mark and the establishment of a new mark resulting in the reestablishment of the credit of Germany. After that, the German economy went forward beautifully until Hitler, about ten years later. But I met Dr. Schacht in Berlin and talked with him the morning of the day before the banks were closed, so I had a first-row seat on the events. Actually what had happened was that Germany had made wonderful progress after World War I in reestablishing itself economically, industrially. And Dr. Sprague at the Bank of England and Marcus Wallenberg, my friend in Sweden, had been a committee of two, while I was in Russia, to look at Germany to make a judgment as to what should be done about Germany. This was after the bank closings. They reported that of all the countries of Europe, Germany had made the most progress industrially, and so there was this favorable aspect to the German situation. But what had happened was that the world had become more protection-minded, including the United States. The United States, it could be said, was one of the participants in this closing down of world markets. In 1930, with the Smoot-Hawley tariff, we closed markets to a high degree. In 1932, the Ottawa Conference resulted in the Empire Preference Program for the British Empire. France took direct action, and wherever any tariffs were put up against French goods they reciprocated and put up tariffs against the goods of others. This was going on without realizing that the principal sufferer was Germany, because Germany depended most upon raw material imports and upon finished goods exports. But with the closing of world markets in general, as a result of this several-year sequence, Germany suffered most. That led to terrible unemployment in Germany, remembering that the German capital installations were well advanced. So it was the closing of the markets that created the unemployment, and that led to Hitler.

TERRALL: This was all around 1931?

GILBERT: 1931 to 1933, yes. My second trip to Russia was in 1934. We had recognized Russia

by that time, and I got my visa, as I recall, in Berlin. Incidentally, one of my travelling mates on this trip to Russia was Dean Watson, Earnest Watson. And the other was Herbert Fales, a resident of Pasadena who later went into the foreign service. We had a wonderful time, but only in Leningrad and in Moscow.

TERRALL: Was this also some kind of tour that had been organized?

GILBERT: No. This was on our own personal account, and I would say I tried to keep an industrial interest on this trip, but we were so busy doing things—we had good social contacts at the embassy, for instance—that I didn't get much done. There was one thing that I did get done. I went into a machine tool factory to see how they were getting along, and I found that this was their problem: A machine tool requires steel of different hardness and different physical characteristics. In the United States, we have command over an assortment of steels that is infinitely broad and highly specialized. But in Russia, no. And so they were using steel that was of a general nature and the machine tools were all the time breaking down because some parts of them didn't have metal of the right hardness.

TERRALL: Was this a factory that you had been to on your first trip?

GILBERT: Yes, I had been to that plant and so I, in a way, was carrying on my contacts there.

We had an amusing time in Moscow on that trip, because it was the Fourth of July and our Ambassador [William C.] Bullitt—he wasn't in residence at the time, but he was trying to promote baseball as a recreation and he had lots of mitts and bats and baseballs. Furthermore, on the Fourth of July the whole embassy staff went on holiday, and they chartered a boat on the Moscow River—a nice boat and a nice picnic lunch. There must have been thirty or forty of us on this trip on the Moscow River. There was a Russian crew on board, but before long the Marine guards at the embassy went up to the wheelhouse and they took over. They pushed the Russians aside and took over; their motive was to go from side to side of the Moscow River to get close-ups of the nude bathing places. And I must say I now know why people wear clothes. I would say also I now know what a potato diet does to the human body. Well, we went out further into the country on this boat and then we stopped. It was right among the fields, and we

began to play baseball. We tried to get some Russians to join us, but there were only a couple of girls who were bold enough to come over and join us, so we played baseball. They were in only bras and briefs, or whatever they are. So it was a breathtaking experience for a simple person such as—well, Watson was as innocent as I. This was an interesting little diversion on our trip to Moscow. This was in 1934.

Then, we were married in the fall of 1934, and in 1936 my bride and I took a four months' trip throughout western Europe. But I think I'll pass that over, because that was entirely just a delightful trip from Sweden to Italy, and so on.

TERRALL: Did you go to Germany that time, though?

GILBERT: Yes, oh yes. That first summer (1930) down in the Algäuer Alps made me more German-conscious than I would have been otherwise. Actually, though, when we went around the world in 1913 on a German ship, this was my first [contact]. I won't say that I ever became pro-German or anything of the kind; I was entirely a free individual.

TERRALL: In 1936 were you conscious of what was going on?

GILBERT: Good question, good question. Actually, in 1934 we were in Berlin before we went to Russia, and the marching of the Nazis, the Brownshirts, was quite conspicuous. I believe at that time Professor Houston, our professor of physics here, was at Leipzig University. Incidentally, I believe he represented the last of the American scientists studying in Germany in order to get to the heights; now, Dr. Millikan and many of our scientists had been in Germany in their early years. But, yes, the Brownshirts were much in evidence, and of course we were no prophets of what was to come, because we had seen lots of parades and lots of things like "Heil Hitler." But I'll say this, that in 1934 I also visited the fruit-importing agents of the Gilbert family operations, because about a third of our market was in Europe, and Germany was one of our special markets. So I had good contacts with the commercial part of German life; it was interesting to note the intrusion of the Nazis into the operations, the business operations. These Brownshirts who took themselves so seriously seemed to be more interested in strutting around and parading than they did in keeping up their business activities; it was a false note all the way through. However our

contacts, our importers, were never Nazis, so it was only as I saw the Brownshirts on the side that I saw them as they were making themselves evident.

In 1936, furthermore, that was the year of the Olympics in Berlin, so Berlin was in quite festive style. But I had a friend from the Harvard Business School who came from a well-to-do family in Germany, and I remember having dinner with him and his wife in their nice apartment off the Kurfürstendamm. About nine o'clock in the evening, there was a knock on the door and my face went white. I didn't understand it at all. He went to the door and it was the escort for the maid who had come in to serve the dinner, so he was relieved. But he, being a non-Nazi—he was trying to keep out of it, you see, but he was scared.

I visited another professor that I had met at Harvard, a professor of fine arts, Dr. Goldschmidt, and I had dinner with him; he was Jewish. He later escaped to Switzerland and he died sometime later. I kept in touch with him and was told that he died in peace in Switzerland.

Of course, the Olympics were a great show. We didn't attend any of the affairs; they were too crowded and all. We took our car down into southern Germany and enjoyed ourselves.

TERRALL: But were the Nazis markedly more evident than in 1934?

GILBERT: I would say no. I think in 1934 they were as virulent. You see, they came in January 30, 1933, with the appointment of Hitler as chancellor, and Hindenburg, the president, had no choice. However, one of my friends, the friend who introduced me to the hunting lodge in Bavaria, commented that Hitler had captured the imaginations of many upper-class Germans essentially because of his repudiation of the Treaty of Versailles. The Treaty of Versailles was not at all a popular treaty with Germany. There were quite a few decent people who became followers of Hitler. I mentioned Dr. Schacht. I had breakfast with him that morning in July in 1931, and then I went to Russia. When I came back I enquired about Dr. Schacht. Professor Sprague at the Bank of England told me, yes, he had joined the Nazis. He had gone to the Thüringerwald pep rally of the Nazi party and had gone over to Hitler's side. Hitler used him as the manager of the autarky [economic independence] of the German economy during that period, right up to the war. This, in my mind, was unforgivable for a man like Schacht, who had all of the decency that we normally associate with great bankers, who had done so well in bringing the German economy back after 1923, but here he joined the Nazi Party! Of course I asked, "Why?"

What made him do this?" And this is entirely not my own interpretation but a comment that was made. It was his wife, his wife who was a Junkers and who had ambitions for Hjalmar and she saw that the only way for Hjalmar to be anybody for the near future was to join the party, to join Hitler.

TERRALL: But you didn't see him after that?

GILBERT: I did see Schacht later, in prison, during the [U.S. Strategic] Bombing Survey. I only saw Hitler in parades. No, I cringed at the whole thing. To me it was abhorrent, what was going on. For instance, as we motored around Germany at the borders of the towns there would be signs, "Jews not Welcome." And everywhere there were indications of the anti-Semitism. Well, then we raised a family from 1936, and we didn't do any travelling until the end of the war. I'll say this, that after the war I continued my travels to study industrialization in many places of the world. But in the meantime, why, other things had taken over my principal attention.

TERRALL: The last trip you spoke of was 1936. So then you came back here and you were here until you went on leave to go to Harvard in 1940, is that right?

GILBERT: Yes. Let's take up, as you call it, the war-related work. I had always kept my contacts with the Harvard Business School, especially with Dean [Wallace Brett] Donham, and in the spring of 1940 I was approached by him to come to the business school on leave from Caltech, to take part in a program that he was in the process of arranging—namely, the transfer of the industrial mobilization work of the army to the business school. The business school could very well train the army officers in the field of industrial mobilization. So Dean Donham asked me, and I accepted. I had already accepted an invitation to teach in the Northwestern University summer school; the dean there was my former professor at the Harvard Business School and I felt a kind of moral obligation to do it. But in September of 1940 I reported to the Harvard Business School and was there for two years in this industrial mobilization program.

Dean Donham's plan was thrown a curve, however, because of the German invasion of the Lowlands on April 9, 1940. This changed the army's plan. They didn't have time for any of their officers to go to school in the field of industrial mobilization. But here I was already under

an agreement to go to Harvard, and so I went to Harvard. For the first term there was a kind of improvisation so far as my activity was concerned. But very soon I became intensively concerned with the mobilization of the aircraft industry and of shipbuilding. For my two years at the school I concentrated on these two, although I did some teaching in the field of industrial mobilization. My aircraft interest came naturally, because coming from Caltech I had an intimate knowledge of the industry here in the Los Angeles area. I prepared three studies which were published in the *Harvard Business Review*. The first was the expansion of aircraft and the second was the expansion of shipbuilding. I've given away all the reprints of my aircraft study—I used them in my class—but they're available in the *Harvard Business Review*. I made an intensive study of the aircraft industry and of the shipbuilding industry. I visited all of the factories, talked with the people who were the executives of these companies, and I published these studies. The third was an overall view, from industrial mobilization to war production.

TERRALL: Was the teaching that you did at the Harvard Business School for regular business school students or were there actually military people there?

GILBERT: They were regular business school students.

TERRALL: So the military program never—

GILBERT: It hadn't hit them yet. It hadn't decimated them yet. It's a two-year program, and so it wasn't until I left—I left in August of 1942—that the school was converted.... Well, they conducted a big program for naval officers. I don't remember just what they did in detail after I left.

TERRALL: Was everybody assuming that we were going to get into the war and it was just a question of when? What was the feeling around the business school?

GILBERT: A good question, because the fact that the war was going on from September 1939, and then the invasion of the Low Countries and of Norway, this started our mobilization in June [1940]. June 10th or so. Caltech was hit by an order from Washington to send its leading

experts in aircraft to Washington to get instructions. But to stick to your question, President [James Bryant] Conant [of Harvard]—incidentally, Conant died yesterday—was not at all a passive person, and he saw the handwriting on the wall that we were going to get into this, and so he was the leader of an activity called American Defense. I became active in it immediately. Incidentally, I have here, and it might be that you could turn these over to the Archives, [transcripts of] international radio broadcasts. We were part of American Defense, headed by Conant, although Ralph Barton Perry was the chairman of the group there. He made one of the broadcasts. There were a lot of wonderful people in the group, [Edwin O.] Reischauer and so on. Harlow Shapley, the famous astronomer, headed the broadcasts. But I repeat, there was this active group, American Defense. One of the most embarrassing situations I ever found myself in was making a speech in Boston on a platform aimed at arousing the audience to the fact that we had to be ready to join the Allies. But there was also on the platform a native Bostonian, Irish-born, who still hated the British, and he was against it. He insisted that we should keep out of the war or else we might help Britain. I couldn't believe my ears that there was still in Boston such a strong resentment on part of the many, many, many Irishmen against Britain.

TERRALL: What was the feeling about national policy and what was going on in Washington?

GILBERT: The feeling of this group was that Washington was going too slowly, that it was pussyfooting. However, it was not a militant challenge to Washington. What we were trying to do was to educate in order to have a consensus, and of course it ended up that way, but not until Japan perpetrated Pearl Harbor. No, I'd say it was probably the case all through the country—namely, that until the war started there was a kind of remoteness so far as the immediacy of the role of the United States. So actually our American Defense group was a little bit conspicuous, but I don't remember any criticism, even from our colleagues on the faculty at Harvard University.

TERRALL: But there weren't any ties between this group and the administration in Washington or anything like that?

GILBERT: No, this was entirely a Harvard deal.

TERRALL: During this time, what was your arrangement with Caltech? Was it a regular leave of absence?

GILBERT: Just regular leave of absence. I found a file in which I have the various notifications of extension of my leave.

TERRALL: You were planning to just go for one year originally?

GILBERT: Yes. It was a year-to-year deal. [I have] those detailed papers, the letters from Munro saying, "Well, it appears that you are going important work," and so on.

TERRALL: Was someone else taking over your teaching here?

GILBERT: Yes. Before I left, I arranged through Clinton Judy to have a young man who was a graduate of the Harvard Business School come in, William Kinard, and for two years he carried on my work. He lives here in Pasadena now, but for that period at least Kinard carried on. There were other temporizing efforts, but when the naval group came in there was a reorganization of the curriculum in which the business economics was not needed.

TERRALL: But even after the naval people were here, the regular student body was still just as big, was it not?

GILBERT: Oh, not as big, no.

TERRALL: Undergraduates?

GILBERT: No. You'd better get the figures on that, but I think if it hadn't been for the naval group here, why, we would have had only a handful of students, because the draft, the war, really reduced the number.

