CHEMICAL HERITAGE FOUNDATION

JOCHEN BUCK

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Andrea R. Maestrejuan

at

Cornell University Medical College
New York, New York

on

14-16 December 1998

ACKNOWLEDGEMENT

This oral history is part of a series supported by a grant from the Pew Charitable Trusts based on the Pew Scholars Program in the Biomedical Sciences. This collection is an important resource for the history of biomedicine, recording the life and careers of young, distinguished biomedical scientists and of the Pew Scholars Program in the Biomedical Sciences Advisory Committee members.

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Marnie Berkowitz, Consultant to the Chemical Heritage Foundation. B.A., Classical Languages and Literatures, University of Minnesota; Ford Foundation Fellowship, Classical Languages and Literatures, University of Chicago.

David J. Caruso, Program Manager, Oral History, Chemical Heritage Foundation. B.A., History of Science, Medicine, and Technology, Johns Hopkins University; PhD., Science and Technology Studies, Cornell University.

UNIVERSITY OF CALIFORNIA, LOS ANGELES

Oral History Interview Agreement No. T0126998

This Interview Agreement is made and entered into this 27th day of January, 1998 by and between THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, a California corporation, on behalf of the Oral History Program at the UCLA campus, hereinafter called "University," and JOCHEN BUCK, having an address at Cornell University Medical College, Department of Pharmacology, 1300 York Avenue, New York, New York 10021, hereinafter called "Interviewee."

Interviewee agrees to participate in a series of University-conducted tape-recorded interviews, commencing on or about December 14, 1998, and tentatively entitled "Interview with Jochen Buck". This Agreement relates to any and all materials originating from the interviews, namely the tape recordings of the interviews and a written manuscript prepared from the tapes, hereinafter collectively called "the Work."

In consideration of the mutual covenants, conditions, and terms set forth below, the parties hereto hereby agree as follows:

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If to University: Office of Research Administration
University of California, Los Angeles
P.O. Box 951406
Los Angeles, California 90095-1406

Attention: _____

If to Interviewee: Jochen Buck
Cornell University Medical College
Department of Pharmacology
1300 York Avenue
New York, New York 10021

University and Interviewee have executed this Agreement on the date first written above.

INTERVIEWEE

Signed release form is on file at the Science History Institute

(Signature)

Jochen Buck
(Typed Name)

Cornell University Medical College

Department of Pharmacology
(Address)

1300 York Avenue

New York, New York 10021

Date 12/16/98

THE REGENTS OF THE UNIVERSITY CALIFORNIA

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(Signature)

Dale E. Treleven
(Typed Name)

Director, Oral History Program
(Title)

Date 1/27/99

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JB
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Signature: Signed release form is on file at the Science History Institute
Interviewee's Name

8/18/2022
Date

Chemical Heritage Foundation
Oral History Program
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JOCHEN BUCK

1956 Born in Reutlingen, Germany on 6 August

Education

1984 M.D., University of Tübingen
1985 Ph.D., University of Tübingen

Professional Experience

Memorial Sloan-Kettering Cancer Center, Department of Immunology
1985 Postdoctoral Research Fellow
1987 Postdoctoral Research Associate

Cornell University Medical College, Department of Pharmacology
1992 Assistant Professor
1997 Associate Professor

Honors

1987 Clinical Research Award, Norman and Rosita Winston Foundation
1993-1997 Pew Scholar in the Biomedical Sciences
1998 Hirschl/Weill Caulier Medical Scholar

Selected Publications

Dannecker, G.J. et al., 1985. The combined effect of interferon-beta and cytostatic drugs on human tumor cell lines in vitro. *Journal of Interferon Research* 5:541-50.

Buck, J. et al., 1987. Specific uptake of m- [125I] -iodobenzylguanidine in the human neuroblastoma cell line SK-N-SH. *Cancer Research* 45:6366-70.

Buck, J. et al., 1990. Retinol is essential for the growth of activated human B Cells. *Journal of Experimental Medicine* 171:1613-24.

Nocka, K. et al., 1990. Candidate ligand for the c-kit transmembrane receptor: KL, a fibroblast-derived growth factor stimulates mast cells and erythroid progenitors. *European Molecular Biology Organization Journal* 9:3287-94.

Buck, J. et al., 1991. Intracellular signaling by 14-hydroxy-1, 14-retro-retinol. *Science* 254:1654-56.

Buck, J. et al., 1993. Anhydroretinol: A naturally occurring inhibitor of lymphocyte

physiology. *Journal of Experimental Medicine* 178:675-80.
Derguini, F. et al., 1995. 13, 14-dihydroxy-retinol, a new bioactive retinol metabolite. *Journal of Biological Chemistry* 270:18875-80.
Grün, F. et al., 1996. Retinol dehydratase from Spodoptera frugiperda synthesizes growth suppressive anhydroretinol. *Journal of Biological Chemistry* 271:16135-38.
Chen, Y. et al., 1997. Requirement of vitamin A in the activation of resting fibroblasts. *Proceedings of the National Academy of Sciences USA* 94:10205-8.
Vakiani, E. et al., 1998. Substrate specificity and kinetic mechanism of the insect sulfotransferase, retinol dehydratase. *Journal of Biological Chemistry* 273 :35381-87.
Buck, J. et al., 1999. Cytosolic adenylyl cyclase defines a unique signaling molecule in mammals. *Proceedings of the National Academy of Sciences USA* 96:79-84.
Chen, Y. et al., 1999. Anhydroretinol induces oxidative stress and cell death. *Cancer Research* 59:3985-90.

ABSTRACT

Jochen Buck was born and grew up in Reutlingen, Germany, in the Swabian Alb. His father was a teacher of science in the *Gymnasium*. His mother, a housewife, came from a middle-class family of butchers, and Jochen might have been expected to follow in the family business. Instead, he became interested in politics early, as a result perhaps of the Vietnam War. Instead of performing his national service in the army, he became a conscientious objector, working with disabled youths. His early interest in mathematics waned, and he decided to become a doctor. But in medical school at the University of Tübingen, he discovered that he loved scientific research; and he added to his MD studies a PhD, with his dissertation dealing with interferon. He worked in Ulrich Hammerling's lab, where he localized cell growth caused by autocrine growth factor. He accepted a postdoctoral position at Memorial Sloan-Kettering Cancer Center, working with Vitamin A and discovering retro-retinoids. He stayed at Sloan-Kettering for a few years until accepting an assistant professorship at Cornell University Medical College. He is now an associate at Cornell, where his lab and Lonny Levin's share space and where he and Levin work together on adenylyl cyclase. He lives in New York City with his wife, Chantal Duteau-Buck, and two children. He has won several awards and continues to publish articles.

UCLA INTERVIEW HISTORY

INTERVIEWER:

Andrea R. Maestrejuan, Interviewer, UCLA Oral History Program; B.A., History, University of California, Irvine, 1988; B.S., Biological Sciences, University of California, Irvine, 1986; M.A., History, University of California, Riverside, 1991; C.Phil., History, University of California, Riverside.

TIME AND SETTING OF INTERVIEW:

Place: Buck's office, Cornell University Medical College.

Dates, length of sessions: December 14, 1998 (130 minutes); December 15, 1998 (121) ; December 16, 1998 (99).

Total number of recorded hours: 5.85.

Persons present during interview: Buck and Maestrejuan.

CONDUCT OF INTERVIEW:

This interview is one in a series with Pew Scholars in the Biomedical Sciences conducted by the UCLA Oral History Program in conjunction with the Pew Charitable Trusts's Pew Scholars in the Biomedical Sciences Oral History and Archives Project. The project has been designed to document the backgrounds, education, and research of biomedical scientists awarded four-year Pew scholarships since 1988. To provide an overall framework for project interviews, the director of the UCLA Oral History Program and three UCLA faculty project consultants developed a topic outline.

In preparing for this interview, Maestrejuan held a telephone preinterview conversation with Buck to obtain written background information (curriculum vitae, copies of published articles, etc.) and agree on an interviewing schedule. She also reviewed prior Pew scholars' interviews and the documentation in his file at the Pew Scholars Program office in San Francisco, including his proposal application, letters of recommendation, and reviews by Pew Scholars Program national advisory committee members. For technical background, Maestrejuan consulted J.D. Watson et al., *Molecular Biology of the Gene.* 4th ed. Menlo Park, CA: Benjamin/Cummings, 1987; Bruce Alberts et al., *Molecular Biology of the Cell.* 3rd ed. New York: Garland, 1994.

The interview is organized chronologically, beginning with Buck's childhood in Reutlingen, Germany, and continuing through his undergraduate and graduate work at the University of Tübingen, his residency at the Children's Hospital of the University of Tübingen, his postdoc at Memorial Sloan-Kettering Cancer Center, and the establishment of his own lab at Cornell University Medical College. Major topics discussed include his political activism in Germany, his work on pediatric oncology, his discovery of retro-retinoids, and his scientific collaborations.

ORIGINAL EDITING:

Ji Young Kwon, editorial assistant, edited the interview. She checked the verbatim transcript of the interview against the original tape recordings, edited for punctuation, paragraphing, and spelling, and verified proper names. Words and phrases inserted by the editor have been bracketed.

Buck reviewed the transcript. He verified proper names and made minor corrections and additions.

William Van Benschoten, editor, prepared the table of contents and the index. Kwon compiled the biographical summary and interview history.

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INTERVIEWEE: **Jochen Buck**

INTERVIEWER: **Andrea R. Maestrejuan**

LOCATION: **Cornell University Medical College**

DATE: **14 December 1998**

MAESTREJUAN: In this session, I would like to cover your personal background and how your interest in medicine and science and scientific research developed. To begin with, I would like to ask you when and where you were born?

BUCK: I was born on the sixth of August, 1956, in Reutlingen, in Germany.

MAESTREJUAN: We talked a little about this because I spent a little bit of time in that part of Germany. Can you tell me a little bit about your family background and how long your family had been in Reutlingen?

BUCK: Okay. I was only born in Reutlingen. I grew up in Neuhausen; that is nine kilometers from Reutlingen, near the Swabian Alb. My mother [Gertrud Reusch Buck] 's family lived there for at least 700 years. My father [Richard Buck] 's family came far away from there--12 kilometers--and they can trace back their background for at least a thousand years.

MAESTREJUAN: Wow. How typical or atypical is that of the families in the village that you grew up in--that they could trace their background?

BUCK: Oh, it's totally typical. I think the people in this region identify with their long history. They are a special type.

MAESTREJUAN: Are they? What makes them so special?

BUCK: It's their *Heimat.* What is that--*Heimat*? Homeland. How can I say that? [pause]

MAESTREJUAN: So there's this real sense of identity; the individual's identity is integrated into the history of the community--

BUCK: Oh, yeah. Oh, yeah.

MAESTREJUAN: And what did your parents do?

BUCK: My mother came from a butcher family. She was and is a housewife. When I was a kid she worked half a day in the butchery selling sausages.

MAESTREJUAN: In the family butchery?

BUCK: In the family butchery. My father was a teacher. He dominated the village between 1965 and 1990; he was the teacher, later the principal, and he was the mayor. There was nearly no social function of the village that he was not involved with.

MAESTREJUAN: Wow. How large was this village that you lived in?

BUCK: There are three thousand inhabitants now. When I grew up there were about two and a half thousand.

MAESTREJUAN: So were there a lot of Buck names around or- -

BUCK: No, because my father came from the outside; he came from the village 12 kilometers away. My mother's name, Reusch--that would be the name you could trace back.

MAESTREJUAN: And when you were growing up, what was the history of your family--as it was told to you--on your mother's side, which had a real history in the village?

BUCK: They can trace back their butchery to about--definitely 1820 or something like that. Then how many generations went through until today? One, two, three, four-- Now it's perhaps the eighth or ninth generation which is running it. Now essentially, at the moment, my mother's brother is running the butchery, and it's already agreed that the son will take over. So it seems that the tradition goes on.

MAESTREJUAN: That's amazing. So at least your mother's side of the family was certainly in this area before, basically, the peasants were freed in southern Germany. Were they part of a landed estate at some point? Or do you know that far back?

BUCK: Oh, sure.

MAESTREJUAN: Or were they always maybe free--?

BUCK: No. No. In this region of Württemberg, the peasants--and it is a peasant village where I grew up--were bound to the earth. What happened was that during the Thirty Years War it went back and forth: we were Catholic, we became Protestant, we became Catholic again, and in the end we were again Protestant. And what happened during that time in Germany was that-- How do you say that in English?-- Your religion was bound to the earth. You had to have the nomination of your ruler. So this region of Württemberg where I grew up was Protestant. Then, by a chance event, our village—as all our neighbor villages were--was owned by the Count of Reutlingen. According to Swabian heritage law, the estate is split into the number of sons you have. In the seventeenth century one of the sons of the Count of Reutlingen changed his nomination and became Catholic; our village was inherited by this Catholic son, and he became a monk. So what happened was that our village was for two hundred years a Protestant village whose rulers were the monks of a monastery about 40 kilometers away. You still can see it today because there is an old 250-year-old mansion, which has a small, beautiful Catholic church, and this is where these monks lived and where my ancestors had to bring 10 percent of their wine, 10 percent of their potatoes, and whatever they had. This changed then with Napoleon, when the modern German states were founded.

MAESTREJUAN: So basically, then, in the period when your grandparents and your parents were growing up, it was still primarily Protestant in terms of who lived there?

BUCK: It was all Protestant. Catholic people came into this region of Germany after World War II. That was it. And that's not history, you know. [mutual laughter]

MAESTREJUAN: That's right. And where was your father from, and how did he end up in Neuhausen?

BUCK: So my mother's side was a wealthy--how do you call that? People like butchers, bakers-- It was a wealthy family.

MAESTREJUAN: Lower-middle class? Middle class?

BUCK: Yeah. My father's side did not own property. They worked as farm workers for the bigger estates. But, you know, there were no big estates in the Swabia; the division of the heritage-- It's totally typical for Swabia that there are no big estates. So my father's side lived on the Swabian Alb, which anyways is poorer than the valley where I grew up. They had to work to get their bread.

My grandfather [Gottlieb Buck] is from a village called Hülben. This is where they have their heritage. It's on the Swabian Alb about 10 kilometers away from where I grew up. Then my grandfather with his family in the late 1920's moved to Neuffen. Neuffen is a small town with beautiful old ruins. The Swabian Alb is made out of limestone, and cement is made out of limestone. One of the new professions was to break the limestone to make cement out of it. So around '25 my grandparents on my father's side moved to Neuffen, and he was working--breaking these stones--and was a typical Swabian worker. How do you call that in English? *Arbeiter?*

MAESTREJUAN: Yeah, worker. Manual worker.

BUCK: Manual worker.

MAESTREJUAN: What would you describe as the typical Swabian worker? How would you describe that?

BUCK: What is typical for Swabian workers? I think they are hard workers, they are totally reliable, they are proud of what they do. So if they do something as simple as breaking a stone, they do it right. What is typical for them? They have to know what they do; they have to understand it. What else is typical? This leads from it, that, for example, education for the kids is important.

MAESTREJUAN: Why is that? Was that true for your parents? It may be different, because your mom obviously is a woman and expectations would be different, but what were the expectations for your father?

BUCK: No. Let's stop at my mother. That's easier. My mother was born in 1933 into this butchery in this village, and all life [revolved] around the butchery. It seemed that my mother was a very bright girl, and she made it through the first four years of elementary school. She was one of the few girls who made it to the *Gymnasium*--this is now higher education in

Germany--and I think there were only one or two girls in her class. She stayed there until she was twelve, and then she was taken out of it because my grandparents [Ludwig and Rosa Reusch] seemed to need additional help. And until today she's very bitter about that. Essentially--talking with her even today--she still has a grudge with her parents that she was not allowed to finish her education and that she, for all her working life, did [un] skilled labor, selling sausages behind the counter, and was unable to follow her dream. If you ask her what was her dream, her dream was to be a teacher. So if you talk to her today, she still will complain about this decision that was made for her a long time ago. I think in my mother's family, contrary to my father's--perhaps contrary to what I said even before--education was not so important. It was important to be a good businesswoman or a good businessman for the men. The women were cheap labor.