TERRALL: Except for people who weren't old enough to be drafted.

GILBERT: That is a record I don't know about, but I repeat, one of the purposes of the naval group was to keep our faculty together here, you see.

TERRALL: But then all the faculty were working on other research.

GILBERT: Not all of them, because some of them in the humanities here, for example, just couldn't make the contact. But the role of the Caltech faculty during World War II is another story, and it would make an interesting story. [They were involved] in varying degrees, some of them direct and others quite remote, but they all, I am sure, had a clear conscience.

TERRALL: You actually didn't have too much contact with what was going on here then, right?

GILBERT: That's right. I lived in Cambridge from 1940 to 1942, and then until 1943 I was in Wright Field, and then—this anticipates some of the later things—I found that at Wright Field the bureaucracy through which I had to work was difficult, because in order to deal with the aircraft companies that I knew so well, I had to go through the Pentagon. And this roundabout route just was no fun. So I asked to be transferred to the Los Angeles office, where I could be direct, and I lived at home from 1943 to 1945, the spring of 1945.

TERRALL: Were you in the army at that point?

GILBERT: No, I was in the army as a civilian. An application was filed for me to become a major in the air force, but I never pressed it because I soon found that I had more freedom as a civilian, and I'm glad that the commission never came through.

TERRALL: You didn't have any problem working with the military people, being a civilian? That didn't get in the way?

GILBERT: No. Perhaps I should tell you how I got into the military part of this. One of my

students at the Harvard Business School was an air force officer by the name of Dave Baker. Because of his special interest in airplanes, I took him down to Hartford and Stratford, Connecticut, where the United Aircraft operations were. In a way, I did consulting work for the company in changing over from the design of high performance planes to mass production planes. This was my particular talent. Incidentally, this noon I'm having luncheon with one of my former students at Caltech here, Wilbur Snelling, I think class of '36 or '37, and at that time I said, "Today the aircraft industry is an industry that emphasizes the performance of the plane, but someday it's going to become a production problem." Well, Snelling took the hint, and he applied to North American Aircraft, and they hired him, and so he was in the production end of aircraft production through the war. After the war, he carried on, has had a very successful experience with North American, now Rockwell International, and he is conducting a seminar right now at the Industrial Relations Center. He is retired; he was president of the subsidiary of North American in Columbus, Ohio, where they carried on a good deal of their aircraft work.

Well, let's go back to Dave Baker, because Dave Baker was interested in airplanes and I took him down, and we worked together, he as a student and I as a consultant, on the United Aircraft program that produced the F4U, the navy fighter. Dave got the idea that I was more expert than I was, so after he left he reported to his senior officer that there was a professor at the Harvard Business School that knew all about production of airplanes.

TERRALL: Now, he was a reserve officer at that time?

GILBERT: He was an active officer but on assignment to the Harvard Business School. Later on he became the head of the Air Materiel Command as a major general. I don't know just where he is now. Well, one day in August of 1942, here I was at the Harvard Business School, still working on my specialty, shipbuilding and aircraft, [when] a telegram came to the president of Harvard University from the commanding officer of Wright Field asking if the services of Horace Gilbert could be made available to the air force. Well, of course, they all laughed, because this isn't the way things are done in the academic [world]. But the president's office called me in immediately and told me the story. I talked around and the result of it was that next time I was going by Wright Field I dropped in and talked with them. I did a good deal of traveling in my study of the aircraft and shipbuilding companies.

TERRALL: Is Wright Field in Ohio?

GILBERT: Yes, outside of Dayton, Ohio. I dropped in, and lo and behold it was almost like the interview I'd had with Dr. Millikan at Northampton. They didn't give me a chance to say no. They assumed, of course, that here was a problem that was so challenging that the only thing for me to do was to come to Wright Field to help them with the problem of production control, of getting the planes to flow through the production lines. What they were doing was getting lots of production but certain essential equipment wasn't coming along at the right time and in the right place. At that time, the emphasis was on the big bombers. The big bombers were coming to the end of the production line at certain of the factories, but they didn't have the equipment that was necessary for them to go into action.

TERRALL: The equipment was being made by other companies?

GILBERT: Yes, GFE it was called: Government Furnished Equipment. So it was a problem of production control and so on. This started me at Wright Field.

TERRALL: Did you move your family out there, or what happened to your family?

GILBERT: No, they were in Pasadena, and I lived in a hotel in Wright Field.

TERRALL: You said you stayed there for one year.

GILBERT: I stayed there from I think August 1942 to April or so of 1943. Now then, here is a footnote you might say. When I signed up with the air force, I did so with a colonel who was a former civilian who had influence, who had contacts. He didn't need to have stars on his shoulders because he had been brought in to do important things. He was my patron saint, and so anything I wanted, I could go to him and he could cut through. So I had a feeling of independence, not that it presented any problems with the regular line army organization. But I guess we're ready to go to October of 1944.

TERRALL: Was that when you came back out here? You were already out here?

GILBERT: Yes, I was already out here, and it was because of this officer that I had been able to get the transfer from the Wright Field to the Western Command.

TERRALL: Did you feel that your work at Wright Field wasn't—

GILBERT: I was stymied because of the bureaucracy. It wasn't impossible but it was difficult.

TERRALL: When you got transferred out here, were you working on a similar problem?

GILBERT: The same thing. But I was on the ground instead of being in the bureaucratic overhead. Because here I could go to the plants, I could telephone people, and I knew the top people in all of the aircraft companies, so I could talk with them on the phone. It was ideal.

TERRALL: So it was really just to make the same job more efficient.

GILBERT: That's right, to be more effective.

TERRALL: So you were here working with the Los Angeles office of the air force.

GILBERT: Yes. There is just one little incident that made contact with Caltech at this time, and that had to do with Aerojet. Aerojet was a creation of Caltech, Dr. von Kármán and the group of rocket people here on campus—a wonderful group. They had formed this company and they had gotten to head it up a fellow by the name of [Andrew G.] Haley, I believe—a colonel in the Air Force. It was considered to be such an important matter that they got Hap Arnold, the commanding general of the air force, to release Haley to come out and be the full-time executive of Aerojet. Well, the trouble with Aerojet was it had a good idea of rockets and so on, it had a pretty good staff, quite a good many of our faculty were on it. But it didn't have much to show for it, and so the inspector general, or whoever it was, came out to the Western Command here

and asked some questions: What's going on out here with Aerojet? There's a lot of money going out, and nothing to show for it. And at this time I got a hold of Dr. Millikan to tell him about the concern. Well, of course, there was nothing Dr. Millikan could do about it. Actually nothing came of this inquiry. What Aerojet was doing at that time was the JATO units, the Jet Assisted Take-off. These were rockets that could be attached to planes to assist in take-off if they were overweight, or taking off from shorter airfields.

TERRALL: They were actually in the production of these rockets?

GILBERT: Yes.

TERRALL: Had the rockets been developed here at Caltech?

GILBERT: Yes, this was part of the whole rocket activity, and Caltech did a very interesting, big job in rockets during the war. But this Aerojet deal became a little bit of, you might say, a scandal, and there was a feeling that someone was making money and not enough to show for it. Actually, the salaries were rather low, but they were vulnerable, and so, well, as I say, I was the intermediary there, trying to make peace between the air force and Caltech because of Aerojet. Actually Caltech got rid of Aerojet officially, and so it wasn't any longer involved in it.

TERRALL: In terms of Aerojet, what finally happened?

GILBERT: Aerojet is still in existence and it's a subsidiary, I think, of the General Tire & Rubber, and it has carried on broadly in many activities. I remember taking my class down to one of their factories where they were making some of the attachments to machine guns—I've forgotten just what they were—having to do with the automatic firing of machine guns. There was a whole factory and they were making these tiny little things. Aerojet is, I think, a successful unit of the General Tire & Rubber. Actually, the General Tire & Rubber bailed out the Aerojet Company about the end of the war, because while it had some good products and good people, it wasn't able to make itself survive. And so the General Tire & Rubber Company took it over and gave it the money they needed, and it's been quite successful. It has several factories around Southern

California here.

Going back, in October Churchill made his famous announcement—I don't know just what for—that essentially the war was over. And so I went to my patron saint and said, "I want to go back to Caltech." But I was so indiscreet as to say, "But for Heaven's sakes, please have case studies made of the procurements that had gone wrong." Coming from the Harvard Business School where we made a big thing of the case studies anyway, I was aware of the large number of projects that were initiated and didn't get anywhere at all. Quite a number of new planes were planned, for instance—fighters, bombers, transports, and so on, and not one of them spilled any enemy blood. Quite a good many equipment items were also developed, and they didn't get anywhere. You might say, "What did get somewhere?" What did get somewhere was the improvement of the existing planes, and I would say perhaps only with one exception—the Black Widow, a fighter of Northrup—we ended the war using planes that were in existence at the beginning of the war but which had been improved tremendously. In other words, the great development was in the improvement of the P-38 of Lockheed, the P-51 North American, and the P-47. And of course the B-17, the B-24, these were all improved tremendously. The irony of it is—if "irony" is the right word—that the best aeronautical engineering brains in the country were applied to these new ideas that never panned out. And it was the second-rate engineers that were used on the improvement of existing planes, which did so well. Oh, at the end of the war our planes were doing just beautifully. Incidentally, anticipating the bombing survey work, the same was true in Germany, although they did develop the jet planes during the war. They had started on them before, but essentially the Germans deserve more credit for developing new equipment during the war. Of course, they were under the gun more than we were.

Well, instead of releasing me in October 1944, my patron saint said that—well, he didn't tell me, but the next day I received orders to report to Wright Field to prepare the case studies.

TERRALL: So you got stuck doing it.

GILBERT: Yes. Well, actually I didn't feel badly about the assignment, because I knew I could do it, because I knew the things that had gone wrong. The XP-54, the XP-55, the XP-56, and the XP-72, and all of these, I knew them. And so I reported to Wright Field, back from Los Angeles. I had a staff of about fifteen young ladies who were expert in going through the files, who knew

their way around, both in Washington and in Wright Field, pulling together the documents that related to each procurement. And then I worked with those, and I wrote the story. I don't think that I have ever worked harder, longer hours, but it was fascinating. It was a narration, telling the story, where the idea had come from and what happened, and so on. So for five months I did this, and they are in the records. At that time I sent a letter to Dr. von Kármán reporting essentially what I've told you—namely, for Heaven's sakes, let's get the record of procurements that have gone wrong. And I have the copy of his reply somewhere in my file that I will turn over to the Archives here. You see, Kármán was at the Washington policy level, and essentially he was too high up to do anything about it. But I still think that I was properly advised to let him know about this, although there was nothing that he could do to correct it as of that late date. So I didn't get out of the Air Materiel Command until March, I guess, of 1945. I came back to Caltech, and that spring I taught a short course to some of the army officers here as I recall. Then, the next step is the bombing survey.

TERRALL: Right. Was it through people you had known working for the air force that you got into the U.S. Strategic Bombing Survey?

GILBERT: No. I was comfortably situated here at Caltech in the spring of 1945, as I say, teaching this small course, when I had a call from Al [Albert E.] Lombard. Al Lombard was a Caltech graduate, took his doctorate with us, and then was a member of the faculty in aeronautical engineering. And Al Lombard had been asked to be a member of the bombing survey.

Now, let's go back. When Churchill said the war was over in October, it wasn't, because later the Germans broke through the Ardennes Forest and so on, and the war wasn't over until May. But the bombing survey was formed about October 1944, and the chairman of it was Franklin D'Olier, who was the head of the Prudential Life Insurance Company. As such, the thought was that his name would be pure and would be above suspicion. The point was that so much of the war effort by the United States had been with the bombers, so much money and so many lives lost, and of course the damage done to the targets, there was concern lest there would be a public questioning regarding the decision to do this. And so President Roosevelt appointed the U.S. Strategic Bombing Survey, with D'Olier as chairman.

TERRALL: It was just an American thing?

GILBERT: Just American, to study the effects of, I emphasize the word, *strategic* bombing, which means the long-range, distant bombing, not tactical bombing, which is the bombing by fighters in close-up relationship to troops, you see. So the survey was formed and Lombard was asked to come in to help on the aircraft section. Lombard became involved in the high-up industrial work in aircraft companies. He couldn't wait, he couldn't stand by. So by the spring of 1945 he had had to say that he couldn't go on the bombing survey. He is now the head of one of the big aircraft companies there in the Middle West. He's in our directory. And so he phoned me and asked me if I could do it. I made inquiry, and I could do it. So I came in as a second choice to Al Lombard.

TERRALL: Was the survey already working at that time, or was it just being set up in those months before the end of the war?

GILBERT: The bombing survey group was bored, because here the war hadn't ended and they couldn't get into the field. They had their headquarters in London in Grosvenor Square, and nothing is more boring than to be all set up to do something and not be able to do it. So this broke Lombard's spirit, and so he came back. I didn't have any spirit to break, because I went immediately from Caltech to Washington, got my uniform, and they flew us over to Europe. Our headquarters were in London, but with subheadquarters outside of Frankfurt in a wonderful resort called Bad Nauheim.

HORACE N. GILBERT**SESSION 3**

February 21, 1978

Begin Tape 3, Side 1

TERRALL: You told me at the end of last time about getting appointed to replace Al Lombard [on the bombing survey] when he had to come back. And I think that's as far as we had gotten.

GILBERT: I think I mentioned the fact that there was concern about the judgment on strategic bombing, and that after the war there might be an inquiry that would throw discredit upon those who had ordered it. I think I said that while there was, as of the fall of 1944, such a thought, as time passed the fear appeared to disappear. And when the war was over nobody cared much about the legitimacy of strategic bombing.