MAESTREJUAN: Did she have any brothers who had gone to college or to the *Gymnasium?*

BUCK: Now, my mother has two brothers [Hans and Kurt Reusch] and one sister [Helga Reusch Schöck]. Essentially, all of them were forced into the butchery. The oldest one [Hans Reusch], who was supposed to take over the business, could not deal with the father and left. Today he's a consultant for sausage production all over the world. He's even here now in the States, building stuff.

MAESTREJUAN: So when he left, he left the village and he left--

BUCK: Right.

Then the second one--the younger brother [Kurt Reusch], who wanted to go for a higher education--was forced again to leave higher education to become a butcher, because somebody had to [take over] the business. That's typical Swabian-- There is a long tradition of following in the steps of your parents. I think for my parents' generation, there was much more pressure than there would be today. On the other side, the business is going on now to the next generation. But on the other side, Jörg [Reusch], who will take over now the butchery, would not be gifted enough to do a lot of other things.

MAESTREJUAN: And on your father's side?

BUCK: My father was born in 1929, and he grew up during fascism. His first vivid memories are of playing in the castle next to the village, and they are intermingled with his first experience in the *Hitlerjugend*/Hitler Youth. How did he experience it? He says it was important for him, and he says he found his friends, as a kid, during activities of the *Hitlerjugend.*

What happened then was that my father-- Essentially, my grandparents did not have any

education. They were able to write and read, but essentially that was it-- Otherwise you were a worker; you had to work. My father was a pretty bright kid in school; he also made it to the *Gymnasium.* Then when he was twelve years old or thirteen years old, he was chosen to go to one of these elite schools of fascism; fascism had essentially offered a free, top-notch education to young kids. My grandfather [Ludwig Reusch], who was a member of the Social Democratic Party until '33, seemed to be totally-- Or did not show his opinions from '33 to '43. In '43 he became a member of the fascist party [National Socialist Party], and later he said that he did it because he wanted his son to be able to go to this good school.

By the way, it never came to that. What happened was that instead of going to the school, my father, who when he was fourteen years old was one of the leaders of his age group in the fascist youth, was asked to name two of the people of his group to become soldiers. That was in '44. He tells me that he had sleepless nights. "What should I do? Who should I recommend?" These kids--they were his age or one year older--would have to become soldiers. So he decided with his friend to go. And when you asked him, "Why did you do that? Why did you become a soldier at the age of fourteen and a half? Didn't you know that it was dangerous?" he said, "Yes, we knew it was dangerous, but it was a mix of not wanting to be responsible for sending somebody else, and at the same time, also, it was this youthful adventurism and this feeling that you could not be damaged or killed." It's a typical fourteen- or fifteen-year-old-- So when my father was fourteen, he became a soldier and he was part of the German army for eight months. Essentially, he was running away from the American troops for seven months.

MAESTREJUAN: Where was he initially conscripted?

BUCK: He was part of the retreat from about 100 kilometers in France to Salzburg in Austria. For the first two months he said, "We still believed that we could win the war." Then there must have been a turnaround that he saw by mostly talking with these old men. During that time, according to what he says, the army [consisted of] either kids of sixteen and below or people over thirty-five--you know, these old people like us. And these old people told these kids, "What are you doing here?"

One of the very important things for him was that two weeks before the German army finally collapsed, he was together with a friend and they left. They walked home from Salzburg in Austria to Swabia; essentially, they were walking at night and hiding during the day in the forest or stealing stuff from peasants. So he came back two days after the war was over. He was back in his village in Neuffen.

By then education was over, because in '45 and '46 there was no school. So my father started to learn a craft. How do you call it in English--when you build the wooden part of houses?

MAESTREJUAN: A framer, construction worker.

BUCK: Yeah, so he learned that stuff. Then in '47 he—

MAESTREJUAN: How would you say it in German?

BUCK: *Zimmerman.* It's one of these old trades going back--

Then he started to go to the *Lehreroberschule* in '47. This was a specific sort of *Gymnasium* which led you in direction of teacher education. Then he became a teacher. Now, when did he meet my mother? I think he courted her around '51 or '52. And against the wishes of my grandparents on my mother's side, after she was twenty-one--legal age, you know--they married. It's very important to my mother that I was born eleven months after they were married.

MAESTREJUAN: Did your father come back to his village or did he come back to Neuhausen?

BUCK: What happened was that my father was a beginning teacher in a village about 8 kilometers away from Neuhausen, and when he became interested in women he found my mother in this village 10 kilometers away and courted her.

MAESTREJUAN: He started hanging out at the butcher shop?

BUCK: No, it was one of those typical Swabian feasts where the village has a feast where most of the people go, and people come from the neighboring villages and you have dancing and you have eating. He saw this woman and they danced. And the rest is history.

Essentially, when he asked to marry my mother-- To break the resistance, one of things was that they would stay in Neuhausen. So he looked for a transfer to Neuhausen, and he started as a normal teacher in Neuhausen. In a matter of ten years he made it through the ranks and became the principal of the school,and he stayed there for another thirty years until he retired two years ago.

MAESTREJUAN: Do they still live there?

BUCK: They are still there, yeah.

When I was born, I lived for the first three years in the teacher's house, because there was a communal teacher's house. Then when I was four years old they built their own house in a new part of the village and they moved there. This was when my brother was born. His name is Michael [Buck].

Now, my father, I think, was a very, very good teacher. I think the kids really loved him--mostly when he was young. Perhaps he was not as popular later--mostly when he was principal; he was also an authority figure. But I think he found his profession. I think my father was a very good teacher, and he really took his job very seriously. I think he did a good job.

I think that my father had similar or has similar talents as I have. Both me and my father--and also my brother--are much more gifted in mathematics and natural sciences than we are in languages. There is a very interesting phenomenon: In Germany, at certain levels in school, there are national exams--kids have exams in languages in German, and they have it in math. And looking at the grades of my father's classes you really can see my father's strengths and weaknesses. If you look at how these kids were in--how do you call *dictée* in French or *Rechtschreibung?*

MAESTREJUAN: Penmanship.

BUCK: Yeah. My father's [grades] were the national average--exactly the average. In math they were one grade better. And a grade is a lot, because you only have five grades; instead of a "satisfying," if you have a "good" as an average of a class, that's a difference. Here, you really can see how he loved teaching math or natural sciences, and it was totally reflected, then, in his knowledge.

MAESTREJUAN: That's interesting. Was he a teacher that taught all subjects? Was he in the *Grundschule?*

BUCK: When he started, there was no separation between *Grund- und Hauptschule;* also, when he was a principal, he was the principal of the school in Neuhausen, which was a *Grund- und Hauptschule.* When they teach the small ones in the *Grundschule*-- Because when they go to elementary school, a teacher essentially is teaching everything: math as well as the language and that stuff. It's interesting. Later when he only taught for ten hours per week or something like that, then he taught the older kids chemistry, physics, and mathematics. This is what he was interested in.

Here, I have still a very, very early memory. My earliest memory dealing with school is that we moved to the new house when I was three. The teacher's house was only about a hundred yards away from the school, and I remember that I went from the teacher's house to my

father's class. I was unable at this age to open doors, so I do not know how I sneaked in through the main door, but then when I was in front of the classroom, I scratched on the door. And when they heard it scratching, they knew that I was there and they opened it. I could stay then till the end of the hour. My favorite friend--this incredible, old boy of six years old [mutual laughter]--So school was something special which I really enjoyed.

MAESTREJUAN: Were you paying attention to what was being taught or--?

BUCK: I had no idea; it simply was great. It simply was great. I have no idea what happened. I only know that I was sitting there with my father in front--during that time; you could not imagine it today--still with a tie and a white coat, teaching these kids.

We moved to the new house and then it was over, because it was a kilometer, which I could not have done. Then I went to kindergarten. This is the next period I remember, which was--thinking back--a nice time. I had fun.

Then I came to elementary school when I was six, and I hated it. What happened was I thought that I was not up to par. My mother tells me--I remember it vaguely--that perhaps after five or six days of school, I suddenly showed up at nine o'clock or nine thirty in the morning back home again. She asked me, "Jochen, what happened?" And I said, "I will not go back." I cried, I cried, I cried. "I will not go to school." "Why won't you go to school?" "I cannot do it." She called up my father. Imagine the teacher's son--during that time he was not the principal, but the assistant principal--not going to school? She put me in the car and brought me back. But instead of taking me to class, she went to my father. Together they went to the teacher--he had not even found out that I was missing; he thought that I stayed at home that day--and this teacher was totally surprised that I claimed that I was not up to par and that I could not do it. Anyway, the next day I, while crying, was brought to school again, and something must have happened. The teacher told me that I was doing okay, and then school was better.

But still, there were problems. The problems did not stop for the long-term, because now we were in third and fourth grade, and it was not too tough for me to learn reading, but I had incredible difficulty writing. What happened was that the teacher who taught me told my father during that period of my life that I was not bright--not at all. What happened was that I was in the second half [among all the students in terms of] writing.

In Germany, when you [complete] fourth grade, a decision is made. After fourth grade the system splits in three parts. During my time, about 80 percent of the kids stayed in the *Hauptschule*. They stayed there until--during that time--eighth grade, and after they finished eighth grade they went out and learned a profession. This sort of education is not a higher education; you cannot go to the university. So essentially at the age of nine, the decision is made whether you make it to the *Gymnasium* or to the middle school. And my teacher during that time was opposed to my going to the *Gymnasium* because, simply, I was not up to par in writing. My father, who, ironically, during that time was also--in the region around Neuhausen--

one of the teachers who tested kids for their abilities to go to higher education, overruled my teacher and said that according to what he saw and according to tests and stuff like that, I should not have difficulties later and that, at the moment, that the right spelling of words was not so important anymore. I should have less difficulties.

So I made it to the *Gymnasium* and had an awful first half-year, because what happened was that in the *Grund- und Hauptschule,* in the elementary school, I still had a "satisfactory" with my writing abilities. Now, in this more select group of kids after having the first writing test, my score was not satisfactory and it really was bad. If you would think back now at what it was, it was *mangelhaft,* which is--

MAESTREJUAN: Deficient.

BUCK: Deficient. Exactly. So I wanted to leave the school. What happened? Luckily, there were other subjects. [mutual laughter] Now, in math, in the sense of calculus or simple math, I was not very good; I was also average. However, when mathematics started, I totally took off.

[END OF TAPE 1, SIDE 1]

BUCK: So luckily there were other subjects.

MAESTREJUAN: Well, what kind of pressure were you feeling to do even better than average because of your father's profession and his role in the school?

BUCK: You have to see that there was also village pressure, in a way that I was the son of the teacher in the village and I should be a good pupil. The thing was my father always told me, "You can do it." I got a lot of support from him. But it's not so trivial, because I was remembering that back at this early stage, the first year of *Gymnasium,* I was as threatened--me, as a person--as I am today when I have these fears that I will not get a grant or that-- It was important during that time for me. I thought I was supposed to be good.

Now, what do I remember about early *Gymnasium?* Early *Gymnasium* was '67, '68. This was the time in Germany of the 1968 revolution of social change. It was the time of the Vietnam War. What happened was that early in the Vietnam War--remembering, as a kid, these Americans with their tanks, with their fancy machines--essentially, my brother and me played soldiers.

Then around '68, '69 this changed. It had a little bit to do with the older people in the *Gymnasium,* the ones who were sixteen, seventeen. They started to be against this war. And it

started a little bit as a fad--running through, shouting out "Ho Chi Minh"--but it was also the time when I started to develop critical thinking. I remember really early back, very vividly, this incident when I was perhaps twelve or so in school. I was talking about the injustice of these bombers over Vietnam killing people who do not even see them. Also, being a pilot up there who really does not see anymore what he does-- He's flying a plane and the result, after pushing a button, is that people die down there.

It also then became the time that I got more and more interested in history. If you ask me today, "What were the three interesting subjects when you were between the age of twelve and sixteen, seventeen"-- Schoolwise, the subjects I was interested in were history, mathematics, and religion.

MAESTREJUAN: Wow.

BUCK: Yeah. And let's talk about the three. Math was simply easy. It was beautiful and pretty; math is the one thing where you have truths which hold. And I was fascinated by that.

Oh, there was a very funny situation. I was thirteen years old [when] the math teacher went to the other teachers and wanted [me to skip] a grade, because he said I was so far ahead mathwise from the other kids that why shouldn't I? And it was so funny that the guy he talked with was my English teacher, and I was, as you would expect, awful in languages. If you look at my grades in *Gymnasium*, they always were the top grade in natural sciences and math. Suddenly, a good grade in German, because now we had to write--how do you call it--? *Aufsatz.*

MAESTREJUAN: Essays.

BUCK: Essays. I did not have to write these words down that they dictated to me. What happened in German was that as long as it had two parts--and the essay--I got an average grade, because what happened was it was "insufficient" in and the essay was "good," so it was "average." So essentially I jumped now to "good" the moment was gone; it was gone when I was fifteen. So essentially I had very good grades in natural sciences and in math, I was good in German, there was no "average," and then there was a "weak" in English and French.

If you would have asked me if I would ever go to a foreign country or speak a foreign language--no way. There was a funny situation. I hated languages. When I was fourteen I had to choose a third language, which was Latin. This was voluntarily [chosen]. I, during that time, was thinking, "Perhaps I do not want to exclude medicine," and during that time we were told, "You still should have a basic knowledge in Latin if you want to go to medicine." And what happened was that after four weeks I was fed up, because my first exam was again not satisfying, as expected, and I told my teacher, "Anyway, I do not want to go into medicine." I was at this stage thirteen or fourteen years old." I want to become a geneticist."

MAESTREJUAN: Where did this idea come from?

BUCK: What happened was that I was interested generally in natural sciences and math, as I told you, so in the time I had, I was reading a series of--I think in retrospect--really good popular science books for kids. I was reading about new developments in math, new developments in physics, and one of the books was new developments in biology, Knaur's *Buch der Neuen Biologie.* And it seemed that I was so impressed that then I said, "I want to be a geneticist." But--"Don't take that too seriously because--"

MAESTREJUAN: What did it mean? What did you think? At that point in your life, you say, "Okay, I want to be a geneticist." What did that mean you would do?

BUCK: I had this imagination during that time that we could study-- What were the experiments which they described? They described this future where eventually, one day, we would be able to clone genes. They had this idea that one day we would be able to get to know how memory works. They had this idea that we could get a good idea about how life developed on earth. This was the stuff I was fascinated with. I was as fascinated in this stuff as I was in mathematics. These were the two things that-- Let's put that on the side.

What was, during that time, at least as important was history and religion. Now, history, I think, [reflected] a similar passion as I had [about] how life works: I wanted to know how did we come to where we are today. This was my interest in history. At the same time I also studied religion, because the religious education that we had in the *Gymnasium* was a Protestant education. However, this meant that for the teachers we had--who were excellent--they [would not] only would teach us stuff in the Bible, but they also told us how did it come to that stuff, what are other religions, what do other people believe? And I looked at this, again, as a sort of history: "How are we here, as human beings, on this earth?" and "What are the different possibilities we have?" I was fascinated by that stuff.

These interests stayed. What was added was middle puberty, when I became interested in girls. What else changed at this time? I was interested in biology. Biology became interesting the moment it was not simply looking at different flowers and different plants, but how does that stuff work? I think that was one of the very important questions that I always had as a kid.

MAESTREJUAN: And this series of new science books, was it a German series?

BUCK: Yes.

MAESTREJUAN: How much were they introducing you to the idea of genes and DNA and the double helix and maybe the beginnings of the revolution in molecular--?

BUCK: No. What happened during that time was that a revolution was predicted. It was clear that something exciting would happen.

Going back earlier, I also have vivid memories of when I was in elementary school. My father was teaching chemistry to the twelve-year-olds and thirteen-year-olds, and they did fancy experiments. I remember that it was one of the greatest things sitting in and watching.

MAESTREJUAN: And what were you seeing?

BUCK: It was totally trivial stuff, like putting sodium into water and seeing it explode--

MAESTREJUAN: Explode.

BUCK: --and making caramel bonbons.

MAESTREJUAN: Okay. Great.

BUCK: I really have to say that when later I got interested in chemistry myself, what happened was that I was allowed to use the chemistry lab of the *Grundschule* to do my own stuff. And I know that I spent hours in this lab when my father was doing administrative stuff.

MAESTREJUAN: What experiments did you do?

BUCK: Very trivial chemistry--color reactions and stuff like that.

MAESTREJUAN: Were you using a lab manual or were you just doing these on your own? Were you dangerous in your--? Singed eyebrows or anything?

BUCK: That's very tough to say in hindsight.

MAESTREJUAN: Did you blow any windows out of the lab building?

BUCK: No, no. My father and I had the code that if I had a new idea, I should tell him before. [mutual laughter]

MAESTREJUAN: Very smart man--your father.

BUCK: Yeah.

MAESTREJUAN: Well, when you were having all these difficulties in school, were you giving much thought as to what you would become as an adult, what would end up happening to you?

BUCK: I think during that time I thought I would be a teacher--yeah, until puberty. With puberty, [my feeling about] teaching was "No. No way. Come on." But before puberty I think my father was my role model.

MAESTREJUAN: What changed about teaching? What was it about teaching that lost its glory?

BUCK: I do not remember. Perhaps it was simply revolt against my parents.

MAESTREJUAN: Well, this might be stating the obvious, but what kind of expectations did your mother and father have for you and your brother in terms of what you should become or what you should do, what directions you should go in?

BUCK: This is a very tough question, because I think that my mother swore that she would not do to her kids what was done to her by limiting her. Now, what was clear-cut was that one of the principles in the family was that as long as education was involved, you could do whatever you wanted. Now, my brother is a teacher; I was not thinking about that. What I wanted to do till the end of *Gymnasium* was I wanted to become a mathematician, and until the age of eighteen I would have gone into mathematics.

MAESTREJUAN: Not genetics?

BUCK: No. So around this age--fifteen, sixteen, seventeen--out of this broad range of stuff I was interested in, if you would have asked me, "What do you want to do as a profession?" I would have thought, "I want to go into mathematics." Also, after the *Abitur*, immediately afterwards if you would have asked me, I would have said, "Yeah, I will study mathematics." Eventually, physics too, but it was mostly mathematics.

MAESTREJUAN: Would you become a university teacher or a *Gymnasium* teacher?

BUCK: I was not thinking of teaching. I thought that I could have the abilities of doing something else with mathematics. I hoped for academia, but academia was far away. The university was 20 kilometers away.

MAESTREJUAN: It was a whole world away.

BUCK: Right, right, right. [laughs] In my small world-- No, I wanted to do mathematics. In case I could not do mathematics itself, I could become a teacher.

MAESTREJUAN: And your brother--did he end up going to the university or did he go to the *Lehrerschule?*

BUCK: He went to the *Lehrerschule.* But what were his two subjects? Math, physics, and music. It's typical for our family.

MAESTREJUAN: How do you account for that? When you say it's typical, how do you account for this persistence of interest in mathematics or ability--?

BUCK: I think that two things [come] together. One thing is that I believe that there is an inherited component in the ability to do math. I think that my brother and I have gotten that from our father. With my mother, we do not know, because she did not have an education here. She was stopped before-- But judging her-- Okay, I'll stop here. [laughs]

Then the other thing is that I think my father simply was able to bring his enthusiasm over to the kids and to show us the beauty of natural sciences and math. I think this influenced me, as well as my brother.

MAESTREJUAN: You said that when you were older, you were able to go into the chemistry lab in school and play around. But how did your parents encourage one direction over another in terms of what they brought home? Did your father bring home chemical kits or--?

BUCK: Sure. However, that was not as interesting as his lab. [laughs] Sure, I enjoyed using kits like that.

What's interesting is that I never was as interested as friends of mine in electronics. I found it boring. After I knew how the principle of a TV worked, that was it. I did not want to go into more detail. I had this one friend who was building Tvs and electrical circuits-- Okay. But it was not my interest.

Anyway, then I was fifteen and there were more important things than science. This was also the age where-- At fifteen the time of the chemical experiments was over.

MAESTREJUAN: Then what were you occupying your time with?

BUCK: What is a fifteen-year-old doing or dreaming of?

MAESTREJUAN: Okay.

BUCK: I was dreaming of girls, you know, which did not work out because they were untouchable at this age.

MAESTREJUAN: Well, this series of books that you were reading, was that something that you went to the *Bibliothek* in search of or did you--?

BUCK: I think I got the first one dealing with astronomy from my parents. I remember how I was fascinated by this idea of black holes, this idea of how vast the universe is, how small we are-- To follow that up, for example, is biology; it goes directly on. "How does the universe develop? Where do we come from?" Around thirteen, fourteen, I was extremely interested in that.

MAESTREJUAN: So once you had one book, you needed to get the rest of them?

BUCK: That's also a typical Swabian-- I wanted to have the other books, but you do not simply

get books or gifts. You have to do something for it. So what I did, starting when I was thirteen--I was teaching other kids for money, kids who were not as good, a grade below me. I was teaching them math. For about six years I made, for me, a lot of money--perhaps twenty marks a week or so by tutoring kids who had difficulties in math.

I had now this money and I could do with it, it seemed, whatever I wanted. So I bought the other books and other stuff with that. Then--big crisis. I was then fourteen-and-a-half and I had this tremendous amount of money; I had three hundred marks. I gave these three hundred marks to the Vietcong.

MAESTREJUAN: This is great.

BUCK: My parents were flabbergasted. "You are fifteen years old and you have all this-- Can't you use it for something else?" And I told them, "Look, we have enough money as a family." So I gave it to [the Viet Cong] to build up villages in North Vietnam.

MAESTREJUAN: You had mentioned that your grandfather was a Social Democrat and then became a member of the Nazi Party. But what were the political traditions in your family? Was there some kind of political tradition that you were drawing upon that made you sympathetic to the Viet Cong?

BUCK: Yes and no. My father, as I told you, had this experience of being a soldier as a kid. This was very important for him afterwards to deal with this [idiocy], as he said. He became active in grassroots politics--I do not remember him differently. He started to do grassroots politics on a local level--only limited to the village--but this led then in a matter of seven, eight years [to him becoming] a member of the city council. And at the end he was mayor of the whole thing. Now, contrary to my grandfather, my father does not see himself [as belonging to] a Social Democrat tradition. Something weird must have happened between my father and his parents--or it was destroyed by my mother--because thinking back, we had way more contact with my mother's side than my father's side. I remember my grandfather as an old man--a nice and pleasant man. However, that's it. So my father sees himself until today in a liberal tradition. Now, in a way, it's the sort of liberalism from which the FDP [Freie Demokratische Partei] started, after the war.

But my father was never a member of the FDP. For fifteen years I think he's been opposed to them, because what happened was that in the FDP, the Freie Demokratische Partei, in West Germany, two traditions came together. There was the liberal tradition that is similar to the liberal values you have here in the States. What are the values they had? Their values were that you have the liberties that you are guaranteed here in the States, but additionally you are only free if you have a free education and a free good education. Then additionally, what became extremely important for my father--[something] that is now more a Social Democrat

idea--is that for freedom, you also need social security, health care, a source to live from when you are old, and stuff like that. So he saw himself in a sort of liberal-Social Democrat tradition. But how did I come here? What did you ask me?

MAESTREJUAN: What kind of political traditions may have led you to--

BUCK: Right. What was clear-cut was that on the base somewhere, he was a pacifist, because his argument always was that we idiots did not know what we were fighting for. He said that the German soldiers in World War II went into Poland-- The average soldier thought that he would fight evil there. And it's so easy to convince soldiers to fight for the wrong thing or for nothing.

When I was fourteen or fifteen--this was the time when the myth of America was breaking in Germany-- What happened before, my father was a total supporter of [John F.] Kennedy of this time-- Oh, that's a very early, vivid memory I have. I remember the Cuban crisis. We had a TV during that time. I do not remember watching TV, but I remember my parents and me sitting in front of the TV and seeing these ships crossing and this fear that something bad would happen. Yeah, that is one of the very early--

I think this revolution [that I had within] myself [at the age of fifteen] of sending money to North Vietnam was, in a way, also-- What worked extremely well between [my father and me] was that we started to talk with each other when I was at a very early, conscious age; we started to discuss the world and our small and big problems. It must have been when I was ten and it went on till I left home, so for at least eight years we spent at least one evening per week discussing whatever ideas I had or he had and what happened in the world that was important. And I think to be opposed to the Vietnam War--he could accept that. But what he could not accept was that I gave my two hundred or three hundred marks all in one chunk to North Vietnam.

MAESTREJUAN: Now, was that Swabian nature coming out--that that was like a frivolous use of money? Or was that more of a political platform that was being committed to this particular ideology?

BUCK: That's a tough call. We will come to similar stuff soon.

MAESTREJUAN: Well, how much do you think that that was typical for a young German, and maybe a young German male, growing up when you did, to have discussions like this? Was this typical, do you think, to have discussions--to talk about it a lot? Because this is a time when the vision of Germany is becoming very clear and apparent and permanent, and it's in the newspapers all the time.

BUCK: It was in the newspapers. We talked in school about it. Thinking back about it, this was stuff which we discussed in school. But what was clear-cut was that compared with my friends, I had this father I could talk with and who really seemed to be interested in what I was thinking and took me seriously. And one thing is that he never was dogmatic. [In contrast] to my mother, my father could admit that there were always multiple sides to a story. My mother is much more dogmatic than he is. This does not mean that he has his principles where you cannot overturn him, but—

MAESTREJUAN: So were you having more conflicts with your mother over this issue of supporting, indirectly, the Viet Cong?

BUCK: Yes and no. The thing was that essentially she had nothing to say, because she could not counter my arguments and I still was the son she liked and she loved. In hindsight, it's one of the stories she even is proud about--that I did that. But she needed a few years to accept that. Yeah, we later will discuss some interesting stuff.

MAESTREJUAN: Well, it seems all this is happening at fifteen, sixteen years old: you're coming into your own at school, but you're also finding these new distractions, like women, and also finding your own road to go with these political ideals. What were you thinking in terms of what decisions you needed to make about your future at about fifteen, sixteen years old or what you were going to do with your life?

BUCK: What I was thinking of was that I would finish the *Abitur*, and then when I was fifteen or sixteen, my idea was that-- In Germany, after the *Abitur*, I would have to [become a] soldier--there was a general draft still--or I could become a conscientious objector and could follow that path. So during that time I was thinking, "Okay, I will do the duties I have to do after the *Abitur*, then two years later I will go to the university and study mathematics."

MAESTREJUAN: So the university was really the direction you were pursuing?

BUCK: Yeah, but it was not so important, because the important thing when I was fifteen, sixteen, was to think it through and to decide what I would do when I was seventeen-and-a-half or-- Because then the [question] was "Do I become a conscientious objector or not?" And essentially there was never a question about that. Suddenly, at fifteen, sixteen, I knew that I would not become a soldier.

At that time there was still a general draft. When you are seventeen essentially, you get a medical and you are registered so that when you are eighteen the army can call you. So during

this registration I stood up and said that I would not do it and that I would be a conscientious objector. So when I was seventeen essentially I had my trial where I went in front of a jury and had to defend why I did not want to go to the army. And essentially what happened was that they accepted me as a pacifist and instead of being drafted to the army, I worked for eighteen months with mentally and bodily disabled kids and lived with nine kids for these eighteen months.

This was an extremely important time for me. Why was it important? First, I left home. It was for the first time that I left--for more than a vacation--my parents, so I had my own apartment. It was important because for the first time I did a forty-hour per week job and I directly had responsibility. What happened was I, essentially, was working on the Swabian Alb in a home for mentally and bodily disabled kids. I was essentially the person living with one group of nine young men: I went there in the morning at six o'clock, prepared breakfast, woke them up, we had breakfast together, and then they went to work; I prepared lunch, they came for lunch at one thirty, and they went back; then we spent the evening together. Yeah, this was an important time for me because what happened? I really enjoyed working with these kids, and professionally I thought that it would be impossible for me to go into mathematics. In the future I thought I wanted to do something in my life that had to do with people, where I could help people or work in a similar way as I did there. But it also became clear that to work in the same capacity as I did during that time with the kids would not be satisfying for me, because what happened was that I really was good with these kids for six, eight months, and afterwards it became a routine and I was not challenged. What else was important during that--?

[END OF TAPE 1, SIDE 2]

BUCK: Now, at this time I really dealt with women. Before that, they were dreams; now they were reality.

Additionally, I was politicized. What that means is that-- Emotion is the wrong-- Stomach patience-- I simply could not be a soldier. I became a pacifist mostly due to gut feeling, but now when I was seventeen, eighteen, I was dealing with the pacifist tradition. I was looking at "What did people do before me?" I wanted to do more than simply work for eighteen months with these disabled kids; it was that I would not go to the army and that's it. I was against the army in general, so the question was: "How can you be against the army in general? What are the tools to get rid of the damn thing? How can you get rid of these weapons of mass destruction which do not differentiate between good and bad or between whatever value you have?" What happens is that if you are in the way of these weapons, you are dead, and you, as an individual, cannot do anything.

So during that time I became very involved with the ideals of nonviolence and grassroots movements. And what did it lead to? It led to, essentially, many of the things I did then in the following six, seven years. How can you change a society fundamentally? How can you change it without using violence? Because the moment you would use violence to change a society,

essentially, it would lead to the replication of violence. Violence creates violence.

Then it became clear that if I was against the army-- The army in Germany, as in most societies, is [such] an integral part of [society] that you cannot be only against the army. If you are against the army, you are also against other parts of the society. What became clear during that time was that this earth may be [destroyed] by weapons of mass destruction. It also could be destroyed via the ecological crisis we had or we seemed to [be going] into. So the question was "How can you change that?" I became really influenced by libertarian pacifist ideas and these ideas that, on the one side, we should live already, today, the way we want to live in the future, that we have to develop now the structures of how it should be, and that we should start to try to get rid of these weapons of mass destruction by using essentially the tools of nonviolence as they were developed by [Mohandas K.] Gandhi and here, in the civil rights movement. Stuff like that.

So starting when I was eighteen, and essentially for the next six, seven years, I became an organizer and believed in nonviolent organization forms. So it started with looking for people who had similar ideas as I had. I met eight, ten people, and we started to discuss among ourselves our ideas, our future, and "What can we do?" This led then to the first things we did, like burning, publicly, our official draft papers.

This is when I, for the first time, came in contact with the law on this level. Because I was a pacifist--a recognized pacifist; I was recognized by the jury as being a pacifist--when I was burning my draft papers, nothing happened to me. But a friend of mine, who was not recognized as an official pacifist, he did now a totally illegal act and he now got his trial. So we publicized this event. The day he had his trial-- We originally did it with six people--burned, publicly, our papers. In front of the court where he had his trial, sixty people burned up their stuff.

What we learned from this was that--[similar to the] civil rights movement-- It was totally clear that if you want to participate in something like the burning of your papers, you have to be prepared. You cannot do that without knowing what you are doing. You have to be aware of the consequences. It could mean that you have to pay this penalty. It could mean, later when we did other stuff--that you go to prison. It could mean that the United States of America will not allow me to enter their country. You have to be aware of that. This is a long-term awareness.

But another [thing] you have to be aware of is, if you do something which involves direct action, it could be that you will be confronted with the police. It could happen that they will hit you with a stick on your head. Now, how do you react? Do you hit back? What do you do? Role-playing-wise, we prepared ourselves for this stuff. We got lawyers to tell us what could happen to us. We did it in small groups. Essentially, twenty people cannot take care of twenty people. You have to divide that in two groups of ten people so that the ten people can look out for each other.

Then if you have multiple groups, these groups have to learn to communicate. And what we had to learn was when you do direct actions, you have to deal with the decisions not on a

voting basis. Because it does not mean anything if six people want to do one thing and four want to do another thing: You cannot force anybody to put his head in front of a tank. It's impossible. You have to do that on a conscious level and you have to learn the methods to do that. So organizing forms like that type of direct, nonviolent action was extremely important for me between the age of eighteen until I came to the States.

MAESTREJUAN: Had this started when you were doing your civil service?