As to how I got into it, I already mentioned the fact that I was asked to replace Al Lombard, who had been the original appointee back in October of '44, when Mr. Churchill thought that the war was over. But Al couldn't wait that long. He had his professional career to look after and so, although he was in London with the survey team, he decided to abandon it, and in order to get a replacement, he called on me. So this, to make a long story short, is how I got into it, replacing Al Lombard. I must say I felt considerable confidence in my ability to carry the job, because I had made such an intensive study of the aircraft industry, going back to my original appointment at Caltech. I had visited the California aircraft companies every year and had watched their development, and had been a close student of aircraft manufacturing methods. So I received my orders in May of 1945, and I was flown to Europe. We flew in a DC-4 at that time, a navy transport. It wasn't at all a luxurious transport. We stopped twice on the way, once in Stephenville in the Maritimes and the other one in the Azores; then we landed in Paris. This was on June 1, 1945, as I recall. I strolled around Paris renewing my contacts with it which I had established over many years. In the Place de l'Opéra, I remember a tremendous crowd assembled, and for what purpose? To greet the return of the one-millionth prisoner of war which the Germans had held. This is a strange thing to celebrate, but nevertheless there was no mistake

about it. The people in the square there were so enthused to have the return of their prisoners of war.

Paris was a strange city at that time. It was like a beautiful woman without her makeup. It was a drab city. And I looked up some of my old restaurants and found that they had scarcely anything interesting to serve. Well, we went on to London, which was the headquarters of the bombing survey. We landed in darkness, incidentally, even though the war was over. The British were maintaining the strict controls. We landed in an airport outside of London and we came in by bus with the lights out. We came to our billeting office near Grosvenor Square. Grosvenor Square is the location of the American Embassy; it was the center of a great deal of the American activity in London. We had been allowed to preempt the apartments on the square, and so we had offices there at Grosvenor Square. I was billeted in a place within a short walking distance across Oxford Street on Harley Street. I shared a room with an OSS [Office of Strategic Services] member; I remember he carried a revolver. I didn't carry a gun any time I was there. I saw him very rarely. We had very comfortable billets, and we had our meals at the great dining room, the great ballroom, of the Grosvenor Hotel. With an army tray with different compartments in it, we would line up and then go past the serving table, and quickly each of our compartments was filled up with something to eat. There was an officers' section to this, which I used somewhat. I had the simulated title of colonel, and as such rated the special dining facilities for officers. I didn't use them much, however.

TERRALL: Were these just people on the bombing survey or other Americans?

GILBERT: These were the people on the bombing survey, and I would say in total there were about 500 members of the bombing survey. However, I think that any of the American groups operating in London had access to the Grosvenor Hotel. But I don't recall clearly just what other ones were there.

TERRALL: You mentioned that by the spring of 1945 the question of the legitimacy of the strategic bombing program was no longer important. So that would imply that the whole focus of the bombing survey had changed, or the idea behind it had changed.

GILBERT: No, not the idea behind it. The bombing survey's purpose still was to determine the effect of the strategic bombing in bringing about the defeat of Germany. And I point out again, if I haven't already done so, the difference between strategic bombing and tactical air force work. The strategic bombing was the bombing which was done against strategic targets by our long-range four-motor bombers, principally the B-17s and B-24s. No, as of 1945, even though the concern about the wisdom of the strategic bombing program in its totality, which originated the survey, had been moderated, it was still quite a live issue.

TERRALL: So it was more a question of evaluation.

GILBERT: Yes, yes. It was still the original concept: Had it been a wise way to conduct the war by mounting the massive bombing raids against Germany? The roots of this decision could be traced back to the meeting between Churchill and Roosevelt at Casablanca in January 1943. At that time, it was decided to carry the battle to Germany by bombing, and the decision was made that the British would do the bombing by night and the United States would do it by day, because we had superior bombsights, supposedly. No, while the bombing survey was going on, it was still a serious assignment to answer the question, "To what extent had the four-motor bombing raids on Germany contributed to the defeat of Germany?"

TERRALL: What were the backgrounds of the other people on the survey? Did they try to get people from various different fields?

GILBERT: The bombing survey was divided up into perhaps a dozen sections. The section of which I was a member was the aircraft section. In other words, we were asked to determine the effect of the strategic bombing upon the aircraft industry of Germany. There were similar teams assigned to other categories. One of them was transportation. Another one was the synthetic fuel plants. There was one on the chemical industry. There was one psychological team—that is, the effect of bombing on the psychology of the German people. And there was a team on overall effects of the bombing. So there were many, many people in the act, and I think that a good many of them had pushed themselves forward to be on the team. In my case, I had been invited, and so I didn't feel at all the same motivation, you might say, as these others. Our

colleague here at Caltech, Burt Klein, was a member of the survey. I don't remember what team he was on. I remember that Kenneth Galbraith—Professor Galbraith, the first time I had ever met him—was over there. He was a member of the overall effects [team]. So, actually the survey was a massive coverage of the total of Germany in an effort to measure the effects of the bombing in bringing about the defeat of Germany.

TERRALL: Well, let's start with methods.

GILBERT: How did we proceed? The survey had a fairly good infrastructure in the sense of staffing, people who could take care of our arrangements and who could look up what information could be found. In some cases, it might be that the material they found was highly useful. In the case of the aircraft industry, however, when I arrived, I asked, "Well, what was the German aircraft industry assigned to do in the way of production schedules? Of what models, as of what months, by what factories?" so that we could relate these programs to the bombs that were dropped on the factories. I found that nobody had this information. I had been with the Air Materiel Command at Wright Field, and our Bible, so to speak, was the plan—namely, as assigned by the Pentagon to the aircraft industry. What planes, how many of them, what months, and by what manufacturer. And I insisted that I couldn't do anything until I had some concept like this for the German industry. Well, not having it, I scrounged around; for instance, I went to the General Motors plant near Frankfurt that makes the Opel automobile, and I found that they made the landing gear for the ME-109, and I said, "Aha, this is a way to determine what the schedule for ME-109s was." Well, yes, but it was only for about six months in advance. I used all kinds of devices to try to find what the program was. We, the survey, had preempted the services of a German; this was a friendly kind of imprisonment. He lived with his family in a little village nearby. He was one of the senior officers of the Auto Union. The Auto Union is the company which in its postwar regeneration produces the Audi. It was late in getting reestablished after the war, but Willy Werner, this officer, was very helpful. He had been in the center of the machinery to get the airplanes forward, but I was surprised that he had no records at all of the type that I was looking for. We also had in friendly incarceration a man by the name of Frydag, quite a fine person. He was the head of the committee for the production of aircraft. And again he should have had the information. He didn't. However, he helped us, and he and

his secretary, a gentleman by the name of Muller, thought they had various leads as to where we might find some of the information. I remember going in our jeep and making an expedition over into the Russian Zone, to see if we could find some of these records. We did it and found nothing. However, it was a rather exciting experience to go into the Russian Zone and to shake hands with a Russian colonel, and to look in his eyes and to see a kind of warmth and friendliness. It was a great moment for him, as it was for me, to greet each other under these circumstances.

While I was trying to find the documents, we visited the ERLA factory in Leipzig that had been making fighter planes, to see if we could get a record of their production, with no success. But I began to talk with the receptionist, a German woman. She knew what our purpose was, and I told her that I had already been talking with Dr. Frydag. She asked me did I know where his secretary was, a Mr. Alpers? I said, "No." And she said, "Well, I think that Alpers would know where the record of these programs is, and incidentally he was here this morning." I said, "Fine, but where is he now?" And she said, "Well, he's just left to try to find his family." At this time, families were all broken up of course, and his home was in Hildesheim, near Hanover, way up in the northwestern part of Germany.

Well, we set up a little group to go look for Alpers, and within a day or so we found him. He had already located his family, so he was happy. But we picked him up and in our little jeep caravan we went back; we had to go across the Russian sector border again into the Bohemian mountains to the hunting lodge of the ERLA director. Getting across the border presented some problems. However, we went directly to the hunting lodge. Sure enough, we had to wait until the Russian guards were not looking—waited until their dinner time, in fact—and then we went in and under the stairway there were seven boxes that had been put there by Mr. Alpers that contained the total of what I wanted—namely, the record of the program of the Luftwaffe as it changed with time and the orders given to each aircraft company for each type of airplane. Incidentally, when we got these boxes back to Bad Nauheim—Bad Nauheim was our headquarters in Germany, it's a beautiful resort about fifteen miles out of Frankfurt—we sat on those boxes and took from them the complete record of the German aircraft program. We reconstructed it so it was essentially identical to the pattern of the American aircraft program. We had some statistical and charting help from the I.G. Farben staff in Frankfurt. This material, incidentally, I've deposited with the Archives, the charts and the tables, and some of the charts

have been marked with a green pencil by Field Marshal [Erhard] Milch. Field Marshal Milch was the head of the Luftwaffe procurement, not the civilian side which Frydag headed up, but Milch was the one who was the military officer in charge of getting the planes forward so that the fighters could use them.

All summer we worked with that material, and we drew our conclusion as to the effect of the bombing on the aircraft industry. All the while the other teams were seeking out their solutions. I don't want to comment on them. You might ask, "Well, what did we find?" We found some very interesting things. Perhaps the most important thing was that Hitler was not impressed by the power of air power, and accordingly he did not give to the German aircraft industry orders to produce planes which the industry could have produced in time so that they could become a factor. At Pearl Harbor, when the United States entered the war, nothing was done by Hitler to increase the production of planes. The orders given by the Luftwaffe remained constant. We were told that Goering, Marshal Goering, had been pleading with Hitler to please let the industry produce more planes, but Hitler didn't respond. It wasn't until the fall of 1943 that Hitler allowed the aircraft industry to go ahead and produce more planes. As to just the significance of this date I don't know, although in August of 1943 there was the tragic bombing of Hamburg, which killed some 30,000 people at one stroke. And this may have dramatized to Hitler that he had better get going. Actually, what was going on was that Hitler had decided that the war was going to be fought and won by the use of tanks and artillery. These were the weapons being used on the eastern front against the Russians, and it was a terrific battle. The one at Stalingrad was perhaps the climax of all of this. So Hitler's attention was diverted, perhaps, in this way, so he didn't give attention to the aircraft industry as it might have been used to fight on the western front.

TERRALL: How cooperative were the Germans whom you asked for information, and how useful were they to you?

GILBERT: It's difficult to answer that question, because it would appear that my opinion of unanimity is unreal. But I would say everyone from Albert Speer² down was completely cooperative. There were no holdovers of loyalty to Hitler that I could discern at all. At Bad

² Nazi minister of armaments.

Nauheim, where I strolled around in my army uniform on dark nights—I like that country; I'd been there many times before—I had no feeling of fear at all. There were a few stories of so-called werewolves who were stretching piano wire across the roads in order to intercept jeeps, [and] the jeep I used for instance had a wire cutter on the front of it. But talking with people, they were completely cooperative—but I repeat, it was surprising how ignorant they were of the overall plan. And, again, going back to Field Marshal Milch, whom I interrogated one morning from eight to twelve—it was on the day that the bomb was dropped over Hiroshima—and I showed him the charts that I had prepared. He was surprised and he said that he wished that he'd had that information. So, I would say there was no holding back at all.

TERRALL: It seems strange in a way, doesn't it?

GILBERT: Does it seem strange? Well, in a way it does, because here a month before, we were fighting. I would say, just as a preliminary general conclusion, that while the bombing of Germany had brought the war home to many, many Germans in a dramatic and tragic way, the German propaganda machine was so effective that it kept the German people feeling that there was yet a chance for them to win. And it wasn't until the GIs crossed the Rhine and came to the cities and knocked on the doors of the citizens, and said, "Here we are," that the people realized that the war was over. Of course, during the summer, I talked with a great many industrialists, and I found that while after the war it was easy for them to change their attitude, quite a common comment was that when our bombs were dropping, why, they were hoping that the targets would be the right ones and that the war would come to an end. They were surprised that we didn't select the targets that they thought would have been the best targets. And this goes back to a comment about the whole conduct of the war. The U.S. intelligence on Germany was not good. The U.S. used a good deal of British intelligence, some of which was good. But by hindsight there was a great deficiency. For instance, we should have concentrated more upon their electric power distribution. We assumed that they had a foolproof system arranged. Well, they didn't. And if we had ruined their electric power distribution, why, this would have been a body blow. No, I think America has a wonderful reservoir of goodwill around the world, even under such conditions as at the end of the war. And I felt personally this kind of acceptance.

TERRALL: Even from the military people?

GILBERT: The military people brings up another chapter. Of course, while I was in uniform, with a simulated rank of colonel, I was using lieutenants and captains to drive my jeep, and so on, and it was quite common for them whenever they came in touch with some German who might have some property that the American officer wanted, to ask for it. For instance, cameras and little art objects. I resented this but I didn't enter into it; I didn't tell them not to do it. However, again, when it comes to victors, the Americans I think were the most gentle victors and demanded least.