BUCK: Yeah. Essentially what happened was that during my civil service, I had the time to deal with traditions of pacifism. I had time to deal with what political groups were here, what sort of people were thinking similar things as I do, where they were organized, going in contact with them--stuff like that.

MAESTREJUAN: And how do you account for this transformation? Was this part of [something] that started off as discussions in school and at home with your father about politics and the state of the world? Or was it more attached to the government? The state had now decided you were a pacifist, and therefore you are a pacifist?

BUCK: No, I think that it was more of an evolution from myself. It is clear-cut to me that the situation that I had now-- For one-and-a-half years where I dealt with these disabled kids, I had time for myself to read and think; that, for sure, catalyzed the whole thing. But in a way, I see it as a natural evolution.

MAESTREJUAN: And how much were you identifying your activities and your direct action with this larger movement that was going on across the world, at least in the western world, among a certain group of people--primarily college students and the counterculture--versus what was going on within a generation of German people?

BUCK: The people before us were the people of the '68 revolution. What was typical for '68 in Europe, or in Germany? One thing was that until '68, fascism was not taught in school. In '68, really, what happened was that a generation of young people started to ask their parents, "How could that happen? What did you do?" Then additionally, if it was the cultural revolution, before that at the university, you wore ties and addressed your peers using the formal word *Sie.* Now you used the informal word *die,* and you did not have ties anymore. Also, it was the beginning of the *Wohngemeinschaft* movement of the communes. We saw ourselves in this context.

However, when I did my civil service--this was around '75, '74--the '68 movement was dead and, additionally, the German movement fell apart. The '68 movement seemed to be this big movement, then you got these people who went in the direction of the Baader Meinhoff

[Group], and then there was a movement on the other side, which became a movement inside the Social Democratic Party, *die Jungsozialisten.* Essentially, the '68 movement was dead. But it was clear-cut that the counterculture developing during that time-- We were a part of it, in a way.

Then what happened was that from '75 till '81 my major interest was direct, nonviolent grassroots movements. This was also this fascinating time in Germany of the resistance movement against the atomic warheads, which was then followed up by the resistance movement against the cruise missiles and Pershing missiles in Germany.

You have to see something that was very specific for Germany, which most Americans cannot understand. The first thing is that the West German Army--what nobody really was aware of--was the third strongest atomic-powered army. The deal during that time in Germany was that the German Army had, on German earth, hundreds of rockets. But we did not have the atomic weapons on top of it. For example, on the Swabian Alb, you had--how do you call it--the place where the soldiers are?

MAESTREJUAN: Barracks.

BUCK: You had these barracks of the German Army, and inside the barracks, surrounded by these four hundred Germans, you had twenty Americans. The atomic weapons had two codes: one by the Germans, one by the Americans. The moment the president of the United States decided to release the atomic weapons-- In a minute the Germans would be the third strongest army in the world.

All these things did not make sense. For example, the rockets which were on the Swabian Alb--these Lance rockets--had these warheads which had multiple times the destructive force of the Hiroshima bomb and they only flew 80 kilometers. So what would have happened if this idiocy of mass destruction happened? There would have been fifteen thousand atomic warheads in middle Europe. This was really one of the things--this idiocy--which influenced me a lot. Very soon it became clear that I did not want to live with that damn thing.

So--I could be off now one year or two--around '76 or '77 there were these barracks on the Swabian Alb only 25 kilometers away. It was exactly the same situation: German soldiers having rockets with Americans inside. And I decided, together with five other people, that we were fed up with it. We went in front of it, put chains around us, and chained [ourselves] around the exit. So essentially we were arrested and very little happened. They took our names and-- Wait a second. That's wrong what I told you here. This first time that we chained [ourselves], I was on the chain for the first six hours, and they left us alone for six hours and simply used another exit. Then why did I take the chains off? I did something else, and this is when they arrested my friends. My friends got a trial, but to our total surprise, they did not get any penalty. It seemed that their defense was so convincing that this liberal court at this one moment in time at this place said, "Okay. That was not against the law." Half a year after this trial I was sitting

in the kitchen of the commune I was living in at that time, and I had this dream that we could start a movement out of that. I started to go to the typewriter and to write that if another eight people were willing to spend the next seven months organizing a long-term blockade of these barracks, then I would commit myself and follow up on that. "Let's do it. Let's simply see if we can find six or seven people." I wrote this out, sent that to about a hundred people, and it worked out.

What happened was that this led then to the blockades of Grossengstingen where, a year later, 350 people in 35 small groups of 10 people each were blockading, for two weeks, this barrack. In this case we did not block the exit to the barracks. The atomic power plants were, we found out, in a small wooden place on the side, away from the barracks; there was a street in-between. We blocked the street, and then what happened was that whenever the Americans--and the Americans were responsible here for the rockets; the German soldiers were guarding the outside--wanted to drive through, they came and they beeped in front of us. We were sitting on the street, they drove back, and then fifteen minutes later the police came and arrested us. And what happened was that for ten days this street--constantly, people were sitting there. Whenever the first ten were arrested, the next ten came, and so on. This was Grossengstingen.

Ask me later why I did not get a penalty for that, because I'm now in medical school at this time. Wait a second. I was also a little bit warped. What was before was the time when we blockaded the atomic power plants. This is where I was arrested for the first time in my life.

Oh, there was a funny situation. If you ask me now, "How did your parents react-- "

MAESTREJUAN: Right, I was going to ask that.

BUCK: Officially, the one deal was that we always talk about it. I think that still, at this age, I was talking with my father [Richard Buck] about whatever went through my mind. My mother [Gertrud Reusch Buck] always was fearful that I would do the wrong things. Against me, she said, "You're stupid."

However, during the first nonviolent blockade of an atomic power plant that I was involved in, the following thing happened. This was in north Germany. What was this place called? I forgot the name. We were sitting in front of this atomic power plant which they built--Brockdorf; it was called Brockdorf- -and the police came. And instead of having a cannon, they had a water cannon. They were--this high pressure--putting this water on us, and what happened was that I had a poncho on and had my back to the water cannon, and national TV got me on the news. It's a clip of how the water was pushing me over the street; I was sitting and it really pushed me away. Then the next clip was of how policemen took me--hands and feet--and threw me over a barrier. This was on national TV.

The next morning my mother went to the bakery shop--they were talking in this shop about how these anarchists were blocking this atomic power plant; that was an event in

Germany during that time--and one woman was saying to my mother, "If I did not know better, some of these people there looked like your son. But that cannot be--" Because I was the good boy in the village, the teacher's boy. And my mother said to whatever her name was, "It was my son and I think it's right--what he's doing." That's very typical. When she talked directly to me, my mother always was against me doing that stuff. To the outside, she stood behind me. A very nice story is-- Chantal [Duteau-Buck], my wife--she's black. Now, last August she came with my mother down from the vineyard into the village, and a woman on the street started to talk with her and she asked her, "Who's that?" My mother said, "That's Chantal." She was looking totally puzzled. "Who is Chantal?" And she said, "That's my daughter-in-law." "What?" She was totally-- I'm Swabian; how can I be married to a black woman? And Chantal, until today, has to laugh about how my mother blasted this woman.

This is my mother. She seems to be totally conservative in her views, but then she votes for the Green Party. My father, who is much more liberal than my mother, would never vote for the Green Party.

MAESTREJUAN: So in terms of how your village saw you, you were seen as an anarchist or a communist or some radical fringe group?

BUCK: I think the majority of the village, for sure, was against this decision of not going to the army. But after that time I did not live in the village anymore, so my contact was a little bit broken.

But surprisingly, what happened was that--later when we did this blockade I told you about in Grossengstingen, there were two groups, ten each, from Neuhausen which participated--one of the people who organized it then, later became a friend of mine and he told me last summer when I was visiting him that in the beginning, he thought that a little bit had changed in Neuhausen, because I did these outrageous things for somebody from Neuhausen. But my parents still accepted it; this meant that other kids at least would have the possibility to do something similar.

Or it simply could have been the time to do it. Don't make too much out of me here, my influence. [mutual laughter]

MAESTREJUAN: And were you identifying yourself with any particular organized political party?

BUCK: Not a party. The thing was that the pacifist movement has two legs. One leg is this religious leg; you, here, can identify with the Quakers. The other leg is the libertarian leg, which sees itself via tradition from the nonviolent anarchists, where you are suspicious against the state in general because you need a state to organize a machine like the military. So the thing was that

our ideas for change in society was not to go through the parties, but to do it via grassroots movements.

I still remember the days when there were these ideas of the Green Party and how I was strongly opposed to founding a party. My argument during that time was that one of the strengths we had as a group outside of the regular parties was that we could talk with anybody. You could not put us in this context of "You are a Social Democrat. You are a communist. You are a liberal." "No, we are against these atomic weapons." So I was, ideal-wise, much more grassroots. Even today I do not know whether the Green Party itself was something good or bad for Germany. I'm not sure about that.

MAESTREJUAN: So you don't see yourself, or at least the people that you were organizing with, and your activities as some kind of impetus for organizing a national Green Party?

BUCK: No. I also did not see myself as a politician. I was an organizer. My gut told me, "I want to do that stuff against Grossengstingen." Then something really interesting happened. [During] this one-and-a-half years of organizing for this big blockade--I really spent perhaps seventy, eighty percent of my effort organizing that stuff; I think it was me who did it--I identified with it and I think I was good at it. I really was able to organize people.

But when it was over, essentially, we had done what my dream was. Then people wanted to push me in a direction [where I would be] the organizer. Essentially, I was dead. What I mean is that there was nothing which I identified [with] strongly enough where I [could bring] myself and my effort in. Therefore, I still tried to do a little bit, but that was nothing real.

This is the typical experience of my life: I helped, in a way--perhaps it would have happened without me--to initiate something which led then, later, to the big movement against these rockets and against the cruise missiles, because the big anti-militaristic stuff which happened in Germany one and two years later was directly a follow-up of Grossengstingen. And they always saw that as the model, or some groups in the anti-militaristic movement in Germany saw it as a model of how to organize. So perhaps, here, I initiated something. Me, a little human, was able to push a stone. But it was time for it. In a way, this is the feeling that you can change something. On the other side, a year later, you put all the effort in, but it's not time for it and you cannot do anything. There is this balance that "I am almighty and can change the world" and on the other side--most of the time--"Come on, I'm a nothing." That's the balance we have to live with, or I have to live with.

MAESTREJUAN: So would you say it's a balance between some kind of idealism and some kind of pragmatism?

BUCK: No. Here-- I mean that under certain circumstances, you, as an individual, can change

the world. If your small contribution would not be at this historical situation, at this time, history would be different. However, this is happening twice in a lifetime or so and it may have happened anyway. But most of the time, you, as a political being, cannot change anything. You can put whatever effort you have, you can put your person in, and it's in vain. That was a very typical situation. When I met my first wife, Regina [Duttlingen], she saw in me the big shot organizer, but that's not me.

MAESTREJUAN: Why wasn't it you?

BUCK: It is only in this one situation that I had this gut feeling and, by chance, that was the time where it happened.

MAESTREJUAN: So that lasted two days or a year or three seconds--that you had this feeling? Was it temporal?

BUCK: No, no. This was part of my life. I wrote a letter where I said if six other people do that, then we do that. You know, this has a little bit of similarity to science.

MAESTREJUAN: In this space and time, you were an organizer, but it was only for that space and time?

BUCK: Right. I am not a politician and I never was. During that time I was a mensch; I was a human being who had this thing to do. It had to be done.

MAESTREJUAN: Okay. What exactly changed that made this space and time different--that this no longer fit what you were called upon to do or what you needed to do?

BUCK: No. Essentially, I did what I wanted to do. I wanted to do this blockade. We organized it. Now it's on the other people's back.

MAESTREJUAN: Okay, so your call was--

BUCK: I did my stuff. Sure, I still have a bad conscience that these rockets are still around, but the steam was out afterwards.

MAESTREJUAN: For you?

BUCK: For me? No, no. What happened was that, then, the year I left and came to the States, there were these big blockades against the cruise missiles and the Pershings, and they were a direct follow-up of that.

MAESTREJUAN: Okay, one last question and then I think it would be a good point to stop for today. Where was the boundary or how were you integrating these different lives? It seems you're leading this one [part of your life]--this call to action to organize this blockade and to create a life that was based upon these nonviolent principles--with this other part of your life where you're working with children—

BUCK: Oh, that was over.

MAESTREJUAN: --you were making these decisions to go medical school?

BUCK: What happened was that after finishing social service, I decided that I did not want to go into mathematics. I wanted to do something which had to do with people, and I decided to go into medicine. Luckily, my grade average was good enough that I immediately was accepted to wherever I wanted into medical school, and I chose to go to Tübingen.

I went to Tübingen with two ideas. One idea was "Okay, I study, now, medicine." The other thing was that I would start organizing nonviolent groups. I think both were important to me. If you would have asked me at that time what is more important--medical school or what I had to do on the political level--I would have told you, "Sure, the political stuff is more important." And it was, for me, more important until I left Germany, I would say.

MAESTREJUAN: Did you see these as two different endeavors or activities or were they part of the same--?

BUCK: No, because what happened was that medical school was easy. I found I had difficulties identifying with the medical students. Most of them, I found, were-- Oh, you have to know one thing: During that time, if you went to medical school, you did not have to go to the army. So what happened was that the normal people going to medical school did not have to make the decision of whether they would go to the army or not. So most of the people I met at medical school were two years younger and, additionally, had missed the two years which I had, which were really important for me. So the people I dealt with at medical school were mostly older

people who either were unable to immediately get a spot in medical school or who had first had another profession. All these people had done something in between, which was different. I was attracted to this group.

And medical school itself was easy. Essentially, I was able to do medical school with thirty percent of my energy. The way I studied for exams was [by studying] together, with other people teaching them. In Germany it's a little bit different. The medical system in Germany is different in that we do not have a premed. After the *Abitur* we have two years of *Vorkliniten* pre-clinic -- corresponding partially to the American premed. This is the basic sciences plus anatomy and that stuff, which is a little premed here plus first year. This stuff was simple; it was natural sciences.

Going to medical school, I was not interested, during that time, in going into academic medicine. My idea was that I wanted to become a family doctor who would live in a small village afterwards--let's say, in the context of a commune or something like that--and work with the people in the village and together with other people.

MAESTREJUAN: Off the Schwäbische Alb?

BUCK: Not necessarily the Schwäbische Alb, but yeah.

[END OF TAPE 2, SIDE 1]

[END OF INTERVIEW]

INTERVIEWEE: **Jochen Buck**

INTERVIEWER: **Andrea R. Maestrejuan**

LOCATION: **Cornell University Medical College**

DATE: **15 December 1998**

MAESTREJUAN: I wanted to start off today with some questions from yesterday and then basically pick up where we left off on your decisions to go to medical school and not become an organizer for passivism and anti-nuclear interests in Germany. My first question is, was there any pressure for you to become a butcher?

BUCK: No. Definitely not. [mutual laughter]

MAESTREJUAN: Before I get back to that, what kind of religious traditions were you brought up with?

BUCK: I was brought up with the religion of our village and of my parents. This is Protestantism with this typical Swabian-Württembergische background, which is a mix of Lutheranism and Calvinism. It is wildly mixed.

MAESTREJUAN: Would this be a *Pietismus* kind of tradition?

BUCK: In all the Swabian villages, the church has two factions: it either has the Pietistic faction or the not so Pietistic faction. It was clear-cut that my parents were not Pietists, and I never could identify with them anyway.

MAESTREJUAN: Were there some in the village that you lived in?

BUCK: Pietists? Oh, yes. Oh, sure. In each of the villages in Swabia you have the so-called *Stundenhaus.* The Pietists, [in addition] to going normally to church, have their special meeting place where they meet once or twice additionally per week.

MAESTREJUAN: So with this kind of Lutheranism/Calvinism, what kinds of things did you

do? Did you go to church on Sunday? Did your activities revolve around Sunday school? Did you have the rituals like the Holy Communion and the confirmation and those kinds of practices?

BUCK: The baptism is immediately after birth in the first weeks. Then, for children, it starts with children's church--Sunday school. After the regular church there is one hour for children, where they tell them stories and where we sang.

MAESTREJUAN: Did you go to those? Did you and your brother have to attend those?

BUCK: Oh, once every month. Whenever. [mutual laughter]

MAESTREJUAN: Okay.

BUCK: I think we enjoyed it.

Then there is--I think at the age of fourteen--confirmation. Do you have that here? Also, you had education before that. I had an education not at the *Gymnasium*, which was at the next city-- I went to school not in Neuhausen, but in Metzingen, which was the next city which had a *Gymnasium.* My education for confirmation I had now in Neuhausen, and this was really a new experience because I met the people again with whom I went to elementary school. It was interesting--the different experiences we had. I was now thirteen and I remember fighting with the priest about stuff he wanted to teach us. One thing I remember--me as a thirteen-year-old--is that he was totally against relationships between boys and girls, and I know that I fought with him during that time as a thirteen-, fourteen-year-old. Nothing would be spoken against [relationships] if we would kiss. However, sex-- No way. It was really fun, thinking back.

Now, if you ask me whether I'm religious, I would say, "No, I'm not." However, I still like the tradition of the church as it's there, because the church is more than religion. It's also a place where-- One typical example is that the church is a place where old people can meet, let's say, once a week and can have coffee together. It has social functions in the Swabian villages for many different age groups, essentially; it's not linked now totally to what you normally think of as religion.

What else do I like about the church? I see that it gives somebody like my grandmother [Rosa Reusch] -- In a way it helped her by giving, simply, a tradition she could live with. In this context, I really have absolutely nothing against the church as I experienced it. However, if you ask me, "Do you believe in Jesus Christ and all the dogmas?" I would tell you no.

MAESTREJUAN: How about a central deity of any kind?

BUCK: Whether I believe in that?

MAESTREJUAN: Yeah.

BUCK: I'm not sure. I'm not sure. The thing is, I have a very strong gut feeling that life is okay and also that my life is okay. Does that have anything to do with a deity? Perhaps. I do not know. I do not know.

MAESTREJUAN: And what kind of--?

BUCK: Oh. Wait, wait, wait. Do I believe in a personal God to tell me anything about me, as a person? No, I doubt that. But on the other side, what I like out of the religion that I grew up with is that the main values they have are values which I can accept for myself.

MAESTREJUAN: What kind of traditions are you bringing forward to your own children?

BUCK: You know, this is a not-yet-solved problem. The reason for it is because I do not believe in these biblical stories, but they are my stories. What's happening is that Hannes [Buck]--he's now five years old--is starting to ask questions. And I really have to come to grips--with my wife, Chantal [Duteau-Buck]--[with deciding] what we want to do and what we do not want to do. It will be interesting because Friederike [Buck]--she's our two-year-old daughter--will go next year to a prenursery school, which is by the church next door. So let's see where it goes.

MAESTREJUAN: Well, how unusual or typical was it, this decision you made to become a conscientious objector and then to be granted *Zivildienst* [civil service] at the time you went through this?

BUCK: Out of my class at the *Gymnasium*, very likely, I was the only one who did it. But it was not unusual. Thinking back at that time--but that's now a rough estimate--it could be that in general, one out of ten of the boys with a higher education, and perhaps one out of thirty of the boys in general, went for this option.

MAESTREJUAN: So typically those who had gone to the *Gymnasium* would probably be more likely to ask for conscientious--?

BUCK: Essentially, two groups asked for it: one was similar to my background, and the other group was very religious people.

MAESTREJUAN: I wanted to ask you, how did you defend yourself at this trial? On what grounds were you basing it?

BUCK: Essentially, it was on a humanistic background where I said, "I cannot deal with, consciously, the decisions I would have to make if I would be a soldier." It was much less political than I would have done years later. During that time it was mostly that I said, "I do not want to learn how to kill people. I cannot do it."

MAESTREJUAN: But it wasn't for any kind of religious--?

BUCK: No, no. It simply was founded on this notion that "I do not want to learn to kill. I cannot do it."

MAESTREJUAN: Okay, you had mentioned to remind me to ask you when you engaged in your nonviolent and very organized activities and you did blockade the military installation--although you were arrested--why didn't you receive any penalty.

BUCK: Okay. That's a little bit of a mix-up. How often was I arrested? I think I was arrested a total of three times. The first two times, it did not come to an accusation because they simply wanted not to allow us to make the whole stuff public. They were then totally astonished when this whole movement became stronger. The next time I was arrested-- The people who were arrested before us got their summons, and we never got them. So we do not know why we did not get it.

But then there was another situation. The big blockade was two to four weeks before the major exam in medical school. When I said that I would organize this blockade, I also said that I wanted to go through this test. I said that I would participate during the actual blockade during the first week, but the second week was so near to the exam that I, essentially, left the whole thing and went on to full-time study for the exam. That was the biggest exam in the medical school. So I was not arrested during--

MAESTREJUAN: I see. So one reason why you didn't get any penalties is because this was very early in this kind of activity across Germany and they just didn't want to publicize the event?

BUCK: Right, right.

MAESTREJUAN: We talked about this political activity, but you also were engaging in what probably at the time would be considered an alternative lifestyle--living in a commune.

BUCK: Right.

MAESTREJUAN: How did that influence or change your views on what you wanted out of life?

BUCK: I lived in three different communes. The first commune was simply [where] people moved in together who needed housing, so [we moved in together] without any other background. But when I moved to the second one, it was already clear that I wanted to move in together with people who had similar ideas as I had during that time. I was looking with the same people with whom I planned these other nonviolent activities; we wanted to look for a house for ourselves. We needed about, I think, one and a half years and then we bought an old farmhouse 10 kilometers out of Tübingen-- That's the university town where we were-- We rebuilt it, and we started to try to develop a common future, which never worked out.

MAESTREJUAN: Why do you think it--?

BUCK: I was the only person--on purpose--who moved in there who did not move in with his or her partner. I thought it would be too fragile to bring my relationship business into the commune--into the *Wohngemeinschaft.* And what's interesting is that [the commune] broke apart all due to relationships. It did not break apart due to ideas or because we had difficulties with each other on the political or [ideological] level. No, the thing broke apart due to relationships.

By the way, it still exists. Two of the original founders still live there. They started to adopt-- No, not to adopt. How do you call it if you take kids you cannot adopt?

MAESTREJUAN: Foster.

BUCK: Yeah, they became foster parents. I really should go by and check out what they are doing.

MAESTREJUAN: So this must have been a large farmhouse that you--?

BUCK: It was an old, 350-year-old farmhouse. The old farmhouses in Germany are relatively small, and we were nine people and we wanted to have room for at least twelve or thirteen so that sometimes people could sleep over and so on. So what we did was the part where the animals were originally--we rebuilt that.

MAESTREJUAN: At what point did you get married in all of this, the first time?

BUCK: I got married for the first time two weeks before I came to America. The first marriage was with Regina [Duttlingen]. We had a long-term relationship, and she wanted to come with me to America and needed a visa. This is why we married. And why did I leave the commune?

MAESTREJUAN: Okay, why did you leave the commune? And when did you leave the commune? This was your second one?

BUCK: Yeah, my good one. I left [because] my girlfriend of that time essentially forced me out. She put me under pressure: "Either me or the *Wohngemeinschaft."* And what happened was I moved out and moved in with her, and the relationship broke up after four months.

MAESTREJUAN: Why didn't you move back into the *Wohngemeinschaft?*

BUCK: Into the old one?

MAESTREJUAN: Yeah.

BUCK: Why didn't I move back? That's now, in hindsight, a tough question. Perhaps, eventually, because it was not time.

MAESTREJUAN: But you moved into a third one then?

BUCK: Out of the second, I immediately went into a third one together with the woman who forced me--

MAESTREJUAN: I guess that brings us up to where we left off yesterday. I wanted to ask--just to catch up to where we left off yesterday--what specifically about your experience in your civil service job, working with these physically and mentally disabled young men, led you to medicine.

BUCK: Essentially, it was a negative selection. As I told you, in the two years or year before I went to civil service, I wanted to do mathematics. Then during that time, suddenly, it was clear that if I would do academic mathematics, this would mean that I would have very little contact with people, and I simply wanted to do something where I had direct contact with people. This led to the decision to go into medicine, but also, [I decided to go into medicine] with the knowledge that medicine is extremely broad.

Then later I had this idea that I wanted to become a family practitioner, general medicine, which was a big bubble. Because what happened was I started medical school, I did my first two clerkships with people doing general medicine--family practitioners--and it was extremely boring. What happened was that during the first, when I really came in direct contact with what is done in general medicine, I found it boring. The other thing was that the expectations did not fit what you studied in medical school. The way it's mostly done in general medicine, what's expected by these doctors does not overlap. If you go to a general practice--as I experienced it--either people are not sick or you have psychosomatic diseases where, essentially, the people have psychological problems and it manifests itself sometimes in somatic diseases and sometimes in nothing. I could not deal with that.

So what really interested me? I did not like surgery at all. That seemed to be too bloody, and I never liked the hierarchy with surgeons, which has to be [that way] because somebody has to be in control. But it's not for me. So what was I attracted by? A little bit by internal medicine, because it seemed that the people in internal medicine were at least logical. But I only was attracted to pediatrics.

When I was in medical school, I got some money from my parents, but otherwise I also made some money by working during the night in the hospital doing nursing jobs. This was now perhaps in '77 or so. I spent my first nights at the Children's Hospital of the University of Tübingen. These nights were important for me, because taking direct care of sick children--I liked it. I also liked-- There is a special climate in pediatric hospitals which you do not find in other hospitals. It's more lively, and I enjoyed that. And how much did I work? Perhaps four nights per month. This was about four hundred marks; this is what I needed.

Then after perhaps the first half year or so, I worked with normal, intensive care kids. I

got a very strong experience when I spent my first night with the children on the pediatric cancer ward; this was an experience dealing with these kids with extreme intensive treatment. You have to imagine, a child with leukemia today--his chances of dying due to the treatment are as high as dying due to the tumor. [This experience] also dealt with these extremely interesting kids who lived for a year or half a year under this threat of dying. The treatments they get are awful. It was an experience.

At the same time I became fascinated with pediatric oncology. It was one of the few fields in medicine where, really, progress had happened. You have to imagine that in the mid-1960s if a kid was diagnosed with leukemia, his chances were about 50 percent for survival. This improved over a decade to about 70 percent. And these people who pioneered this sort of treatment of these kids were still around. These were now the people in their mid-forties--very energetic, nice people. Essentially, this experience with the kids led me then to the idea to deal more with it. First, I thought to do a medical thesis in this context. So I really did more and more basic research related to these sorts of tumors, which then, in the end, led to my thesis six years later.

MAESTREJUAN: It seems to me you can look at it two ways. You do clinical research in neuroblastomas where the survival rate is incredibly poor. You seem to me to look at it as a glass that is half full in terms of medicine and its ability to help these young children, as opposed to looking at it as half empty. You know, the survival rate is still fairly horrific.

BUCK: Neuroblastoma tumors--it's a very ambivalent tumor. If my children had neuroblastoma, they would not get any treatment.

MAESTREJUAN: Because?

BUCK: Because the prognosis with neuroblastoma today is the same as twenty-five years ago. Essentially, all this modern, aggressive chemotherapy did not improve the survival of neuroblastoma at all. The way I have experienced children with neuroblastoma--I mean, stage three and four--modern therapy only extends pain and suffering. Now, if my kids had that, [I would give them] morphine and that's it. I think the only way, today, with kids with neuroblastoma--if people would like to treat it--is to try out new things which may improve the outcome or which may give new knowledge. But I'm very pessimistic here with neuroblastoma.

MAESTREJUAN: So where were you seeing the role of--?

BUCK: Wait, let's save this neuroblastoma. Let's jump because-- I was doing a lot with neuroblastoma, and what happened was that during my last year of medical school and the last

year I worked on my thesis, there was really a time of big hope for neuroblastoma treatment.

For neuroblastoma, the corresponding adult tumor would be at the pheochromocytoma. And for pheochromocytoma, a drug was found which is enriching in the tumor and with which you can make scintigrams and image for [whether] there is a tumor or not. At the University Hospital [at Tübingen] where I did my thesis, the clinicians found out that the same drug can be used to image neuroblastoma. Now, what I did then for a year is I studied how this drug is doing it and I characterized how neuroblastoma cells take up this drug--which cells take it up and which ones do not take it up. By the way, this drug is today, worldwide, the most sensitive tool to detect neuroblastoma, so for imaging purposes, it's totally established now. But we had then--coming from the results which I had, which showed that this drug is taken up actively and that you get about a hundred, two hundred times higher dosage of this drug inside of the neuroblastoma cell compared to a non-tumor cell--this idea that we could use this principle by putting a radioactive emitter on this drug so that we eventually could kill the cells this way. We tried to do that with neuroblastoma kids, and what happened was--I still remember the first kid, who really had a huge metastasis, perhaps the size of a grapefruit--we injected this radioactive drug, and you really could see how this tumor shrank. So it was clear-cut that it was able to work on these huge tumors. Then when the kid was re-treated, it shrank again.

What happened was that it came out that this drug is able to shrink big tumors, but it's unable to take care of single cells which are sitting around in the body. So essentially this drug did not improve the treatment of the kids at all. And it was a little bit of a disappointment, but in my youth I still had this hope that we could find the cure for neuroblastoma.

But back to what I said--that I would not treat my kid for neuroblastoma--this is only due to [the fact] that I do not see anything to my knowledge at the moment which would help. I would have a totally different opinion if my kid had a leukemia; we would go for extreme, aggressive treatment.

So essentially what happened was that around 1980 I wanted to become a pediatrician.

MAESTREJUAN: How long were you in medical school by this point? You had done your clerkships?

BUCK: Oh, medical school in Germany is a little bit different. It was '76, '77 when I did my preclinical stuff, and it was '78-'79 when I started to work in the Children's Hospital during the nights. Before that, I made money in other ways. Then I became fascinated by these tumor kids--that must have been '79, because already in 1980 I have the first records of working at the lab there, and there must have been some months in between.

MAESTREJUAN: Okay, you had--just to clear it up in my mind--based on your experiences as a sixteen-, seventeen-, eighteen-year-old with pacifism and also your civil service job, decided

that you really wanted to pursue something that would involve you with humans. So that's more personal.

BUCK: Right. Then what happened when I was in medical school, dealing with humans, I did not feel anything for that. For example, I did not feel anything doing a clerkship of internal medicine. Internal medicines are old people; I did not want to deal with old people during that time.

MAESTREJUAN: Why?

BUCK: I did not connect so much. The thing was—

MAESTREJUAN: Intellectually or spiritually, emotionally?

BUCK: No, no. Look, I like playing with kids, even today. [mutual laughter]

MAESTREJUAN: So with your experience in the pediatric oncology ward, how does this lead to getting focus in terms of whether you're going to spend or direct your energies towards clinical aspects or--?

BUCK: During that time in the early eighties, I would have thought that I might make a combination out of [clinical work] and research related to clinic [work]. It was really a time of hope in this sense. What happened was that at the hospital I was working at during that time, specimens of the kids went down to the basic lab and were checked with [whether] these specimens responded to certain drugs or not. I was fascinated by this idea. I was fascinated by an idea that we could take bone marrow from a kid, treat it to get rid of the tumor cells, and give it back. I was really more and more fascinated by the clinic and research, lab-related interface here in between. I also was fascinated at that time with the way that clinical studies were done for these kids.

During that time if you would have asked me, "What would you be," I think between '80 and '86 I would have told you that it may be that I would end up in pediatric oncology and would follow that up. This is also how the history went; essentially, what happened between 1980 and '86 was that with perhaps forty percent of my effort, I did politics; with twenty-percent of my effort, I did medical school; and with forty percent of effort, I did research related to pediatric oncology.

This is why, for sure, I lack a lot of knowledge in medicine, because I never was

interested in it. [I lack knowledge] in many things. For example, I do not have a basic knowledge about techniques in surgery. In the surgery clerkship which we had to do, essentially I did as little as possible. Or sometimes I used my connections with the pediatric hospital not to do stuff--excuses like I had to do lab experiments which seemed to be important.