Well, what else about our methods and my role and the situation in Germany? I'd like to make a brief comment about the situation in Germany. When I arrived there in June of 1945 and the jeep picked me up at the airport and took me out to the billet—Frankfurt was the center of pre-war autobahns, these wonderful four-lane highways—and I was overwhelmed by the presence of people walking on each side of the autobahn. There were people walking who were refugees from various parts of what had been Hitler's Germany. Some of them had little carts in which they were carrying a few of their possessions. But these were streaming along the side of the road. They were escaping from the places where they—well, such as the Sudeten Deutsch from Czechoslovakia, and the Polish. Well, this was a dramatic sight to see. And at every hour of the day, it seemed, they were moving along. Fortunately it was a very nice summer and I suppose they could camp out, and the whole spirit of a defeated Germany was to take people in, so apparently there was not a great deal of privation. In the cities—Frankfurt, that I knew especially well, because we went through it all the time and I drove into it off and on—they had used bulldozers to clear away the rubble from a few of the streets, but there was the stench of death around from the bodies that had not yet been recovered. It was a dramatic sight. Of course the opera house, which was one of the largest in Germany, the roof had been blown off of it, and incidentally, when I was there with the High Commission later, I found that the weather coming into the roofless building had destroyed the foundations of the building so that they couldn't rebuild it. I think they have rebuilt it, but they had to take it all down and begin again. But the autobahns were in fair condition except the bridges, and of course we had bombed out a good many of them, so normally, in our jeeps, we had to go down and around and get across little streams through improvised bridges.

There was no factory activity as such; a great many of them were bombed out. In my searching for records of the aircraft program, I visited quite a good many factories that had been assigned parts of the program, and in some of them I couldn't even identify where any of the parts had been produced, because the twisted steel and masonry and all were in such a condition.

TERRALL: You were talking about the conclusions that your part of the survey came to.

GILBERT: The survey's report. There was a kind of psychological pressure on the survey, topside, to come up with something that might be helpful in the war against Japan. Actually, you see, here we were in June of 1945 and it was August when Japan collapsed, so there wasn't much time, really. I would say that the defeat of Japan was brought about by tactics that were not especially derived from the German experience. There was one comment that I remember—namely, the use of fire bombing, and they did use a good deal of that in Japan and a great deal of damage was done in Japan by the use of fire bombs. However, I think that the B-29 attacks on Japan, and the U.S. Navy isolation of Japan, had been the real body blows that had put Japan out of the war. So the fact that we were under pressure to come up with something resulted in the tendency to come up with something that was preliminary, and we did that. The preliminary statement was quite a brief one—this was before the report was ready—but the preliminary report emphasized the fact that air power had been a dominant factor in bringing about the defeat of Germany. There was a brief support for this conclusion. As the survey continued and was completed, I became highly critical of that preliminary generalization, and my reasoning was this: that the purpose of the bombing survey—its very name, the United States Strategic Bombing Survey—was lost, because the strategic part of the bombing, while it did tremendous damage, in spite of that damage Germany was able to mount a military effort that was very impressive. And so I rather discount the role of strategic bombing in bringing about the defeat of Germany. The use of tactical air power, however, was another thing. And this was something that we didn't know that we were superior in, because the Luftwaffe, the ME-109, the FW-180, Junkers-88, these were superior planes that were equal to anything we had. So we go back to just what was the reason for the defeat of Germany, and the observation that appeared to me the most basic was that it was the combination of strategic bombing, which in a way softened the German war effort, but principally the use of tactical air power in protecting the invasion of

Germany on D-Day, and in permitting the Allied Forces to move across France under vulnerable conditions, and then the crossing of the Rhine, and moving into Germany. This was all done under the protection of our wonderful fighters, the P-38s, the P-51s, and the P-4Ts. And as I drove around Germany in June of 1945, along the autobahns there were many examples of German weapons that had been pot-shot by the American fighters. Actually the American fighters I think had fun just roaming around and waiting until they saw a target, and especially if there were some woods, they would wait until they came out of the woods—or tunnels, in the case of railroads. So the tactical air power was the definitive factor that brought about the defeat of Germany. Now, I don't think this was ever clearly brought out by the survey, and the reason was very largely the politics of the Air Force High Command. They couldn't admit that bombing as it had been conducted had not been the big thing. And there was rivalry between the two arms of the air force—the Tactical Air Command and the Strategic Air Command. Well, maybe it's just as well to let those arguments fade into history. But in my opinion the survey report was deficient in emphasizing the overall factor of air power in bringing about the defeat of Germany, when the specific assignment of the survey was to measure the effect of strategic bombing. There is considerable objection to this conclusion in England, because England had been at the receiving end of bombing at the beginning of the war, and while it had done great damage, the British knew the limitations of it; they knew that there were ways to recover from the bombing.

So as I say, it goes back to the fact that in the United States, beginning back in June of 1940, we had decided to go ahead with the production of heavy bombers. This brings us back to Caltech, because when the Caltech people were invited to Washington by [William] Knudsen, the head of the War Production Board, the decision had been made as to the type of plane that was going to be used. At that time, there were attack bombers available that could have been used. The Douglas A-20 and the improvement of that, the A-26, in particular, the Martin bomber—these were intermediate-size bombers and they wouldn't have taken anywhere near as much materiel, or they would have cost as many lives. In the case of the British, they had built the Mosquito, which was a very high performance attack bomber. Looking back, one could say that if, instead of the four-motor bombers, we had concentrated upon these attack bombers, we would have challenged the German Luftwaffe and at that time we would have found out whether we could conduct the war in that way. I don't like to use hindsight carelessly, because if we had

used this alternate type of bombing it is quite conceivable that the Germans would have come up with a counter. As it was, they didn't come up with a counter to our strategic bombing, even though they destroyed so many of our heavy bombers; the Luftwaffe was still the underdog in the whole conduct of the war.

TERRALL: Was the report of the survey much publicized in this country?

GILBERT: The report was available widely in the United States. When I came back from the survey in September of 1945, my first copy went immediately to my friends in the aircraft industry. Don Douglas had a luncheon for me out in Santa Monica, and I reported to him and I gave the copy of my survey [report] to him with the assumption that he would return it. Well, I never got it back. I had four copies all together, and not one of them was ever returned. But it made no matter. It was a matter of public record. And somewhere in my files here there is a statement of where you could get them and how much it would cost.

TERRALL: Was there much coverage of it in the newspapers, for example?

GILBERT: There wasn't much coverage, because, as I said before, the war was behind us and the hindsight on it was not interesting.

TERRALL: Did you feel that the survey was useful? Was it worth the effort that went into it?

GILBERT: Was the survey useful? Well, the day that I was interrogating Field Marshal Milch, the day that the bomb was dropped on Hiroshima, I didn't tell him about it until the end of our conference. He was in prison there in London; I went out to his prison to interrogate him. He was a delightful person. He was in his uniform, but no insignia on it. And I told him about the atomic bomb and his eyes bugged out, of course, but then we opined that that meant that the purpose of our survey was almost irrelevant. Because bombs of the nuclear type, the atomic type, were such a different thing from the bombs that had been used in Germany. And so we sort of left it up in the air. That was the fact of the matter. We had completed the history of the bombing of Germany, but so far as its relevance to the future, we were sort of pessimistic. Now,

as time passed I would say that in South Vietnam, and possibly also in Korea, that the lessons of the bombing survey could have been applied, because we didn't use the atomic bomb. But I would say I'm not sure that the lessons were properly learned and applied, because I think there was still the momentum of the air force thinking that air power was so unquestionably the right thing. All you need to do is to pour on more of it. But without going into this in detail, I would say that the usefulness of the bombing survey was not very great. I don't like to generalize about army officers, but I would say they don't like to study the lessons of history. Actually the survey itself was guilty, because it oversimplified in its own statement. It did not differentiate between the strategic and the tactical in the way that it should have.

TERRALL: Shall we move on from the Survey?

GILBERT: All right. Oh, wait a minute. There is a little footnote here that ought to be inserted. We've spoken about the aircraft industry of Germany and the effect of strategic bombing on that industry. I was also assigned to the missile program in Germany. The missile program consisted of the A-1 and the A-2. And I wrote the report of the survey on the A-1 and the A-2. This is another story, of course, and I don't want to go into detail on it. All I will say is that the engineering work that went into the A-1 and the A-2 was remarkably advanced. Clark Millikan, for instance, who went over as a member of the team ahead of the survey, went over there in order to find out just what these advanced ideas were. It was at that time that we picked up some of the key people in the Peenemunde group. My concern was the use of hidden facilities in which to produce the key elements of the two weapons. The A-1 was the buzz bomb and the A-2 was the ballistic missile. The buzz bomb had been pretty nearly beaten by the British fighters, but the A-2 ballistic missile, no. And it terrified the British, because it was shot up and came down; however, the aiming wasn't very good, so they weren't able to pinpoint their targets. But, again, I went to the facilities. The principal facility to which I went was the Nordhausen Tunnels, and I have a picture of them somewhere here which I will turn over. We didn't bomb out these missile facilities. The missiles were rather small, incidentally, as targets, and so it's not surprising that we had so little effect on them.

There may be a couple of other footnotes. One of them was the famous bombing of the German aircraft fighter plants, February 20th to 25th of 1944. You notice this is several months

before D-Day. D-Day was June 6, 1944. Our high command with careful planning decided to concentrate upon the bombing of the German fighter plants, and so in those five days they poured it on the fighter plants. What we found was that this bombing was very effective, but it impaired very little the flow of fighter production. The reason was that we were bombing the final assembly plants, because we knew where they were, but the components were scattered around and the next day or within two weeks, why, the components were flowing to other assembly plants. As of February 1944, they were producing around 1,000 fighters a month. By June of 1944, which was the time of D-Day, they were producing 3,000 a month. In other words, the famous bombing of the fighter plants turned out to be a fiasco. It wasn't what they had hoped it would be.

TERRALL: And that was because they didn't have the information on where the other plants were?

GILBERT: [Where the] components were, yes. Also, as soon as we began to bomb the German aircraft plants seriously as we did at that time, Goering ordered the scattering of the aircraft production plants. Actually, this decentralization went back to an earlier period before the bombing of the fighter plants. It was the bombing of the ball-bearing plants at the end of 1943. Incidentally, the morning after the bombing of the ball-bearing plants, Goering called a meeting in Berlin to decide what to do about it, and he put in charge a distinguished German engineer—I've forgotten what his name is now. The decision was to commandeer all ball bearings in Germany. Anybody with ball bearings had to report them. This was done, and when it was done they found so many ball bearings that it more than compensated for the ball bearings that had been lost in the bombing. The normal thing is for manufacturers to carry extra inventories, you know; they hoard. And this had been the case. But anyway Goering had ordered the decentralization of the production plants in the aircraft picture in order to reduce their vulnerability to our bombing. This was done, and you might say that it was overdone, because they scattered them around so much further than they needed to, to stop their vulnerability to our bombing. It became quite difficult to produce with these scattered facilities. Well, those are the two little points I wanted to add.

TERRALL: OK. Were you finished with the survey in time to get back to Caltech in the fall of 1945?

GILBERT: Let me see, in September of '45. You see, I had come back to Caltech for about three months from my air force work at Wright Field during the spring. And then I went off on the bombing survey. In that spring, I conducted a class, a rather special class, for certain military people that were here. But when I came back in the fall of 1945, as I recall, I came into full swing with my course, Econ 100. And that continued uninterrupted until my work with the State Department and the High Commission.

TERRALL: Weren't you also doing some part-time work with the Air Materiel Command? The industrial preparedness assignment?

GILBERT: You are quite right.

TERRALL: How much of your time did that take?

GILBERT: It didn't take any of my time away from my Caltech teaching, but I remember in the spring of 1946 and the summer of 1946, I worked full time as a consultant to the air force. I have a couple of letters of commendation here for my work, which I am turning over to you. This was a very interesting assignment, and it reflects credit upon our administration that we did it—namely, after the war the question came up, What preparedness measures, costing how much, would save how much time in the mobilization of the aircraft industry? This seems like a very sensible assignment and the military ought to know about it. They appropriated funds and placed contracts with twenty-nine of the principal Air Materiel Command sources for airplanes, engines, and a few of the highly specialized items of equipment. They placed contracts with these twenty-nine companies and I was hired to supervise the preparation of their reports. Actually they were like doctor's theses, to take the best thinking of these company managements as to what preparedness measures, and so forth. My problem was, as it is so often in teaching, the precise nature of the assignment was understood very differently by different companies. So I had to get them all started at the right point and guide them along the line. Well, here they came

in, and I wrote the summary of these twenty-nine theses, a copy of which I've turned over to the Archives. It was confidential at the time, but no longer of course. And what I found was that certain kinds of preparedness measures would save a certain number of months in building up production, and how much the measures would cost. The problem, as it developed, became something else—namely, with modern war as it is, how much time does anybody have? And so essentially you have zero time to mobilize and so the only way to be prepared is to have an air force in being. So this was, you might say, the unspoken conclusion of our survey. At the same time, let's see, Congress asked for a survey on the same question—namely, mobilization. It isn't the first time the government has had two teams assigned to the same thing, but no harm was done. It's very expensive. But the other team that was appointed by the congressional committee came in with its report about the same time, but instead of having a careful analysis of the tooling and what not, they just jumped to the conclusion that the only thing to do was to have an air force in being. So I must say they were right, but we were right also.

Now, what was the situation regarding current procurement? It wasn't high enough to create an industry in being that would be very useful. However, it did cause Congress to place a few additional orders in order to keep the aircraft industry alive. Because the alternative, if there's no business, is to lay off all the people. If they're laid off, you can't bring them back and have them do anything excepting after years. So this was my special assignment with the air force in 1946. And the summary of our report is contained in that document, which I filed.

TERRALL: So that would have been finished up in that summer of '46?