And we have to say the following: the pediatric oncologists during that time were extremely powerful in medicine because they really had changed medicine a little bit. So these young professors, who are in the range of forty-three to fifty, had a lot of influence at the university. And when it became clear that you were connected to these people, you were sometimes home free. Yeah, I used that sometimes.

Then essentially what happened was that it was totally clear that after finishing medical school, they immediately would give me a residency at this place at the university that I--

MAESTREJUAN: The Children's Hospital?

BUCK: Yeah. With normal residency at the Children's Hospital, you would go through a rotation of the different disciplines in pediatrics. You would do, let's say, six months general, then you would do three months of preemies, then you would do nephrology. There was, in a way, a very stringent plan. But what happened was that instead of doing that, I was officially in pediatric oncology but spending 80 percent of my working time doing basic research, which led then to my Ph.D.

Then it was totally clear that I would need two years of general rotations before I would-- In Germany, pediatrics normally would be a five-year program, and two years would be fixed where you really have to show that you saw so many patients of this, so many of that. What happened was that I was fascinated by the new idea of bone marrow transplantation, which during that time seemed to be developed at [Memorial] Sloan-Kettering [Cancer Center] or at [Fred] Hutchinson [Cancer Research Center] in Seattle, and I decided that I would first go to the United States for a year to learn this new methodology and then afterwards, after coming back, finish my residency and go on. This never happened.

[END OF TAPE 3, SIDE 1]

MAESTREJUAN: You don't go into bone marrow transplants. But to go back a little bit, what was it about what we would call today translational research that was grabbing your interest as opposed to just straight clinical or straight science?

BUCK: During that time I really thought that I could bring my two interests together. One thing was, really, I liked to deal with kids; kids like me. On the other side, I have--this basic science

strength.

MAESTREJUAN: Just to clarify for me--because I have seen some of these theses that have been written for Ph.D. [degrees] from M.D. [students]--how was it structured, in Germany, to get a Ph.D. if you were in an M.D. [program] in a medical school? How did you acquire a Ph.D., and what kind of work was involved?

BUCK: The thing is that if you finish medical school in Germany, you are a physician afterwards; you are not an M.D. To get the M.D. degree, you have to do something additional. And you can do that cheap: you simply can put a study together, do a literature search, put that stuff together, make a review, and that's it. You get, for this, an M.D.

MAESTREJUAN: Okay, and that was your thesis on interferon? For you?

BUCK: No. The thing was that it was absolutely clear to me that I wanted to do experimental work. So I started to do lab work; I essentially spent then six years on that, and this led to my stuff, which was then recognized as a Ph.D. thesis.

MAESTREJUAN: So the work for your Ph.D. thesis was—

BUCK: That was the interferon stuff. However, to be honest, what happened was that at the same time I did this stuff dealing with IBG [iodobenzylguanidine] --this was way more important, looking back, than this interferon work, because the way-- Why did I start working with interferon?

The thing was that at this hospital that I was working at, during the time that I became fascinated with kids with cancer, they treated a child with interferon. This child had cancer of the upper larynx, and the tumor went already to the brain, so it was totally resistant to chemotherapy. And this one child was cured with interferon. This was one of the two or three chance events which came together in the late seventies, which led to this euphoria that interferon could be the new wonder drug. Therefore, I wanted to go into this fantastic field.

MAESTREJUAN: So the work that was published in *Cancer Research* in '87 [J. Buck et al., 1987. Specific uptake of m- [125I] -iodobenzylguanidine in the human neuroblastoma cell line SK-N-SH. *Cancer Research* 45:6366-70] wasn't the work for your Ph.D., was it? This was clinical work that really—

BUCK: No, no, no, no. That was the stuff I told you about, where I showed that IBG is actively transported into cells.

MAESTREJUAN: Okay. And at what point were you learning the biochemical techniques needed to complete the experiments?

BUCK: Simply in this basic research lab, on the job. That is one of the typical things of my career, that whenever I needed to know a new methodology, I simply had to learn it. This went on in America for another ten years.

MAESTREJUAN: Okay. Your thesis work, then, on the hopes and optimisms surrounding interferon was the basis of your Ph.D. When you were deciding to go to the United States to do work in bone marrow, how were those ideas related? How was your Ph.D. work and then shifting to these ideas in bone marrow transplantation--?

BUCK: When I originally planned to come here to the States, I did not plan to do a lot of basic research. Sure, basic research would have been involved, but the hope in the early eighties was to make bone marrow transplantation a treatment which could be done to all people, totally independent of whether you had compatible donors or not. What happened was that Sloan-Kettering--as well as in Seattle--developed methods where not-matched bone marrow could be used. And it looked good.

Then why New York [City]? Why not Seattle? This was due to my interest in music, [which falls] somewhere between jazz, rock, and punk, and the cultural place was New York City. During that time nobody would have thought of Seattle. That was later.

MAESTREJUAN: I suppose you're right. You wouldn't want to hedge your bets, but that was--

BUCK: Right. So I came to New York.

MAESTREJUAN: Well, where did this interest in music pop up?

BUCK: Oh, I have been interested in music really--between jazz, rock, and punk; avant garde music--since I was fourteen. It started, for sure, with a very good education by public radio about jazz music, and it developed. Until today, really, it's one of my major interests.

MAESTREJUAN: We're talking about you playing and composing music?

BUCK: Not composing. But we tried to. When I was sixteen we had, for half a year, a sort of early punk band, and thinking back about the ideals we had-- But that was amateurish. It never led to anything; we made a lot of noise for half a year.

MAESTREJUAN: Okay. So you saw New York as a good venue to experiment with some of your musical interests--playing or listening?

BUCK: Oh, no. It was more to listen. The thing is, I would love to actively make music, but I do not have the talents of some people. I tell you, there are good people out there.

MAESTREJUAN: So do you regret your decision not to go to Seattle in terms of grunge music?

BUCK: No, definitely not, because even that grunge that developed in Seattle-- I like Nirvana, but for example--let's stay in the rock scene--for me, Sonic Youth is still the better band.

MAESTREJUAN: And why come to the United States?

BUCK: Essentially, there were two things. On one side, there was a genuine interest in learning new techniques. On the other side, also, at that time all these people in pediatric oncology before me, they [had already been] two years in the States. So it was also as a vehicle to [advance] in my career at the academic university setting where I planned to be.

MAESTREJUAN: And when you left Germany, what were you expecting in terms of returning?

BUCK: I expected to be back at Tübingen after two years, and I expected to finish my residency and thought that then I would go for *Habilitation* afterwards, and then become an attending [physician] and go on to an academic career.

MAESTREJUAN: How aware were you of Tübingen's role and its strengths in molecular biology?

BUCK: I was not. It's really interesting that Tübingen has the Max Planck Institute [für Entwicklungsbiologie] with Doctor [Christiane] Nüsslein-Volhard, and she is the absolute pioneer in early development and in the development of *Drosophila,* now zebrafish. I was not aware of that. It may be that in '85 I even would have told you that I was not interested in that, because what does that have to do with us humans, you know?

It's really interesting that in the early eighties in Tübingen, the breakthrough discoveries, which later led to the Nobel Prize for Nüsslein-Volhard, were done. I was totally unaware of that. I was aware, at that time, of basic research of the early oncogene story, and I went to seminars at the Max Planck dealing with that stuff. But I had no idea that two buildings away, really groundbreaking work was being done.

MAESTREJUAN: So when you thought of doing benchwork, it was purely human tissue culture work?

BUCK: I started to deal with the tumor cells of the kids in the hospital. This is how it started.

MAESTREJUAN: Well, what happens to this work in bone marrow when you come to New York City? Because that's not what you end up working on. So what happened to this? Had you identified a lab that you wanted to work in at Sloan-Kettering?

BUCK: I wanted to go to the Bone Marrow Transplantation Unit [Transplant Service] and do the research they do in this context. Two things happened. One thing--which I'm pretty sure of but did not really get in '85--is that when I started to work here, publication-wise, these new thoughts of re-treating bone marrow so that bone marrow could be used against the MHC [major histocompatibility complex] barrier-- All these papers came out, but I think that the people at Sloan-Kettering already knew that it was a total dead end. Because what happened is if you treat the bone marrow the way we hoped to treat it, it's not rejected. However, essentially, what you give to the recipients is acquired immunodeficiency. So you may cure, sometimes, the tumor, but the cost would be an AIDS-like syndrome. So it's useless.

What happened was that in meeting with Richard [J.] O'Reilly, who was during that time the chief of the Bone Marrow Service and still today is one of the big, big shots in bone marrow transplantation--he's now the chief of pediatrics at Sloan-Kettering--we decided that [because] I had money from the German Cancer Society for two years and my English was not the best, I first would spend a year in basic research. And then the second year I would do bone marrow transplantation. So the question was "What lab am I going to do my basic research in?" He said I would have, with my background, no difficulty finding labs. So the question was "What would be an interesting lab?" I have this history with the IBG of imaging; this means that you look at where tumors are. What we did is we added to IBG a radioactive element. Now, wherever this

radioactive element was integrated, you could see it on a scanner. And he said, "Why don't you use this knowledge to develop imaging techniques with monoclonal antibodies?" So I went to a monoclonal antibody lab.

During that time monoclonals were still thought to be magic bullets. The major problem during that day, for monoclonals, was the following: There was a system for how you reproducibly could make mouse monoclonal antibodies, but mouse monoclonal antibodies are of rather limited use for a human treatment, because what happens is you have a very specific antibody, you inject the antibody into a human being, it works beautifully, and you can detect whatever you want to detect or you can target a tumor. However, when you inject it for the second time, what happens in between is that the human body recognizes it as mouse and makes, now, antibodies against mouse antibody. So the antibody cannot work.

So during that time the big challenge was how to make human monoclonal antibodies, and it seemed that Ulrich Hämmerling--the person I did my postdoc with--was on the way to developing a methodology of making human monoclonals. And this is when my postdoc here in the States started.

MAESTREJUAN: So it wasn't until you actually arrived on the shores that you realized that the bone marrow work may not pan out?

BUCK: This specific methodology? Right, right.

MAESTREJUAN: But you thought you would go back to it once—

BUCK: Oh, definitely. I thought that in the second year I would learn it. Because until I came here, I was convinced that this sort of bone marrow transplantation would be the future. It only hit me then, during my first year in talking with people doing it, that it looked very, very bleak.

MAESTREJUAN: Well, we can talk about it in regards to this work that you do in Hämmerling's lab, but also your work with the IBG stuff-- What was the impetus driving you? Was it technical issues--to create better diagnostics for tumors--or was it therapeutic tools?

BUCK: During that time I still had this idea that my research should have something to do with clinic--should be translational. This idea vanished years later, but--

MAESTREJUAN: Okay, we'll get to that then. So this original monoclonal idea with EBV [Epstein-Barr virus]-transformed B[-cell] lymphocytes doesn't exactly pan out as well as you

thought. Is that right?

BUCK: The thing was--

MAESTREJUAN: That there was this autocrine--

BUCK: Wait a second, wait a second; I have to explain that to you.

We wanted to develop a methodology of making human monoclonal antibodies. One possibility to get human monoclonal antibodies is by taking human B lymphocytes, infecting them with EBV--this Epstein-Barr virus--and you would get immortalized cells. This you can do. Let's assume that you would have the flu. If it would take a week after all your symptoms are gone and if I would immortalize your B-cell with Epstein-Barr virus, your B-cell would grow and we would find in the supernatant antibodies against flu. However, this would be a polyclonal mixture: we would, at the same time, immortalize hundreds of your cells. Now, what's happening is if hundreds of the same cell--hundreds of distinct clones--are starting to grow and if you do not clone them, if you do not clone them individually, only the one that will overtake [is the one] which is growing the fastest. So in 99 percent of all cases when you would not do anything, you would lose your antibody of interest.

So what became totally clear in '85, '86, was that if this methodology would have any future, we would have to develop a method to clone the cells. Cloning means that you should be able to grow a single cell, and this is essentially how my next ten years of science started, because Hämmerling essentially told me, "Why don't you deal with the problem of why are they growing perfectly fine if you, let's say, have a hundred thousand cells together in a ml [milliliter] of medium, but you go below a thousand cells and nothing goes? They die." This was the problem which I tried to tackle in '86.

MAESTREJUAN: Okay, so that basic problem, hypothesis, paradigm, has not changed?

BUCK: Today it's different. But this was the starting hypothesis. The phenomenon is that a hundred thousand cells per ml grow, but a thousand per ml do not. However, if you take the conditioned medium--the supernatant of the hundred thousand cells--and give them two thousand cells, they will grow. So there seems to be something which the cells use and on which they are dependent. We thought that they could use an autocrine growth factor, and I tried to characterize this molecule. What happened was that I did not have any experience with protein purification during that time, and our assumption was that this--we were in the heydays of peptide-derived growth factors--also had to be a protein growth factor.

So I learned protein chemistry--protein purification. I went in a second lab which was led

during that time by, now, a friend of mine called Karl Welte. He was also a Swabian who had his lab at Sloan-Kettering.

MAESTREJUAN: They are everywhere, they are everywhere.

BUCK: He taught me how to purify proteins, and in the beginning it looked good. However, whenever I went on to sophisticated columns, I lost it. For a year I was unable to make any progress at all, until some strange day--I do not know how I came to this idea; I went to Hämmerling and he told me afterwards that he thought I was crazy--I said, "It's not a protein. It's a lipid." So I asked somebody else, "How can you separate proteins and lipids?" We separated proteins and lipids, and what happened was the growth supporting activity was in the lipid fraction. Now that was it; I did not know how to deal with lipids, so I had to learn how to deal with lipids.

MAESTREJUAN: And how much convincing did it take for Hämmerling to realize that it wasn't this protein--it was going to be a lipid?

BUCK: I think the moment he saw the data; they were clean. He admitted afterwards that he never would have done this experiment, but he let me go because--

MAESTREJUAN: What made you pursue this experiment?

BUCK: Because otherwise I could have given up.

MAESTREJUAN: Right, but you don't. So why don't you give up and why do you pursue--?

BUCK: But look, that is this typical thing that happens to me in my career every one, two years, at least once: I hit a wall where I cannot explain my data at all. I'm one of these scientists who has these three o'clock in the morning cramps--waking up at night and being afraid; also, having, sometimes, crazy ideas. This is the time when I leave bed and write, simply, my ideas down. And sometimes--one out of ten times--they are good.

MAESTREJUAN: And this was one of those times that you thought, "There is something there that's worth pursuing"?

BUCK: Definitely, there was something. I simply needed a fundamental change in ideas, and the lipid idea was right.

So I had to learn lipids. I could have given that stuff to a natural product lab, but then I would have lost it. This was my project, so I had to learn it myself. This is why I needed to learn lipid chemistry.

What happened was that there was this lipid activity. I tried to separate it at Sloan-Kettering on an HPLC [high-pressure liquid chromatography] machine and test all the fractions. When I had reached where it seemed that I had activity, I ran over to Rockefeller University to do mass spectroscopy and for, I think, a year I only got junk. We were totally unable to make sense out of this mess of data which I generated. It is very likely that it was never pure.

MAESTREJUAN: Why not think of it as just "This was just a crazy idea and it wasn't going to work" rather than "Oh, this wasn't pure" or "This data is--"?

BUCK: There was something. What happened was I could not do it. This activity, which was B-cell produced, I was unable to characterize with the tools I had during that time.

However, in serum or in plasma, there was a substance which helped a little bit and which had seemed to be a little bit in this context of the activity we were looking for. So I decided, "Let's see what this substance is. Perhaps it could help us later to characterize the one which I was unable to get." I purified this activity in serum and went to Rockefeller, we did one trivial shot, and we knew what it was. I went home--I did not go back to Sloan-Kettering--and cried because this was now two and a half years of lipid work and what did I do? I rediscovered Vitamin A. The substance which was in serum was Vitamin A. And Vitamin A was, for the first time, described very early in this century: these German chemists already got the structure around 1915 and they already had it synthesized--it's really not trivial--in the twenties. I come now sixty years later, seventy years later, and rediscover--

MAESTREJUAN: Reinvent the wheel.

BUCK: Right. And what came out of that was that afterwards we were able to show that activated lymphocytes need Vitamin A for survival.

MAESTREJUAN: So you rediscovered Vitamin A. But how trivial was it to discover that it's needed by--

BUCK: Oh, this by itself was a nice publication [J. Buck et al., 1990. Retinol is essential for the

growth of activated human B cells. *Journal of Experimental Medicine* 171:1613-24]. Nobody knew that before, and I did not know it when I was finding it out. At the same time when I found out that lymphocytes are dependent on Vitamin A--so the immune system is dependent on Vitamin A--a totally different branch of scientists found exactly the same thing but in a different context. What happened was that Vitamin A was brought in this context of vision. It has been known for three thousand years-- On papyrus, there is this information that if kids are night blind--see bad--they should eat liver; liver is a beautiful source of Vitamin A. Vitamin A deficiency is still today the major reason for blindness in this world, and normally the first sign is night blindness.

So what the UNESCO [United Nations Education, Scientific, and Cultural Organization] did was it started programs in the developing world of trying to see whether you could give Vitamin A to these kids. They really did some nice epidemiological studies showing that you can prevent this sort of blindness by giving Vitamin A. Some health care workers did, really, a good job. They got this feeling that the kids who were on Vitamin A supplementation were generally better off.

In the mid-eighties some really beautiful studies were done. For example, in Southern India, villages were randomized: in half the villages, the kids got Vitamin A; in the other villages, the kids did not get Vitamin A. The kids were looked at for six weeks for signs of night blindness. If they got night blindness, they would be supplemented with Vitamin A; as long as it's night blindness, you can prevent the real blindness by giving Vitamin A, and they simply followed up these kids. What they found out was that the Vitamin A-supplemented group had the same morbidity for diseases; this means that the same number of kids got sick. However, mortality--that's the number of kids who died--was more than double in the group which was slightly Vitamin A deficient. So they brought Vitamin A deficiency into a context where you can deal with this disease. Now, what does dealing with this disease mean? This means that your immune system can handle this viral infection like measles or-- So at the same time when I made the connection with Vitamin A and lymphocytes, the epidemiologists made a connection of Vitamin A with the immune system in general. That was the story.

MAESTREJUAN: Okay. Well, you may think I'm comparing apples and oranges here, but I wanted to ask you-- Earlier you had committed yourself to this idea: you had this feeling that if you could get a group of people together, you could make a difference using nonviolent organizational tactics to stop the nuclear weapon development in Germany, and yesterday you said it showed you that one human--

BUCK: Can make a difference.

MAESTREJUAN: --can make a difference. Now, here, you make this commitment to come to the United States and learn techniques and develop projects, and it slowly gets transformed into something different; it ends up with you rediscovering Vitamin A and going over to Sloan-

Kettering and crying--

BUCK: Going home crying, not to Sloan-Kettering-- I was so ashamed I did not want to talk with anybody.

MAESTREJUAN: Yeah. So how was your optimism and your belief that as an individual you can make a difference being impacted by your progress or lack of progress in this now scientific endeavor of yours?

BUCK: You know, I do not see a big difference here. I think that starting with optimism--that you can change something or you can find something-- There's no difference between my political background and the way I see research today. Now, if you ask me, "What are you doing politically today?"

MAESTREJUAN: Well, no. How were you interpreting what you saw as a major setback in your career by rediscovering Vitamin A?

BUCK: Oh, it was only a setback for a few days. It was not-- Look, imagine that you spent three years in the hope of finding something new and you discovered the wheel. Sure, I found a new quality of the wheel; I found then this work afterwards-- Yeah, let's discuss where the Vitamin A work led. But no, I do not see it in retro--

MAESTREJUAN: So this kind of philosophy that you could make a difference as an individual if you set your mind to it--whether it was organizing people for a political purpose or designing a set of experiments to prove a hypothesis--

BUCK: It's the same. I'm really convinced that as long as you do it, as a person, with your gut, it's fine.

MAESTREJUAN: And these results were not telling your gut to drop the project?

BUCK: Oh, no. Look, then it got started [laughs].

Do you know what's really interesting? I needed a relatively long period--hands-on--to learn something like protein purification or to learn something like lipid purification, but I think career-wise, as a scientist, it helped me tremendously. It seemed to be a very nonproductive

time--to spend two years to learn to deal with proteins—but then later as a side product, totally on the side, I was purifying the *kit* ligand or proteins, which I purified in the last years. The thing is it took totally the fear off me of dealing with proteins, and today I'm totally convinced that if a protein can be purified, I'm the person who can do it. I may be even a little bit arrogant, but this is my gut feeling.

MAESTREJUAN: So the c-*kit* work, which we haven't really talked about, was going on at the same time. And you were getting solid results?

BUCK: What happened was that at the same time when I did the lipid work, I did the c-*kit* work--the *kit* ligand work --as a side project. We purified it and we got it.

MAESTREJUAN: So you were getting validation that way?

BUCK: Look, at least I could show that I was able to purify a protein. [mutual laughter]

MAESTREJUAN: So there wasn't all this despair?

BUCK: No, no. That's not my personality.

MAESTREJUAN: Okay. So at what point did you think that you wouldn't have to extend your stay in the United States or extend your postdoc anymore? How long did it take you to recover from this one setback?

BUCK: Oh, don't see that as a setback. Essentially, what happened was that--

MAESTREJUAN: How long did it take you to stop crying that one evening after coming back? Let's put it that way.

BUCK: Oh, perhaps two weeks. [mutual laughter] Luckily, perhaps one or two months after--Look, I thought when I found Vitamin A that I had totally screwed up. The reason for it was the following: When I knew that it was a lipid--Vitamin A is a lipid--I went to get reagents from different labs at Sloan-Kettering which were dealing with lipids. I went to a steroid lab, got steroids, and I also went to a lab which was dealing with Vitamin A and I asked them to give me the substance to test it with. And I got from them retinoic acid. According to the dogma at that

time, retinoic acid is the mediator of Vitamin A's action outside of vision. I had tested retinoic acid years before and it did not have any effect. So my big, big disappointment was that I rediscovered Vitamin A, and it seemed that I already had tested it years before and it did not work. Now, the thing was that when I repeated this experiment in the following weeks--I compared Vitamin A, the alcohol, with retinoic acid, the substance which I tested--it came out that my old data were valid; retinoic acid was not able to keep immune cells alive. However, Vitamin A was. And immediately it was clear that my work was not in vain. Essentially, this hard road of rediscovering Vitamin A was needed to know that Vitamin A is needed; otherwise, everybody would have assumed it's retinoic acid. And if I would not have learned for two years to deal with lipids, I would have given up, because at this situation I knew that you give Vitamin A to cells and they survive. That's a nice observation, fine, [write] a paper, do the next [experiment]--something else, you know.

However, I already had spent three years on that stuff and I immediately got this idea: it does not make sense that Vitamin A itself is doing the function we are looking for. So the question was "Is Vitamin A metabolite, which is not retinoic acid, which can do the job?" Yes. We found that if we give radioactive Vitamin A to the cells, they produce a substance which is not retinoic acid and which can do the job, which was unknown. With my lipid background, I was able to characterize the substance, and this led to the discovery of the retro-retinoids.

MAESTREJUAN: How did it feel after persevering with this problem to realize that you were the first one to discover retro-retinoids and this agonist?

BUCK: Wait, wait, wait. I do not remember that too much. You want to ask, "How it is when you find new things?"

MAESTREJUAN: Yeah, are there--?

BUCK: Hopefully, it goes on like that once or twice a year.

MAESTREJUAN: Okay. I was just-- We've talked about this off tape.

BUCK: For example, let's explain to you the last ones I had, which I had during this year. The way I have my lab is that my grad students, techs [technicians], and my postdocs are working on my major projects. I, myself, want to work in the lab for at least half of my time with my own hands. So my people are doing the stuff which I have funding for--relatively safe projects. And I, myself, have the luxury of playing around with strange, new ideas.

This way--and we should discuss that again a little bit later--led to a project where I was

purifying a new enzyme called soluble adenylyl cyclase. I spent fifteen months on this project. We knew this activity was in testis, so I started to purify from 2 testis; there are 2 in rats, so we started with 2. Then with 2, it was clear that the activity was there, but it was not enough to characterize it. We went to 10, we went to 100, then finally with 950, we were able to do that stuff. But this needed now, already, fifteen months. When we got sequence data and got the first real genetic information, it was a beautiful afternoon of high epinephrine and whatever you want, because we found out two great things when comparing what we got with known stuff: The first thing was I purified from the rat a substance which also exists in us humans. The other thing was--this is one of the events you really live for--that the substance which we purified was very similar to an enzyme which is found in *Archaebacteria.* Everybody thought, originally, that this enzyme which is making these very important messenger molecules--cyclic AMP [adenosine monophosphate] –was evolutionarily developed a few billion years ago and then went in the bacterial direction and in the known mammalian direction and that it diverged. And we find out now--

[END OF TAPE 3, SIDE 2]

BUCK: Adenylyl cyclase is a molecule which is making this relatively well-characterized, very important second messenger molecule--cyclic AMP [adenosine monophosphate]. Originally, it was thought that it evolutionarily developed, let's say, two billion years ago, and that then it diverged into bacterial form and in the already characterized form in mammals. Now we find out, "Wait a minute. In mammals there is an enzyme--the one which we purified--which does not look at all like the known mammalian ones making the substance, but like the ones in bacteria." And this is simply great.

There is another episode, which happened four months ago. We were purifying, cloning, and expressing an enzyme which is making a retinoid which is killing cells; we did that in moth. Now, four months ago we were able to show that the substance--the one which we hoped would be produced in moth--is produced in moth. At the moment you see this on your instrument.

Look, there were bets in the lab against me. They said, "You are dreaming. This will not happen!" But the moment after one single experiment of fifty minutes, nobody could dispute it anymore and you know, you know you are right!

MAESTREJUAN: Why? How do you know you are right? In the face of--obviously, if they're betting against you--critics in the audience, how do you know you are right?

BUCK: We simply took one pupae and dilipidated it--put the lipids on a HPLC [high-performance liquid chromatography] machine--and on the screen there was the product which we were looking for. That was a dream come true. My hope would have been that I would see a small blip, so that I could, afterwards, take 100 pupae and force it if it's there. But one single

animal and boom! The substance was there in a way that somebody who knows how the substances look knows that's it with no doubt. That's great.

MAESTREJUAN: Why?

BUCK: Why is it great?

MAESTREJUAN: Yeah.

BUCK: Because this opens a totally new field on the other side. I invested and idealized two, three years on that damn thing. Sometimes my ideas hold; most of the time, they do not. But sometimes they hold, and that's great. As long as this experience is happening at least sometimes--let's say, once a year--it's worthwhile doing that stuff.

MAESTREJUAN: What you said off tape is that science is like two great moments a year and the rest is an exercise in masochism.

BUCK: Oh, you have to be a masochist to be a scientist.

MAESTREJUAN: So to just go back, because I want to pursue this line of what makes you persevere-- The adenylyl cylase is one of those moments that you live for.

BUCK: Oh, yeah.

MAESTREJUAN: The SF21--

BUCK: Enzyme-- Right.

MAESTREJUAN: --that produces AR [anhydroretinol] is one of those other ones. Would you say the discovery of HRR [hydroxy-4, 14-retro-retinol] --?

BUCK: It was great, but that has been now already eight years. It's not fresh.

MAESTREJUAN: So what is the criteria for these great moments that [determines] whether they're great or just not so good?

BUCK: What is the criteria for these great moments?

MAESTREJUAN: What makes a great moment?

BUCK: A great moment--

MAESTREJUAN: Is it the fact that your idea proved to be right, that you won the bet--?

BUCK: No.

MAESTREJUAN: --that you created a new field, you introduced a new paradigm, that you got a paper out of it? There are all different kinds of criteria.

BUCK: The paper story--that's the future. That's not so important.

MAESTREJUAN: Okay. So what drives you? What is your standard for success--your criteria for success?

BUCK: Essentially, you start with the problem, you try to tackle it, and you really have to put effort in. I never reached anything like that without effort--without sleepless nights. Then sometimes at [un] expected moments, qualitatively something happens and you see something new which is true. It's like a mathematical proof--that you got now something-- Science does not work totally-- Small progress, small progress, small progress. Science very often works [in a way where] you work hard, you seem to make some progress, and everything crashes. Like Sisyphus, you start simply again. Try it a little bit different and then sometimes what happens is that you get these moments where you are able, [unlike] Sisyphus, to push the stone over the hump. And you know you have it; you are over it. Those are great moments.

Writing papers, writing grants--that's cleanup work. But most of the time, these are not trivial findings. These are findings, at least, where you judge where something new--a new idea, a new quality--is happening. I could not imagine having this feeling with something like finding simply a new gene or purifying a new protein. This is day-to-day work.

MAESTREJUAN: Your work where you purified even more new retro-retinoids is just kind of everyday work?

BUCK: I'll tell you exactly in this context what I mean. We found 14-hydroxy retro-retinoid. Then we wanted to know--we found that in mammalian cells--how far could we go down in evolution and find the substance? We still found it in fly cells. However, in fly cells, there was a second retro-retinoid. By itself--interesting. It was fine. So we decided to characterize the second retro-retinoid and I thought, "Okay, the flies simply have two and it could be interchanged"--you could use either this or the other. I remember how a grad student was testing anhydroretinol and its effect on cells. He claimed that at very low concentration he saw some effects--that it's similar to 14-hydroxy, can keep cells more happy. It seemed strange. The next thing I heard afterwards was that anhydroretinol seemed to be toxic.

But why would it then be in fly cells? Why would it produce that? One day it hit me: Why could it not be that anhydroretinol and 14-hydroxy retro-retinoid could be like yin and yang, where one keeps the cells alive and the other one is now doing the opposite and killing the cells and doing that in a competitive way by binding to the same receptor so that one stimulates the receptor and the other one sits there but does not stimulate and does the opposite? Having this idea and simply testing that in tissue culture and getting, then, to decide that this yin and yang exists--this is, again, one of the moments where you do qualitatively something new--one of the exciting moments you live for. The dogma is toppled over.

MAESTREJUAN: How do you decide when to pursue something, when to keep pushing the stone up the hill, or to just let it stay at the bottom and cut your losses and pursue something else?

BUCK: No.

MAESTREJUAN: Pursue another idea.

BUCK: I do not have a clean answer for that. This is one of the difficulties I sometimes have. I think that maybe that's the difference between a good and an excellent scientist. Looking at the people I have in my lab, the ones who know to follow up these tough questions--these are the real good [scientists]. The ones who simply always have explanations for why their stuff did not work and the ones who are unable to see-- Essentially, interesting questions always start when the common explanations do not fit. You have to ask, "Why do you get these results?"

Look, all the stuff I think I ever did was seen by people before. However, they did not

make connections. I bet that I oversaw many things. However, I think that a good scientist at least finds things he can tackle. And there's so much stuff out there. We know so little.

You know, the big thing is the great thing. I think that we as basic scientists have a big, big luxury. Essentially, we are allowed to be curious like kids. They simply allow us--as long as we are funded--to do what comes to our mind. And this is great.

MAESTREJUAN: Who is they?

BUCK: Whoever gives us money. [laughs]

MAESTREJUAN: We'll pick up this issue of money probably tomorrow. Where does creative science come from?

BUCK: Where does creative science come from? In a way, I think that creative science meets the same qualities as creativity in art. I think creativity needs knowledge, creativity needs a little bit of naivete, and a little bit of childlike ideas--simply a bit of playing. What else is part of creativity? If I see my kids playing, they are creative. Essentially, I think that this is one of the qualities we never should disrupt in kids, and perhaps I had this luck--that they allowed me to play.

MAESTREJUAN: Your parents or your superiors here?

BUCK: Starting with my parents until whoever. [laughs]

MAESTREJUAN: You still play.

BUCK: I still play, yeah. In the same way that Hannes [Buck], my son, is playing with his toys and putting them in different order--that's what we do with our data. And what happens is that sometimes new questions come out of that: "Let's see what's happening." It's the same as when creative people make music. But don't think that artists do not have to know their craft. You better know how to play your guitar if you want to make noise.