GILBERT: Yes, it seemed longer than that. I know during the spring holidays I went back to Wright Field and worked on the contracts. I'll tell a little story here. The lieutenant general who signed my commendation here was the commanding general at the Air Materiel Command at the time, and one of my recommendations was that he, as the leader of the team, should go to Detroit and talk with the heads of the automobile companies that had heavy roles in turning out various types of air materiel equipment. Willow Run, of course, was one, and then several of the engines were being produced by the automobile companies. But I was terribly disappointed, because General Twining, the commanding general of the air force—I asked him pointedly, "Won't you come up with us to get from them their ideas on preparedness measures?" And he refused. His

reasoning was that he didn't know enough about the subject, and he didn't want to be in a position of being a rather stupid participant. Which is a good reason in a way, but I remember feeling very disappointed. I thought it would have added a great deal if we had taken our commanding general right up to the top of the Detroit people and gotten their thinking.

TERRALL: How did you happen to get that appointment?

GILBERT: How did I get this consulting appointment with the air force on mobilization? I don't like to put it so simply, but I had established something of a reputation for knowing something about the aircraft industry. The people at Wright Field were scrounging around trying to find somebody who knew this. The key man at Wright Field who picked me out was a fellow by the name of Captain Rosenheim, a very alert young officer. And he knew exactly what my abilities were. Well, I think as it turned out, he was right—namely, everything that we did was right down my line. But in a way we ran into another little internal political problem, because this special assignment which I was given and which General Twining commends me for, and which we carried out, there was a section of the Air Materiel Command that considered this its private assignment already. Which in a way was right. So we found ourselves sort of feuding with this young general, who resented the intrusion of an outside team preempting this. The reason I cite this is that there was a little bit of a follow-through from this. The name of the officer was Horace Shepard, General Horace Shepard. At the time, they were developing the jet engine and the key problem in the development of the jet engine was to increase the life of the turbine blades, to have them hold up longer. In the beginning, why, fifty hours was considered to be quite good. The key company in the United States that was master of this kind of metallurgy was Thompson Products of Cleveland. So Shepard worked with Thompson Products, and Shepard took retirement early in order to go with Thompson Products and headed up the work of Thompson Products in the improvement of the turbine blades. Now then, Thompson Products since has become Thompson Ramo Woolridge, and Thompson Ramo Woolridge brings us back to Caltech. The chairman of the board now is one of my former students, Rube [Ruben F.] Mettler, and another executive vice-president is Stanley Pace, who was in my class. Shepard at last has retired from Thompson Ramo, but I cite this as an interesting little detail in relation to my consulting work on this mobilization study through Horace Shepard and back through

Thompson Products, and Si Ramo and Rube Mettler and Stanley Pace.

TERRALL: When you got the appointment in 1949 to work in Germany again, did this come out of your work for the air force?

GILBERT: No. My work with the High Commission in Germany was based upon my longtime interest in Germany. With the end of the war, for the first few years the government of Germany was in the hands of the military, and General Lucius Clay was the head of our arm of the military government. Between 1945 and 1949—this was the period of strict military government—it became apparent that things had to change. With the development of Adenauer as the top man in Germany, and with the confidence that he inspired in the occupation authorities—that is, the American, the British, and the French—in June of 1949 it was decided to make a shift away from the military government into a High Commission. And the man who was asked to head up the American side of the High Commission was John J. McCloy. McCloy didn't know Dr. Millikan directly, but it was through one of our trustees, I've forgotten whether it was O'Melveny or who, who was a friend of McCloy's. McCloy wanted to sweeten the group from the military government, because McCloy had the idea that with four years of military government there were people there whose reputation was identified with the Prussian heel over the neck of the people and so on. Actually I don't think this was serious, but McCloy decided to try to sweeten up from the military government to the High Commission by introducing some new blood. And so he got on the phone and to make a long story short, he got hold of Millikan, and Millikan knew that I had knowledge of Germany over a period of quite a good many years. So he recommended me, and I'd say this, it took all summer to clarify things. But this is not surprising in a big bureaucracy. I have letters in my files here going back and forth. In a way I was wanting to let Caltech know whether I was going to be available to teach. I remember talking with McCloy on the Forest Service telephone up in the high Sierras where I had been visiting my son, who was at a camp there. This finalized the action, even though my travel orders didn't come through right away. But McCloy apparently had decided that I would be a good one to be on his reconstituted nonmilitary team.

When I got to Germany, when we were invited to the embassy out in Bad Hamburg at a more or less formal dinner, the first thing that McCloy did was to take me into his what was sort

of a tack room, in which he had his sporting equipment, because he thought if I was in the high Sierras that meant that I was interested in the outdoors. Sure enough, he had fishing equipment, he had rifles, and so on. The hunting over there was not my cup of tea, because you had beaters who would beat the bushes to drive the animals in front of the people with guns, and when they came up, why, you'd shoot them. Well, this wasn't my cup of tea, and actually it wasn't McCloy's cup of tea, but if an individual starts out stalking, well, like as not he'll be shot; you see, it's a practical problem. The game that we shot, we never enjoyed; it was turned over to professionals, who pick up the animals and put them through the restaurants and shops. I remember one of the special delicacies that we used to buy in the shops were roebuck, which is a small deer. And we sometimes had boar, but I must say I never tasted any wild boar that I thought was worth eating. Well, that's my entry into the next stage, which is the High Commission.

TERRALL: What was the relationship then between the High Commission and Adenauer and his government?

GILBERT: That's a good question. It was ambivalent, but not with friction. Every Thursday the High Commission met at the Petersberg, which was near Bonn, in a palatial hotel high up on the banks of the Rhine that had been preempted for this purpose. We had a special train go up there more or less early in the morning on Thursdays, and spent the whole day with the French and the British high commissioners, around a table. Adenauer would be present there and essentially it was a matter of Adenauer presenting his problems and the High Commission responding. It was a remarkable exercise in cooperative evolution to a freer Germany. Adenauer I think deserves the credit, although I think McCloy on the part of the tripartite occupation deserved credit, because McCloy was a true statesman, while both the French and the British high commissioners had behind them the bitterness toward Germany, you see. It was awfully hard for them to be decent to Adenauer. But McCloy carried it beautifully. And so all summer this went on. In September of 1949, there was an election in Germany. We were all afraid that the Social Democrats, who were a little bit on the leftish side, would win, but surprisingly the Christian Democrats won. Adenauer's leadership was endorsed by this action. And Adenauer carried on for—well, I don't know; they have four-year terms—it must have been sixteen years, until he

died, in his nineties I believe. That is the way we worked. And then we would come back to Frankfurt, where our working offices were.

TERRALL: Now, what was your own role? Was that spelled out for you?

GILBERT: My own role was a little bit confusing, because when McCloy asked me to come over they had to find a niche for me, and there was already the established military government that was fighting any new body coming in, and so I was assigned to trade and something else—it's in the notes here. But I didn't care, because I was working with McCloy and that was all I cared about. I do remember one of my first assignments in September of 1949, that was the time the British pound was revalued downward by a small amount, and I was asked to go over to the offices of the leading German chemical company—the Hoechst unit of I. G. Farben—to find out what they were doing with their pricing in the light of the British devaluation. I went over, about ten miles or so from our headquarters—this was a part of a factory that had never been hurt by the bombing—and I was received by one of the top managers of Hoechst. The tone of the situation was not one where he was telling me; I was supposed to be telling him, or asking him. Before he would let me talk, he said, "I want you to know, Dr. Gilbert, how much we Germans appreciate the Marshall Plan," and went on. Well, this was very nice of him, of course, but I remember it vividly, and he didn't need to do this, you see. But of course he was right. The Marshall Plan was a lifesaver to Germany. So then we went on and finished our conversation.

I told Mr. McCloy that my interest was in industrialization broadly, and so as time passed I became what would be called the industrial economic adviser to the high commissioner. The economic adviser to the high commissioner was the head of the Marshall Plan in Germany, who was a political appointee, and incidentally his name was Jacques Cattier. He was a Belgian-American, about fifty years old, who had come to the States when he was twenty-five years old, had gone into the banking firm of White Weld, in Wall Street. He had a Venezuelan wife, a beautiful woman. There were three Cadillacs in the High Commission; one of them was Mr. McCloy's, which was a tremendous big old-fashioned one, and then there was Jacques's, which was the latest model, and the third was a Negro messenger boy's in the finance section of the High Commission. Isn't that a pretty good portrait of America? But Jacques Cattier was the economic adviser and I've never thought well of Mr. McCloy for accepting him, but he had to do

it because of the politics in Washington. A Belgian-American in a position of authority like that in Germany, it was unavoidable that he would be interpreted as getting even, you see, for the many damages that Germany [had caused in Belgium].

HORACE N. GILBERT**SESSION 4**

February 28, 1918

Begin Tape 4, Side 1

GILBERT: My role as the industrial economic adviser to the high commissioner for Germany was to keep Mr. McCloy, the high commissioner, informed about two things. One was the aftermath of World War II—namely, the liquidation of the German war machine. This was called the Prohibited and Limited Industries Agreement. The second was the administration of the Marshall Plan in Germany. Both of these were exceedingly challenging, but when one stops to think, they were in conflict. The liquidation of the German war machine meant that we were liquidating things that we wanted to start in order to make Germany viable, especially to get her off the American taxpayer's back. So while the work was challenging, I must confess that I was frustrated on many counts. Our British and French colleagues were not party at all to the Marshall Plan reconstruction of Germany, even though their countries were enjoying the benefits of the Marshall Plan themselves. They insisted upon the enforcement of the PLI, the Prohibited and Limited Industries agreement. I could cite one particular case, the case of the Krupp plant in Salzgitter, a part of the tremendous Hermann Goering steel complex. It was an ore-beneficiating operation and due for liquidation. Did I mention this last time?

TERRALL: I think you did, and it was the last such plant to go, right?

GILBERT: Yes. Fourteen others had been dismantled and shipped to Czechoslovakia and the USSR. I fought long and hard to have this last ore-beneficiating plant saved to help in the restoration of a much reduced German steel industry. Mr. McCloy backed me up. The matter had to be referred to Washington. In spite of the high commissioner's favorable recommendation, the decision in Washington was that while my argument was sound from the U.S. point of view, the matter had to be cleared with London and Paris, and the case was not important enough to fight that battle, since both Britain and France favored complete

dismantlement of such installations. I had to agree. I had won a moral victory, but the plant was shipped east.

I had several meetings with the caretaker Krupp management in Essen. For obvious reasons, they had suffered wholesale dismantlement, and the area of their huge plants in Essen had been reduced to a wasteland. They wanted ideas about what they could do. Their steel-making operations had been removed. They had been allowed to continue making locomotives, heavy trucks, and some tungsten carbide tools. I made a few suggestions, but I'm afraid that I was not very helpful. I did give them moral encouragement and expressed the U.S. point of view, hoping that they would persevere with their efforts and find ways in which their outstanding management would contribute to the restoration of the German economy.

This is an example of the type of thing that I had to contend with. Well, let's go on. Under military government, the United States was taking care of the German economic situation. A dramatic incident during this time was the blockade of Berlin and the airlift to Berlin to keep it alive. This went on for almost a year—1948. This was before I came into the act. But it illustrates the crisis nature of the German economy during that early postwar period.

The incident that started Germany forward is related to the economic minister, Ludwig Erhard. He was an independent thinker whom Adenauer had brought into the cabinet. The first thing that he did in his role under Adenauer—this was the summer of 1949—was to remove the controls on German industry which had been imposed under military government. Well, this was a shock to the British and French and somewhat to the United States, but they couldn't do anything about it, because legally the Adenauer government had taken over in a transitional sense the government of Germany. As soon as the controls were removed, the wheels of German industry began to turn. In other words, enterprisers reasserted themselves and they put together the scarce materials and other resources. Because of the removal of the limitations that existed [in] the aftermath of the war, the German economy moved forward. There was a slight interruption in 1950, and I was asked about it by Mr. McCloy: Should we reimpose the controls? And I said, "No, let's not," because I had faith that the forces of German industry were strong and that this was a temporary problem. Actually the German people, after so many years of privation, were going to market and buying luxuries wherever they could find them. I remember in Dusseldorf seeing in the entry window of the leading hotel a pile of caviar, for example, which made me rather surprised. There were many examples of consumption of luxuries, and of course

the British and French pointed to these, saying, "Well, I told you so. As soon as we remove the controls, why, the Germans will go wild." Well, they did go wild for a month or two, and controls were reimposed, but the constructive forces continued to operate and, well, my judgment was vindicated within a few months—namely, the German economy advanced in a way that was most encouraging and sound. It came to be called the German economic miracle.

TERRALL: So you were satisfied that the Marshall Plan was working?

GILBERT: Yes. Let me talk about the Marshall Plan, because of course that is a dramatic subject. The Marshall Plan as applied to Germany contributed a unique function. It supplied Germany with food, raw materials, and petroleum. The industrial resources of Germany were standing by waiting, and all they needed was the food, the raw material, and the petroleum in order to get going again. Incidentally, a rather large item in their requirements was tobacco, and there was quite an argument as to whether the Marshall Plan should make provision for imports of tobacco. They were allowed. But in summary, the German economy responded almost immediately to the infusion of the Marshall Plan aid, and the United States can take great credit. As I mentioned earlier, when I went over to talk with the official of the big chemical company, he complimented the United States on being so generous in helping Germany recover.

The case was different with France. Now, France did not have the industrial potential at all that Germany had. In the case of France, it wasn't a matter of providing food, raw materials, and petroleum; it was a matter of supplying her with new factories. And this became the principal application of the Marshall Plan in the case of France. The case of Britain was rather similar to that of Germany—namely, the industrial potential was all set and all they needed was food and raw materials and petroleum. The Marshall Plan agents in the various countries met each month in Paris and shared their experiences, so I could get a perspective on the total of the Marshall Plan as it was operating in the fourteen countries.

TERRALL: What happened to plants in Germany that had only partially been used for armaments? Were they also dismantled?

GILBERT: The Prohibited and Limited Industries agreement covered principally the heavy

industry that was related to the making of weapons. This was a very wide assortment of industries. The steel industry was the center of attention, and there was an emotional concentration on the part of the occupation authorities—British, French, and American—to liquidate Germany's steel-making capability. The name of this became associated with our secretary of the treasury, Hans Morgenthau, and it became known as the Morgenthau Plan to make Germany an agrarian country. Well, this dominated the thinking regarding German industry, principally the steel industry, and it was limited to some ten million tons a year.

This introduces another subject, and while I could go on and talk more about the PLI and its application to Germany, something happened in the world on June 25, 1950—that is, the Korean War. The Korean War had a big impact on our situation in Germany, because if there was a threat from Communism in Asia, it might trigger off a threat from the east in Europe. What should we do to prepare for a possible Korean type of war in Europe? To make the story short, we—the Americans in particular—wanted to find a way to win Germany to our side. In other words, to remilitarize Germany in some pattern so that Germany would be able to help if there was any kind of attack from the east. We as civilians were given instructions, for example, on what we were to do in case we had to escape. The mobilization points were indicated where we and our families were to gather and we would be escorted and so forth. This seems rather ridiculous by hindsight, but it illustrates the tone of the impact of the Korean War in Germany, especially with respect to American policy. Well, of course, time soon removed the pressure. We saw that there was no threat coming from the east, and so we didn't concern ourselves much about it.

Going back to German industry, the Marshall Plan money was being made available to any user in Germany who could contribute to the national economy and also to the foreign exchange earnings. This was done in a rather widespread way. I remember working with the Daimler-Benz Company in Stuttgart to try to get them to come out with a new model, because everyone appreciated the Mercedes car, and we knew that it would be a winner so far as earning foreign exchange. But while I was received courteously by the Daimler-Benz officials, they smiled, and shook their heads. They wanted to do it their way and on their own time and money; they didn't want to be hurried up. This to me was an interesting sidelight upon the management philosophy of the Daimler-Benz Company.

To repeat and to conclude about German industry, the constructive forces were lying

ready, and all that was needed was for these forces to be released through the provision of food, raw materials, and petroleum. The General Motors Company plant at Russelsheim, near Frankfurt, I visited several times and I knew the management well; I had known it while I was with the bombing survey. I remember a comment made by the head of the General Motors plant with regard to the German worker, because it was well known that the productivity of the German worker was good. This manager said, "The German worker is the last worker in the world who still connects working with eating." I think this is true. One can be a little sad about it—that is, the attitude of the worker who blindly works because he wants to eat. But it did dominate the labor market as of that time and probably is still a consideration.

Well, what will we talk about next?

TERRALL: Well, I think we should come back to Caltech. When you came back, it would have been 1951. Was there any question of your staying on in Germany, or had you gone with the understanding that you would just be staying for two years?

GILBERT: The understanding was that the maximum would be two years. I don't recall precisely just the sequence of incidents that led up to my return. My family came home as of January 1, 1951. I stayed on and was very active, and in my files I find various notes to the effect that there were still things to do, which I did. But Mr. McCloy's role as high commissioner for Germany had been accomplished. The shift from military government with the attendant note of pushing people around—that had changed, and the German government under Adenauer had succeeded in catching the imagination of the German people in a universal way. Actually, just before I left I talked with Mr. McCloy, and he urged me to make whatever talks I could explaining the fact that Germany was not the problem that had been anticipated—that it would be necessary to convert Germany both in spirit and in material ways. When McCloy came home in 1952, he thought that there was still a job to do in the way of making speeches to get an acceptance on the part of the American public with regard to the new Germany. And Mr. McCloy's successor, President Conant of Harvard University, had been selected because the president of Harvard had a unique appeal to the German public, and it was thought that Conant thereby would assure a continuation of a reborn Germany. Well, I had been pretty close to Mr. Conant for years, and looking back now—he died last week, but he would agree that his selection was not necessary,

because the German attitude had already changed and it didn't need any president of Harvard University to come over to win them over to what we think of as the right way to run a country.

I was eager to come home, but I didn't come home until the spring of 1951. I taught a small class of military people. I forgot the detail of this; I have it in my records. But Hallett Smith, the chairman [of the Humanities Division], asked me to give this course, so I did in that spring term of '51. And then came the Vista Project.

TERRALL: Before we get into the Vista Project, can we just talk a little bit about the changes that you saw in Caltech after the war as opposed to before, and the administrative changes that came in with [Caltech president Lee A.] DuBridge.

GILBERT: I don't think that my observation is a very good one in this respect. During the war, Caltech went through some major changes. It became a rocket factory, in some sense. And many of the faculty were scattered around the country and around the world. I'd say if there is any generalization I could make, it is that the return to normalcy was made rather gracefully. Dr. Millikan had retired. The exodus of Millikan, Munro, and [Max] Mason—the three M's—this was contrived, and they all retired at the same time, partly to make it easier for Dr. Millikan to retire, because, as Mrs. Millikan told me many times, Dr. Millikan wanted to die in the harness. But as I think I've said, in my subsequent conversations with Dr. Millikan, subsequent to his retirement, I remember he smiled at one time and he said, "I should have retired earlier." In other words, he realized that he was failing and that he should have given up earlier. As to just what damage had been done during that period before he retired, I don't know. There was, I think, some bitterness at certain points on the faculty, but by and large most of the faculty were doing their business and they hadn't much directly to do with the frictions of running Caltech during this time. It was a graceful transition, in my mind. When I came back from Germany, I found that Caltech was in stride. The GI Bill was creating a flood of students, so that we were overloaded. But I repeat, I don't think my perspective is a very good one.

TERRALL: OK. The Vista Project was for the year of 1951, I believe. Were you in it from the very beginning, or was it already going when you got back?

GILBERT: I was in it from the start. The contract had been signed and the organization had been set up and it came into existence you might say instantaneously. Dean [Earnest] Watson was the director who immediately turned it over to Professor [William A.] Fowler. Fowler was the acting executive director of the Vista Project, but Watson had been the one who had arranged to have the whole thing come to Caltech—well, Watson and [Charles] Lauritsen and the others. So it was an instantaneous creation. And incidentally, we were each given a \$200-a-month increase in salary; there were no differences. In other words, it was recognized as an additional load, that we were to continue with our normal work with the Vista Project on top. And this worked all right, certainly in my case. We had our offices in the Vista del Arroyo Hotel, where the name comes from, and it was very convenient to carry on our work at the Caltech campus and also the Vista Hotel. My own section was called Intellicon—intelligence. We had code names, not secret, but code names for the various sections of the Vista Project, and my particular assignment was the function of intelligence with respect to the problem of tactical warfare, which was the assignment given to Vista. The whole group went on a national tour—we had our own plane—about two weeks as I recall, stopping at various military installations to be briefed on the way they looked at the problem of tactical warfare. This was very interesting, and I suppose it was useful.

TERRALL: Did you get different responses at different places?

GILBERT: I would say the problem was not so much a matter of differences of responses as it was the fact that each installation had its concept of its role, but that concept may not have been in agreement with the total. In other words, and I don't say this critically of the High Command, but there were a great many tag ends with respect to the function of each of the installations as to what it was supposed to do in the event of tactical warfare. But this, I think, is unavoidable in a big organization such as the military, and I'm rather modest in wanting to look back and say how things should have been done. I had considerable respect for the people at each installation, but if I'd stopped to think I would have decided, "Let's hope we don't have to have this thing come into operation, because it would be a very scattered kind of effort."

TERRALL: The idea of having a classified study assigned to a campus like Caltech and having

everybody take a part of it is rather an unusual way for something to be done. I'm wondering if you thought it was working well?

GILBERT: I don't recall just how high the classification was. It wasn't conspicuously high. Elements of it were high, and as time passed there was the controversial matter of the role of nuclear weapons. This didn't affect me in my role. But Caltech was at a point after the war when there was no doubt that we wanted to have nothing to do with classified projects. The Vista Project was an intermediate type of assignment which we could take and which we could do, but when it was over we were glad it was over. And I repeat, I was not especially impressed by the degree of secrecy that was needed in order for us to make our studies.

TERRALL: So are you saying that it didn't need to be so highly classified?

GILBERT: As I recall it was not highly classified, and so it was not the usual problem of an educational institution being a tool of the Pentagon. One might say, "Well, why was the Vista Project necessary, if it wasn't classified?" Well, as I look back, what we were concerned with was the problem of tactical warfare, and we could study that problem without resorting to the usual classification categories. I'm conscious of particular coverage for my office, for instance, at the Vista Hotel. You see, this is six years after the war, and the thinking was alert regarding the problem of tactical warfare, especially in connection with nuclear weapons. But the secrecy aspect of it was a minor point.

TERRALL: Was there objection from anybody on campus to the institute getting involved in a project like this?

GILBERT: I wasn't aware of any objections, no.

TERRALL: In terms of the way the project actually worked, did you talk as a large group about the bigger problems, or was it all done in small subsections?

GILBERT: Well, we did both. We had plenary sessions, lectures, and so on, and then we had our

own little section meetings. I think the essential work of Vista was done at the top side by Fowler and the heads of sections. The problem became rather clear, but still it was controversial—namely, the extent to which atomic weapons could be used in tactical warfare. I had known a good deal of the geography of Europe, and I had been enough of a student of history to have known of the military campaigns over the Continent for centuries. Professor [Heinz E.] Ellersieck was also well informed about the geography of western Europe. We all contributed to the thinking as to where tactical nuclear weapons could be used in a close-up battlefield. There are certain gaps and whatnot in western Europe where these weapons might be used to interdict the enemy. And so we went through this exercise rather ambitiously, probably not very realistically. My information on western Europe included some knowledge of Russia, because I had been in western Russia in 1931 and again in 1934, and again—well, not until after the war. In my private opinion, the Russians would have been very ill-advised to have advanced any tactical warfare to the west; just the plain fact of transportation was a major consideration. There is a great area there where roads were not in existence, the railroads were not adequate, and Russia didn't have air power that would make up for it. So in a way I wasn't very worried about the problem of tactical warfare in western Europe. Some of the others were who didn't realize the great swamps of White Russia and so on.

TERRALL: Other than this one national trip that the whole group made, did you have other contacts with military people in doing your own work?

GILBERT: Yes, I remember I spent some time in the Pentagon, maybe a week. And I remember Dr. DuBridge and three or four others talked with the undersecretary of war, and then I talked with the heads of intelligence for the three services—the army, navy, and air force—and that took several days. But we coordinated our study with the Pentagon, very definitely. I'd say my general impression was that the intelligence level of the services, while individually it could have been quite all right, collectively it was poor. That is, after I had been around to the three of them, I knew more about them than any one of them knew, because they were not set up to share their intelligence. The CIA [Central Intelligence Agency] we talked with also, but they didn't fall into the area of the Vista Project, the problem of tactical warfare.

TERRALL: Was that the kind of thing that you would put in the report then? A recommendation for more cooperation between the different branches?

GILBERT: Yes, yes, I think this was one of the things that in my section in particular, Intellicon, we emphasized. Actually there was a delay of some months before the impact of the Vista Project report became apparent, and a kind of explosion took place. It then became identified with [J. Robert] Oppenheimer and the Teller argument regarding the whole nuclear field.

TERRALL: When you say there was a kind of explosion, you mean from the Pentagon when the report was made to the Pentagon?

GILBERT: Now just in what sense did I use the word "explosion"?

TERRALL: As a reaction to the report. You said there was a delay time.

GILBERT: Yes. This was because the media picked up the theme of it, and they read into the Vista report, I would say, more than I thought was deserved. But it was explained by the positions taken by Oppenheimer, [Edward] Teller, and the public debate on nuclear weapons.

TERRALL: Now how much did the media know about what was actually in the Vista report?

GILBERT: They knew enough so there was no problem in this respect.

TERRALL: It wasn't classified then?

GILBERT: No, no, this was not. The element of secrecy was a very small element. And while it would be very easy for one to associate secrecy with the Vista Project—namely, the problem of tactical warfare—actually it didn't amount to much.

TERRALL: What was the report's recommendation about nuclear weapons for tactical warfare?

GILBERT: I prefer that you get that from Fowler, because my memory is rather blurred. What we did was cover the problem of tactical warfare; we described it and the role of the various services in connection with this problem. In western Europe, of course, it became more an army and air force problem, not the navy. I don't know to what extent the report itself was made public. Do you know?

TERRALL: No, I don't know.

GILBERT: The big thing that happened was—and this may be associated with the McCarthy incident, because, let's see, when I was with the High Commission in Germany back in 1950-51, the McCarthy terror was riding high. While I of course had no fear from it, one of my colleagues was under investigation and he had to appear two or three times and tell his story over and over again. My own comment was that I was more impressed by the fact that he wasn't doing a very good job, and he couldn't do a very good job under the system of interrogation that he was being subjected to.

The McCarthy story as it ties into the Caltech campus picture is another story, actually, but some of the individuals were identified. I remember one of my best friends at Caltech was Dean Watson, Earnest Watson. And Watson told me about his problems with some of the Caltech faculty that were being accused of association with the Russians. Of course, Pauling was one who was a big headache. Well, I do remember some of the other names of the faculty that Watson had a hard time clearing, and I was proud that DuBridge fought for their protection. This was also the time of [Hsue-shen] Tsien, the Chinese aeronautical engineer. He was being subjected to a kind of terrorist attack that I thought was very unfortunate. And the fact that he did go back to China and has been identified with the Chinese military effort—I doubt whether there is a big element of bitterness in his mind. I knew him only slightly, but I am sure he is motivated principally by doing all that he can to advance the Chinese competence in rockets, [though] not the nuclear weapons. Of course, the vehicle for nuclear war is the rocket, but he was not a nuclear physicist.

TERRALL: Well, just for a minute to get back to the Vista report, what was the reaction in the Pentagon to the report? Was it considered useful?

GILBERT: Not dramatically so. I think the impact on the Pentagon was through several of the generals that we had with us. Some of them were with us for weeks at a time, and I must say these generals were some of the finest men I have ever known. I think that reflects on Dr. Fowler's selection, and Charlie Lauritsen. They had brought in, from the military, these generals—General [James M.] Gavin I think was one of them, who now is the head of the Arthur D. Little Company, I believe. But there were several generals that were enlightened people. They were loyal members of the Pentagon family, of course, but they were also free thinkers with respect to what a modern military ought to be and do. So I would say that the impact of Vista was probably rather small in the total sense, but in the individual sense I am pretty sure that these generals saw the light, and that they were powerful enough through their rank and through their personalities to make an impression.

TERRALL: Just from having worked with you.

GILBERT: Having worked with an independent group who were objectively studying the problem and bringing it all together.

TERRALL: But there wasn't a feeling in the Pentagon that one or the other of the branches of the service was being put down?

GILBERT: No, no, I don't think so. The inertia in the Pentagon with respect to the roles of the several services is very great. And there was nothing that the Vista Project did that made any particular change in that.

TERRALL: But the public in general would have known something about it from the newspaper stories?

GILBERT: Yes. The word "Vista" became a buzz word for a little while. It had a little bit of the James Bond note to it. But this was passing. And the whole thing, the whole Vista thing, became blurred in the battle with respect to nuclear weapons, and that became blurred in the

battle between Oppenheimer and Teller, broadly speaking—there were quite a good many other individuals [involved]. Looking back, the nuclear weapon belongs to the strategic arm of the military, you see, and that wasn't our province. We didn't visit the headquarters of SAC [Strategic Air Command], for instance, and we didn't miss it; this was none of our business. The adaptation of nuclear weapons to tactical warfare was the limit of our concern, and as of that date nuclear technology had not produced a weapon small enough to operate in tactical situations. Now, of course, since then they have reduced its size, and.... What is this new bomb that kills but is not destructive?

TERRALL: Oh, the neutron bomb?

GILBERT: The neutron bomb, yes. That's been very much of an updating of the use of nuclear weapons in tactical situations.

TERRALL: In the newspaper stories, was it a question of misinformation? Did people not realize this distinction—that the Vista Project wasn't concerned with strategic arms?

GILBERT: I think unavoidably that the media weren't careful to differentiate between the nuclear weapon in strategic and tactical roles—that's very true.

TERRALL: In terms of the effect on Caltech of this project, was it understood by people at Caltech that it wouldn't be done again? It was sort of a one-shot thing, is that right?

GILBERT: Yes. But I would not associate this policy on the part of Caltech with the Vista experience. I would say that there is thinking on campus that regards military, secret military work as poison, and they don't want to have anything to do with it. I think it's a matter of intellectual honesty and scientific discipline. It doesn't mean that we don't want to help the country, but we feel that our role is one that can be separated from the dirty work of actual weaponry.

TERRALL: You talked a little bit about the effects of the McCarthy business on Caltech. Did you

want to add anything to that? You mentioned that the administration had certain problems in trying to clear people.

GILBERT: I think this was an individual matter, of a few individuals. I think that the faculty broadly were oblivious to the McCarthy gyrations. And actually, even the individuals were not terrorized, because Watson and DuBridge were protecting them. I think Caltech was rather lucky to have come through as well as it did the McCarthy period without having more grief.

TERRALL: What about the whole question of loyalty oaths that other places were having problems with? Was that ever talked about around here?

GILBERT: I was surprised, in going through my files, [that] when I returned to Harvard University in 1940, I was asked to sign a loyalty oath. I have a copy of that in my files, if you're interested. In other words, it was normal in 1940 for Harvard University. I don't know whether it was required; I assume it was required. I've never had any hesitation about signing things like this. But so far as the Caltech campus as a whole is concerned, I think that the loyalty issue has come up at certain times when the government required some piece of paper. I think it has been handled nicely so that it has never come to a point where anybody's feelings were hurt. I believe now, there is an option so that you don't need to sign it unless you want to.

TERRALL: Well, I know some places had more problems with that than Caltech did. OK. I have here from somewhere that you were involved in the faculty Committee for Foreign Students.

GILBERT: You've skipped the CIA.

TERRALL: Oh, yes, I have that down here.

GILBERT: Job offer from the CIA. Now that goes back a little bit. That was in 1946, wasn't it?

TERRALL: I don't have the date for that.

GILBERT: My connection with the CIA.... Well, there was no connection at all, but I became a recognized authority on aircraft, and the CIA wanted an expert in aircraft. Through my work with the bombing survey and then my industrial mobilization study, my name came forward. I was sort of dragging my feet, because the last thing that I wanted to do was to leave Caltech and the routine of my teaching here. But I did have this connection with the CIA through some of the individuals. For instance, Dr. Millikan's youngest son, Max, was high up in the CIA, head of one of the divisions—the economic division, I believe. And one of the finest men that I've ever known was Robert Amory; if he wasn't the number one man in the CIA at the time, he was the number two man.³ I had known his father at Harvard, and I admired him, and he wanted me to come with the CIA in order to upgrade their intelligence on aircraft. In effect, I was to be a spy to determine the aircraft capabilities of countries all over the world.

TERRALL: So this would have been a real full-time job?

GILBERT: Yes, and I have in my files here the letters, because I didn't want to do it, and still I wanted to have an intelligent reply. I got DuBridge into it, and tried to get him to make the decision for me. Well, he wouldn't do it; he put it down in black and white. Well, to make a long story short, I didn't go. I remember Amory and I went over to see DuBridge and we talked it over. The whole thing very nicely, gracefully closed up.

Well, Committee for Foreign Students?

TERRALL: Was that something that was started after the war?

GILBERT: No, no. Caltech has had a very interesting foreign student group for a long, long time. When I came to Caltech in 1929, I wasn't aware of the Committee for Foreign Students, but I believe there was one, and I believe that John Buwalda, the head of the geology department, was the one who was chairman of whatever committee there was.

Mrs. [Imra Wann] Buwalda is still living; she was a very outgoing person who would be most helpful in dealing with foreign students. After a while, Millikan asked me to take over from Buwalda, I have forgotten just when. But I served as chairman of this committee for

³ Amory was deputy director for intelligence in the 1950s.

maybe twenty years or so. I remember while I was away during the war at Wright Field and all, Carl Anderson substituted for me. I had to do with the foreign student group for a very long while, almost to my retirement. I have forgotten just when I gave it up. I was a member of the national council of [the] National Association of Foreign Student Advisers. I served on the board for I guess it was five years.

TERRALL: What did the committee do at Caltech?

GILBERT: The committee was charged with the overview of the foreign students on the campus to see what could be done to make their experience more enjoyable. Now, this fell into various parts. First, admissions. In the early days there was rather a careless attitude toward admitting foreign students, and we admitted some who were not qualified and accordingly couldn't do a good job, and accordingly their egos were hurt. So my own role was to watch this and to see that there was in each option somebody who was watching out at the admissions point, to learn from experience the probability of a given student from a given country making good at Caltech. Now, this became the general atmosphere at Caltech—foreign students, yes, but the admission had to be very carefully done. As a result of this, we learned, through all the options, that students from certain countries, from certain universities, the probability of their being happy at Caltech was either this or that. I think this has worked, over all.

We had an interesting little experience in this connection. When Dr. Millikan went to India—I think this was in the '40s or maybe early '50s—he created a great deal of interest in Caltech, and we had a stampede of applications from India. This stampede was one which produced a whole lot of students that just weren't qualified at all, and we had a lot of grief with them. So gradually we were able to get around that difficulty, and I'd say now we have a pretty good line on any Indian student applying for Caltech. Actually, two of the leading scientists of India are alumni of Caltech; both are in the field of aeronautics, and one has broadened out into the National Academy of Sciences.

Well, this was one of the problems, the admissions.

TERRALL: So you worked with the Admissions Committee?

GILBERT: Yes, insofar as I needed to. I talked with the people in the options to make sure that they learned from their experience the probability of success of students from various countries.

Another area had to do with community relations here—namely, to get the foreign students admitted to the homes of people in Pasadena. In this activity, we had several very nice people who took a lead in it. One of them was a retired YMCA secretary from Chile—an American, Augustin Turner. He lived until he was ninety-six years old. He was a member of Rotary Club, and he got the Rotary Club interested in the foreign students at Caltech and PCC [Pasadena City College]. He did a remarkable job in helping them have good experiences, taking trips and so on, helping them with their English. So this was another area. Actually all I did, or the committee did, was to do what it could to encourage this kind of public hospitality. Then there were some technicalities, such as visa status and finances. But Caltech has been very lucky that it has had so few problems either with respect to visa status or finances. The reason is that in selecting only the best foreign students, why, these students normally were properly taken care of with respect to the immigration procedures. Furthermore most of them for the first year had their own financing from their own countries or from some foundation, so Caltech didn't have to put up much money. I did raise some money for a few cases, but by and large it was one of the lesser problems of the committee.

TERRALL: Did you have students coming to you with problems that they needed help with?

GILBERT: Oh, yes, yes, I would say I had foreign students coming to me. A good many of them were students in my class, because most of them were engineers and my class was considered to be sort of an introduction to America. So I knew them in the class in addition to having them come in, and I had them come to my home once in a while. I've kept in touch with quite a few, and they're all over the world, some of them outstandingly successful. But I'd say that the human part of the foreign student experience at Caltech was taken care of more by Mr. Turner than it was by our committee, and for that we were thankful. In a way, it's a little awkward for faculty to try to do things that will make it easier for the foreign students.

TERRALL: Do you think that the foreign students by and large had good experiences here?

GILBERT: I'd say that Caltech is one of the few institutions in the United States where the foreign students who come to it go away from it with a feeling of friendship, including friendship to the United States. I'd say that many universities, the bigger ones especially who are not careful about their admissions and who are unable to integrate their foreign students, like as not half of them go home mad at the United States. It's one of those unfortunate things. But in the case of Caltech, I think our record is one of the best and we can be very pleased with it.

TERRALL: Were you doing consulting for industry during this time?

GILBERT: My consulting for industry had an initial start when I first came to Caltech in 1929, '30, '31, and after a few consulting assignments I made up my mind I couldn't do both.

TERRALL: Was it a question of time?

GILBERT: My type of consulting would have required hiring an assistant to do clerical work, statistical work, and so on, preparing reports, so I decided, no. I would say since '31 I have done no consulting for pay. I've done a good deal of consulting as a friend, and especially with respect to Caltech—companies that are close to Caltech, and where members of the management are former students. But I've done nothing for pay. My assignment with the air force on mobilization was for pay, but I did that during my vacations, so I was able to separate the timing of it.

TERRALL: So that anything that you may have done over the years was more on a personal basis, through personal contacts?

GILBERT: That's right. I might say this, that consulting for industry normally is a clear concept, but throughout my teaching I was preparing case material for use in my class that was a kind of consulting work. Of course I wasn't being paid for it, but I was going to industry and was talking with managers about subjects that they were interested in, and I'd like to think that they got something out of our association. Those files down there on the bottom shelf are mostly left-over cases that I prepared. So in the sense of consulting with industry in order to get teaching

material, I did this continually.

TERRALL: I think the next thing I have is your trip to the USSR in 1958. I read an article that you wrote in *Engineering and Science* about that, and you mentioned the problem of the consumer dissatisfaction with the standard of living, and that you felt that the standard of living was adequate but low. I was wondering whether the people who were showing you around there admitted this sort of dissatisfaction or whether they were aware of it.

GILBERT: In direct reply to your question, it's not just so simple. You might say there are two basic considerations. One of them is the one you made—namely, the discontent regarding the lack of comforts, housing in particular. The other one is the ideological concept of the superiority of Communism—that they are a clean society, nobody exploits anybody. Now, these are the two dominant considerations. I'll say this, it takes a lot of idealism to compensate for lack of good housing and other things.

TERRALL: Was there that much idealism? Did you feel that people had that to offset the dissatisfaction?

GILBERT: You can't help it. It has been taught them from childhood. On my first visit back in 1931, I saw this group of five-year-old children in a park; they were being talked to by a teacher. I asked what the subject was, and was told that they are being told that as individuals they could do nothing but as members of the group they could do everything. This is the Communist central doctrine. I repeat, every Russian knows that he is not living well in the material sense, and very few of them are really excited enough about the ideology to have it compensate for their privation. But again they have no choice. Few of them get out, but just in the sense of realism, you are there, you live there, you can't just go to a place where you will have more material comforts even though you are willing to exchange them for a giving up of your idealism.

TERRALL: How did you happen to go back at that particular time?

GILBERT: Well, Russia was closed to visitors until 1957, and for good reason. The Germans left

Russia in ruins. It was terrible what Germany did to Russia. But by 1957 they were ready to open up, and through my foreign student assignment I had met the head of the Institute of International Education, Kenneth Holland. He went to Russia in 1957, as a member of a small group looking into education in Russia, and I said, "Well, if you can go, I can go." So the next year—my son was then nineteen, he was a sophomore at Stanford, he and I applied to go to Russia.

TERRALL: Was it to go with a group or you were just going to go?

GILBERT: We went individually. No, we did not go as a group. They say there are just two ways to go to Russia, one is as a group, and the other is to go alone under the auspices of Intourist. Well, I knew this, but it didn't trouble me at all, because I had found in my two previous visits to Russia that the Intourist people were human, and that if I looked in their eyes and pleaded with them to do certain things, that I could do them. I did this. And so in 1958 Russia was open and I wanted to go. I had some very interesting experiences getting my visa, but they are more of the human interest side, not for oral history. I wanted to go to catch up on what had happened in Russia, because here I had the reference point of 1931 and 1934, and I was still of the opinion that any self-respecting economist should look at a laboratory example of another kind of system. I promise you I kept my mind open, and we went through the principal cities of Russia and were very well received. Again, we were told that we were to go to this church or that church, and I said I didn't want to go to that church but I would rather go to.... Well, I knew something about the making of ball bearings, and I'd say, "I'd like to go to a ball-bearing factory." And they would say, "It's out of the question." And I'd say, "Well, you try." Well, they found that there were three Frenchmen and two Germans, engineers, who were scheduled to go to a ball-bearing plant the next day, so we were added to that group. Here are some of the ball bearings incidentally—they are Russian ball bearings.

We went to this factory. It's called the First State Ball Bearing Plant of Moscow. It is in a suburb of Moscow, a multistory, big, ugly plant—Czarist, I think, in its origin. I'd like to tell this little incident. We first met with the manager for about half an hour and worked through a translator—our Intourist guide, of course—and he told us the doctrine with regard to the socialist way of doing things. Then we went down a long corridor; along the walls were the pictures of

workers who had been heroes because they had done very well. At the end of this long corridor, we came to a new building, attached to the old building. We came into a room where there was an elaborate process for automatic production of ball bearings and not only the balls but the races and then the assembly of the total bearing. I must say I was tremendously impressed, because here there were two lines with no workers at all; there was an automatic transfer of the metal work in process from step to step. I had been to a similar plant in Ohio in connection with my work with the air force, so I knew what the advanced practice was in the United States. Well, so I was tremendously impressed, and my French and German colleagues were taking notes as fast as they could.

Begin Tape 5, Side 1

We came to the end of the operating line, and here the balls were being measured electronically with great precision in order to be mated with races that were equally carefully measured. This was wonderful. I watched it with great admiration and then I began to count the number of ball bearings coming off the line, and it wasn't very large. I just thought, "Well, it would take a hundred factories like this to produce enough ball bearings for the normal truck production, for instance." Well, I didn't make any point of it, and we left the room and went back into the corridor, and I asked our guide—incidentally, he could speak German; I didn't need to go through our Intourist [guide]—and I said, "What's on the other side of this wall?" And he looked at me wondering whether he should do it or not, but he pushed the door open, and sure enough, there was a tremendous area in which they were making these ball bearings the old way. There were women with their hair tied up with a neckerchief and so on, and they had donkeys pulling carts loaded with parts of the ball bearings from place to place, so this was where the ball bearings were being produced in quantity.

TERRALL: They just had that one room for automated production?

GILBERT: That one room, a huge room, and it was a great credit to them, but it's obvious that it isn't the way that they would get enough ball bearings to contribute much to their total need.

Yes, we went all through Russia. We went down to Stalingrad again, and there we met

the manager, who, incidentally, had been at the plant in 1931 when I first visited there. And so it was like meeting an old friend, and he gave us the royal treatment. We went through the plant. They were making tractors—this is the leading tractor plant of Russia—and I was much impressed as we went along. It's not a very complex thing to make a tractor in a big volume; it was all tooled up for it. There was just one point along the line where I noticed a very modern technique—namely, the cylinder block was being machined by a machine that bored all four cylinders at the same time. And I smiled at him and commented. Well, it was too noisy to talk about it then, but later on I called attention to it and I said, "Well, where did you get the idea for that machine?" He hesitated, and then he said, "I found a picture of it in an American magazine that I had picked up," apparently from an under-the-table source, and he said, "I made it in my own shop." I noted that this was the hard way to do it, but this was a type of machine that was like the machines in Detroit. I asked him, "Well, what did the machine tool trust say when they found that you were doing this?" And he said, "They complimented me." Which is a nice way to do it. But I'd say as a broad statement that Russia is full of examples like this, where they are doing things the hard way, and I just felt sorry for them, to think that this individual had to use his own resources in order to make an advanced machine, which was not at all the normal thing for a tractor plant to be doing.

TERRALL: And then no other plant gets to use it, too.

GILBERT: That's right.

TERRALL: What about the differences that you saw between then and your previous visits?

GILBERT: This article that I wrote that you referred to I think hits the high point—namely, the differences in detail. I could go on and talk about it for a long while, but the high point was the realization that bureaucratic centralism just cannot handle the problems of management in a modern factory. And so what's the answer? Well, in 1962—it just happens that I was there again, but not at this factory—but in 1962 there was a professor from Kharkov who advanced the idea that in order for the Russian economy to move forward there had to be a decentralization of decision making. And so they permitted an experiment along this line. They permitted a men's

clothing factory to work directly with the stores that were selling the suits to find out what sizes and what was wanted. It worked just so beautifully, and the result was that the productivity in the factory went way up and the workers shared in the increased productivity and they got bigger wages, but this presented another problem. As soon as one factory gets out of line with its wages, why, it's a headache for the others, and also the central planning for the materials that were being used, in Moscow, wasn't flexible enough to take care of the needs of the liberated factory. And so they had to retreat. But Russia today I'd say is still the captive of bureaucratic centralism and Khrushchev put it very simply when he visited Yugoslavia—this was in 1962 or 1963. He said, "This system of worker management that existed in Yugoslavia is very fine and I'll send my people down to study it, but we must remember Lenin's advice: Never give up the central control." And so that is still the thing that is paralyzing the Russian economy.

That was the situation in Russia in 1958. And I was in Russia again in 1962 and '64, and a little visit in '72 in Leningrad only, but I'd still say it is making very little progress, and the reason is that the energies of the Russian people cannot be released productively, because of bureaucratic centralism. And I don't see any way out. Well, that's their problem.

TERRALL: I also saw in *Engineering and Science* about this Southern Africa project which was started in 1962, and I believe you went that summer, didn't you? Now, were you involved in the organization of this project?

GILBERT: No, that's making too much of it. This was an informal group—the Capricorn Project, as it was called—managed by Ned Munger. The group consisted of Fred Lindvall and Bob Oliver, one outsider, and myself. We spent a little time in South Africa. It was a most informative experience. Professor Munger had excellent contacts. We talked with people of all colors and so on. So we added to our information about the problem but I would say the outcome of it was nothing dramatic. All it did was raise our literacy regarding the South African problem, and I hope we made a good impression upon the people with whom we came in contact.

TERRALL: Was that the first time that you had had contact with Africa?

GILBERT: No, no. My son and I went there in '59. We cased the whole continent from Dakar

around to Addis Ababa, and we had excellent introductions everywhere. I'll say the most dramatic experience we had was spending a couple of hours with Chief Luthuli, who was later awarded the Nobel Peace Prize. He had been a chief of the Zulu tribe. He was under house arrest out in a village some thirty-five miles from Durban. He was a remarkable man, a most impressive individual. But on that trip we did a very much more inclusive job than we did on the Capricorn Project. I don't know what to say. The Capricorn Project I think had ambitions of being more significant than it became.

TERRALL: It was supposed to continue over several years, wasn't it?

GILBERT: I thought so, yes.

TERRALL: But nothing ever happened after that first summer?

GILBERT: No. I think the financing of it presented a problem, so nothing followed up from it.

TERRALL: I see. That's what I was wondering about. OK. Let's see, I'm trying to think what we left out. We didn't talk much about DuBridge.

GILBERT: Well, I don't know what to say about DuBridge. There is one little incident that occurs to me. When I first talked with him, he had a fair idea of my course, Econ 100, and he had made some inquiries apparently about it among his associates, and he commented to me that he understood that a good many of the students who took my course—mostly engineers, of course—decided not to go on for their doctorates. Well, I was wondering, What's this leading up to? But he followed it up and he said, "Maybe the scientists ought to take your course." In other words the thought was that it was a test of motivation. Taking my course made it easier for the student to decide whether or not he really wanted to be an engineer 100 percent, a scientist-engineer, or a decision maker in industry. This reflects his broadmindedness, which I think was a great credit. I see DuBridge also in perspective—namely, from the days of Millikan, Noyes, and Hale—and in this light I'd say that DuBridge played a creditable role in continuing what he had inherited. He sweetened it up in the personal sense, because, as we noted, Dr. Millikan got

into trouble during the war and so on because some of his ideas about how Caltech should be run in its war activities were not practical. However, this was a little frictional detail with Millikan, because when Millikan retired Caltech was still the great institution that it had been, and it wasn't even on a plateau; I'd say it was still on the make. The miracle of the Noyes educational philosophy was still dominant. So DuBridge took over and he carried on, and I'd say carried on with considerable credit. If anything, his problem was the chronic problem of finances, and in this respect he had as chairman of the board of trustees strong individuals—Jim Page, Albert Ruddock.... I've forgotten the man who was head of the General Petroleum Company. These people were able to continue the flow of funds in a rather generous way. But even generosity wasn't enough, and so I'd say the record of DuBridge in the sense of money raising is a moderate record, and this is no reflection on him, it's a reflection on the basic problem of a great institution against the background of limited resources.

TERRALL: What about the administrative organization, where under Millikan there was the Executive Council—

GILBERT: Yes, and I hope that the story that I wrote for the *AAUP Bulletin*, in April of 1940 I believe it was, and which Millikan said was OK—I wish that more people would study that. I think that many universities have as presidents individuals who take themselves too seriously. And this is not good organization, because faculties in general don't want to have a god around, they want to have a society—that is, a creative one. And I think the Executive Council form of running Caltech was a success story, but I also agree that it's not easily transferable, and I'd say universities or colleges need leadership of different types as of different times. But I would like to see the Executive Council idea used more often, or again, whether at Caltech or at Pomona. I think it has germs of eternal life—namely, it's right. I knew all of the members of the Executive Council, and I think that while they all recognized the Millikan leadership, the Millikan leadership was only a spark, it wasn't the dominant spirit of the administrative office at Caltech. The administrative office was truly decentralized to these people in physics and chemistry and biology, and here in humanities it was Munro.

TERRALL: What happened to the idea, if it was working well?

GILBERT: Well, when DuBridge was invited to become president in 1946, he apparently preferred to come as a president. I don't know exactly what options were offered to him. I would say for DuBridge to have come in as chairman of the Executive Council at that time could have presented problems, because he was unknown. So I wouldn't be critical of it, but I wish very much that we'd get away from this idea. I don't want to be personal with respect to DuBridge or his successor, Harold Brown, but I'd say it's true that presidents tend to take themselves too seriously. And this can be a burden on them, too, and wears them out. The Executive Council form is a way out, especially for the smaller institutions.

TERRALL: OK, I think we're finished. Are we?

GILBERT: When can we get in that little chapter on the Oppenheimer declaration? When he said the only thing he could contribute to the book was a guilty conscience.

TERRALL: Well, do you want to tell about that committee?

GILBERT: Yes, there must be some record [of that committee] around here. In the fall and winter of 1945-46, after the bombs were dropped on Japan, I sensed so deeply the fact that Charlie Lauritsen wanted to do something, and the theme of the doing something was, "Here we have found the secret of atomic energy; now let's show what can be done with it that will help society." The new discovery of nuclear energy had been a murderous experience, and people like Lauritsen were emotionally disturbed by the bombing. I remember Watson bringing members of the faculty together who had been active in the war effort. We had a dozen or so meetings. We decided to produce a book, along the line of Lauritsen's idea, and tentative assignments were made to those who would contribute chapters.

TERRALL: Now, was it mostly physicists on this committee?

GILBERT: No, I was not aware of any differences in the group that was brought together by Watson. The fact that I was in it meant that somebody looked around outside of physics.

TERRALL: But were there other people from other departments?

GILBERT: I'm pretty sure there were.

TERRALL: Was it a big group?

GILBERT: No, I think we met several times in Arms Lecture Hall, and occasionally in 101 Dabney. No, I would say it would have been a group of thirty or forty, something of the kind. But I think the Archives ought to have in them some reference to this group. Now, I'm still working on my files and I may find a folder that has that in it, because we had an agenda when each meeting was called; we had a topic. And as I say, I made a presentation, I think, on the bombing survey.

TERRALL: How long did the group meet for?

GILBERT: It was a matter of months—I suppose three or four months that we met.

TERRALL: And Oppenheimer was here during that whole time?

GILBERT: Well, he traveled a good deal, and especially between here and Berkeley, but I was not impressed by his absence.

TERRALL: So he did attend the meetings?

GILBERT: He was here more often than not; in other words, he was one of the group, and he knew what was going on, although he wasn't a member of the committee that assigned these chapters.

TERRALL: What happened to the book idea?

GILBERT: It died after the Oppenheimer "guilty conscience" declaration. What can I do with these ball bearings?

TERRALL: I don't know.

GILBERT: Isn't there some place on the Caltech campus that they would like to have some good Russian ball bearings? OK, well I may find some other ideas. Here you're inspiring me to come up with various things that I have observed, and they may be useful for posterity.

(End of Interview)