MAESTREJUAN: So it's knowledge, still?

BUCK: Yeah. And really, it's effort. I do not know of one creative person who does not spend hours on it and years.

MAESTREJUAN: And in terms of science, what is creative science? How would you define creative science? Is all science creative?

BUCK: Definitely not. Who are the creative scientists? There are not so many out there. Notice how people with some background knowledge play these ideas-- If you really look at the great inventions in science, these were always inventions other peers told them, "It cannot be." But what seems to happen in science is that the limit is our own creativity and our imagination. Then the moment somebody proposes something new, first, people will deny it, but afterwards all the people will claim they saw it already, years ago.

Who are the creative people? One thing is strange--again, it has something to do with god. In a way, I would say I know them. It's strange--this was one of the experiences with Pew [Scholars Program in the Biomedical Sciences] by the way--that I have found creative people through my life, but in the context of science, the Pew meetings were really the place where I found creative people.

MAESTREJUAN: How do you account for that?

BUCK: It could be the selection; I think they are looking for people like that. It looks like that.

MAESTREJUAN: So if you look around a room, what do you base your criteria on--that a person is going to be creative?

BUCK: You know, part of being creative is simply to ask questions and not to stop asking and not accepting dogma. I have a very good, noncreative postdoc at the moment--one of my people. This person always wants to prove dogmas, and her hypotheses are more often true than mine, but she's not creative because she exactly wants to prove the wrong thing. She wants to prove the status quo, and this is so boring. We need these people; they are great to work out glitches. But they never will make jumps. This postdoc really fears new things. So it cannot be-- You have a result which does not fit, you do it another five, six times--change the condition until it fits again in your dogma.

One thing, really, could be true of creativity: I do not see a big difference between good scientists and good, creative artists. I get the very same feeling from these people. To be creative you still need a little bit of this childlike wondering, that you are astonished by what's around you. The moment you miss that, I think creativity is gone.

MAESTREJUAN: How do you train a graduate student and postdocs to be creative scientists?

BUCK: You cannot train them.

MAESTREJUAN: So creative scientists are born?

BUCK: You have it or you do not have it. What I mean-- I think if you do not have it as a young adult, right before you make it to grad school, you will not get it. You either have this curiosity or you do not have it.

You can be a good scientist-- No, you can be a good worker in the sciences. Let's say it that way. We need people in quality control. We need people in companies for that stuff. It's also our duty in academia to train people like that. And we should.

MAESTREJUAN: Is that a general curiosity about things around you or is that a curiosity in science that you need to be born with in order to be a creative scientist? Is it a curiosity that's very general in scope--just being curious--or is it being curious about how things in the natural world--?

BUCK: You know, looking at me, I think I could be in the biological sciences; the way I am at the moment, I could be, as well, in physics. I could be, as well, in whatever. I think simply, to be me, I need a creative profession. Otherwise, essentially, what would I do? Otherwise, I would be park ranger in Yellowstone [National Park], which would be a dream.

MAESTREJUAN: Yeah?

BUCK: Yeah.

MAESTREJUAN: Why is that? Why would that be a dream?

BUCK: Oh, if you would ask me, "What would you like to do when you are sixty-five?" I would tell you my dream would be to have a lab for three months, four months here in New York City, because I really like the city; to have a lab for four months in Maine, in Acadia National Park, at Jackson Lab[oratory], because it's a beautiful landscape; and for another three

months to be a park ranger in Yellowstone. Really, I mean it. I would like to do evening programs and hikes. And for another four weeks I would like to visit my kids. This is my dream of my old age. That would be fantastic.

MAESTREJUAN: What role does environment play in the creative process, whether it's science in New York City or science in Bar Harbor [Maine]?

BUCK: Luckily, I need nature. I spent, perhaps out of the last twenty years, most of my vacations hiking: hiking through the Alps, hiking here in the national parks, going with the backpack for days. This is also stuff where you can recharge and where you can be creative. As strange as it sounds, walking in nature in sort of meditative states where thoughts are coming and going--

What is creativity? It's connecting different thoughts which seem to be non-connected. To see a connection where there was no connection before, I think that's creativity. Here, at least, I enjoy doing it. For creativity, you cannot do it when you are tense. Whenever you are tense, nothing works; at least, I cannot do it. Or if I have to do stuff, I have to start doing it early so that there's no pressure.

MAESTREJUAN: Well, you had mentioned yesterday that you thought your father had found his profession in teaching. Have you found your profession in science or biomedical research?

BUCK: Yeah. It was one of the possibilities in me and I like it. I like it. Would I do it again? Sure. However, would the same things happen, the same chance events? I do not know. I think I could be as happy in other professions as long as creativity were involved. Or the job would have to be so minimal that I would have enough time on the side to do stuff I like.

MAESTREJUAN: Well, to pursue this just a little bit and then we can stop for the day-- You had talked just a few minutes ago about how curiosity is almost an instinct, that you either have it or you don't, and that's part of being a successful, creative scientist. But then you had also mentioned, "Would these chance opportunities still happen?" What role does serendipity play? You have a creative, curious person trained in science and possessed of scientific knowledge, but then what role does chance play in the creation of a successful scientist?

BUCK: Chance plays a big, big, big role. However, I see here the development of a scientist [as being] similar to the development of the human being. My son, Hannes, is a very smart, creative kid. He's at the same stage as a human being as the very good, smart grad student that we sometimes have. Now, it's by chance that they will develop. If they learn how to learn, if they know that they have to put some effort behind something, if they know that they are allowed to

follow the moment, let's say, I think that Hannes will be fine, as well as this young scientist. In my opinion, he does not have to follow an academic career. However, he should do his stuff right, you know?

It's so typical-- Looking here at these students starting in the Ph.D. or M.D./Ph.D. program and so on--being with them for a short period of time--you know it. You know whether they are able to make it in life or not. Some of them have it. It's so strange to say that. Here is the scientist; I think I know.

What is, now, success? The one person I'm thinking about--the grad student; he's, by the way, not in my lab, but I have followed him in the last few years--where will he end up as a very, very good, smart scientist and productive person? This does not mean that the other ones, who do not have it, will not be good scientific technicians-- Let's say it that way.

I think that's the difference. Many people with Ph.D.'s will spend their lives as medical technicians; this means using the stuff they learned as a technology. Then there are some people who are able to play with it. I think this is the difference between an excellent scientist and a medical/Ph.D.-technician or M.D.-technician or whatever.

MAESTREJUAN: So chance then has no role in determining those fates?

BUCK: Yes, it has, because these creative people would be creative either in natural sciences or in other stuff they chose. This guy I have in front of me, who really could become a top scientist, could as well make it as a top creative person in a different field.

If I had not gone to work with disabled kids, I would not sit here today. If I did not like avant-garde music, I would not sit here today. So sure, chance--

MAESTREJUAN: One last question and I promise I'll stop. Within a lab there are different roles for different people: grad students, technicians, postdocs, PIs [principal investigators]. Also, there is this world I see you depicting of good scientists, who are good technicians, and the good scientists, who are the creative drivers of science. Is there some kind of hierarchy in science? Are you painting a picture of science with some kind of hierarchical structure?

BUCK: It's not a hierarchy in the sense of titles. When I deal with--I'm running a second-year M.D./Ph.D. course--these people, it's really fun to deal with them on the same level. These are smart men and women; it's fun to discuss stuff with them. However, sometimes perhaps I am a little bit arrogant. What I mean by that is that I hate pretenders. Whenever I get that people are pretending to know stuff they do not know, I very often simply do not listen. This is one of my personality traits where I have to be careful. Sometimes I go in my own fantasy land and let them talk, or I walk away. That's sometimes rude.

[END OF TAPE 4, SIDE 1]

[END OF INTERVIEW]

INTERVIEWEE: **Jochen Buck**

INTERVIEWER: **Andrea R. Maestrejuan**

LOCATION: **Cornell University Medical College**

DATE: **16 December 1998**

MAESTREJUAN: I wanted to ask a question, because I think I interrupted you and we kind of went off in a different direction. So I'll ask it again just to see if we could have gone further with this question: What is the relationship of your earlier political activity and your current scientific activity?

BUCK: What is the relationship? Both is me. It seems in my political activity I put the same energy as I put today into science. Also, I think we used similar analytical tools or abilities as I use today in science--planning what to do, what is possible, what is not possible, dealing with people. I think still today I want to lead my lab under similar terms as how we did politics together--that we saw ourselves as different but equal. But I think that is two different phases of me.

MAESTREJUAN: How well have you been able to attract committed grad students and postdocs into your lab?

BUCK: In the beginning it was relatively easy. I was the new guy, I seemed to do interesting stuff, I seemed to have enthusiasm. So grad students immediately were interested in what my lab was doing. The first postdoc I had came from a lab I collaborated with. She simply was interested in the stuff I was doing and decided then to do a second postdoc in my lab. The second postdoc I got was a grad student in the lab where I did my postdoc. So I, immediately, from the beginning, had very good people.

The moment you have good people, other people become interested in what you are doing and it goes by itself. However, with grad students, it was broken a little bit last year. During that time I had two very gifted grad students doing their theses in my lab. Evy [Etseria Vakiani] is still in my lab, and she's really doing a very good job. She will be able to finish whenever she wants.

The other grad student I really had major difficulties with. He is a really very gifted person. However, one thing was strange: For the first two years that he was in my lab I had some strange gut feelings. What I did not like was that, essentially, I was his idol; whatever I said was good. I thought that he did not see me critically enough, so I never had the full equal

relationship with him as I had with other people in my lab. Also, when I asked him, "What do you plan? What do you want?"-- "Whatever you say." It was very strange. Then essentially what happened was that from one day to the next I was the enemy. He did not show up in the lab anymore; he did not talk anymore. He really went into a psychotic crisis; it was really classical. Here, I still do not know what would have been the right way to behave.

It was a very, very destructive period for the lab, because everybody feared seeing him around. This was a period of perhaps ten weeks. Everything that was good before was bad now. He really thought that I was--how to say--his worst enemy and only wanted bad things and wanted to sabotage his career and his life. It was a very strange experience. Then suddenly it switched again--the climate. He was back in the lab, did not work from ten to six in the morning, but had normal working hours again. However, the communication was broken; I think he was so ashamed of what happened. I still do not know if I behaved the right way. Essentially, he got, then, his Ph.D. in four months and was gone. I have no idea what he thinks today about me.

It's really interesting: before this event with this grad student, people were knocking on my door, [asking] whether they could rotate. Then with this event, suddenly, it was over. Now it's starting again. In the grad school it would have been out that I'm a tough boss or that there are difficulties in the lab; grad students talk.

A big change happened in my lab two years ago. What happened was I had a small, very cozy lab which really was, in a way, a dream lab to start up. I knew I could do with this [lab] whatever I wanted, and really, it was cozy. But it became a little bit too small; we became limited in space, so I was looking at how I could expand a little bit. And another assistant professor during that time had lab space which was way too big for him. So we decided, because we liked [each other] on a personal level, "Why don't we move the labs together?"

In the beginning we simply thought we would divide the lab in half; he would have one half and I would have the other half. Essentially, my lab moved together with the lab of Lonny [R.] Levin. Then a few things happened. What happened was that everybody predicted we would have difficulties sharing lab space and that there would be conflicts, conflicts using space and conflicts using equipment. This never happened. In the beginning we simply used shared pipettes, stuff like that. What it led to was that after a year all the equipment stuff--all the money stuff--became one.

Why does it work with Lonny? Because Lonny is an extremely nice guy. He's a bright guy, he knows what he wants, and he has enough self-confidence that he does not have to use his elbows. There are no ego problems; he had his own functioning project, and I had my own functioning project.

And Lonny and I have different backgrounds, different experiences. Lonny is--what he did as a grad student, postdoc, and so on--a classical modern cloner. Lonny knows how to deal with DNA, RNA, and whatever is involved with that; this is one of my weaknesses. I know much more biochemistry than Lonny knows, I know how to deal with protein--not an expressed

gene--sometimes I know how to deal with lipids. He has no idea [about these things]. So what happened was whenever his people had problems with biochemistry, they started to come to me, and I started to send my people to him whenever cDNA, DNA, RNA was involved. So essentially Lonny and I do not have two labs any more; we have one lab. Lonny has his own project, which he has his own funding officially for; I have my own project.

Then we started to do stuff together, and the first result of that is the soluble cyclase project. For the foreseeable future we plan to stay like that. A quarter of the lab is doing my retro-retinoid enzyme work, a quarter of the effort of the lab is going into his membrane adenylyl cyclase work, and half of the [effort] will go into our common project of following up on this new finding of this soluble adenylyl cyclase.

MAESTREJUAN: Now, this is a different type of collaboration than I've seen most Pew scholars engage in. But you also engage in traditional collaboration work.

BUCK: Oh, definitely.

MAESTREJUAN: What are the reasons to collaborate? For you?

BUCK: The absolute good, classical collaboration is, for example, my collaboration with Fadila Derguini. Fadila is an excellent natural product chemist; she is one of the few persons who is able to determine, let's say, the structure of a vitamin A derivative if you give her 5 micrograms of pure substance. That's her specialty; that is what she does for me. I purify a retinoid for her--this is what I'm an expert in--and she can do the structure.

A collaboration is ideal when two groups work together which have complementary knowledge and where they can help each other. Then it works extremely well. Collaborations normally do not work out when groups have the same knowledge and use the same techniques. Then immediately jealousy will start, and that's not good.

MAESTREJUAN: I know from your CV that you continued, even after you left [Memorial] Sloan-Kettering [Cancer Center], to engage in collaborations with [Ulrich] Hämmerling and coauthored papers with other students in his lab who were working on vitamin A derivatives. When does collaboration turn into competition?

BUCK: I'm not even sure. Two years ago, one year ago, I would have told you that "I'm in competition with Hämmerling." I would not say that today any more. What happened was that for the first two, three years I was at Cornell [University], there were still loose ends which started when I was a postdoc in his lab and we did that stuff together. This led to many of the

publications which were done when I was independent, and he still coauthored--that I was in his papers. And when I left, we tried to split the field which we together founded; we tried to split it up so that it was clear in which direction he would go and in which direction I would go.

You are right, there was a time of competition, of bad feelings. This was the time when it seemed that a postdoc in my lab had made a major breakthrough, which--by the way--did not work out--

MAESTREJUAN: The breakthrough?

BUCK: It was no breakthrough. It was a dead end in the end, but what happened was that Hämmerling tried like crazy to have his fingers in it. It was a little bit like that-- It seemed that most new ideas were happening on this side of the street and nothing was coming from his side.

However, it's not like that anymore because it was always clear that the enzyme work was done on my side, and the first enzyme in the retro-retinoid field was purified and cloned here at Cornell. This took off by itself. What Uli [Ulrich Hämmerling] is doing today in the retro-retinoid field is stuff he's fascinated with, but I cannot get any enthusiasm for it. So it's good.

MAESTREJUAN: What is about you that makes this kind of unique relationship with Lonny Levin work?

BUCK: What's on my side?

MAESTREJUAN: Yeah, what is it with you? What abilities or strengths and weaknesses do you have that make this collaboration?

BUCK: Why does it work? One thing is totally clear: it's very, very unlikely that if I find new stuff together with Lonny, then this would not be on equal terms. It’s absolutely clear that this work we have here exists only because we meet on an equal level. It’s absolutely clear that Lonny has equal contributions to this work as I have. I do not have any fear here that he would try to take all the credit for himself, and I think he does not have any fear that I would not recognize him. No. This is our work and we developed a relationship where we can criticize each other and we can have totally different opinions without hurting the other. I can say to Lonny, "Lonny, that's totally wrong!" I can even say to him, "You are an idiot!" And he would never take me seriously if I would say, "You are an idiot!" Perhaps two personalities have met that can work with each other. That's what it seems like to me.

MAESTREJUAN: Is this a case where two creative scientists are coming together or two scientists, one with more creative abilities and one with more technical abilities, are complementing each other?

BUCK: Lonny is good. He's creative. We are different; it is clear-cut that we are different personalities. Lonny talks much more than I do, he bullshits much more than I do, everybody knows Lonny. However, Lonny is a very good and creative scientist. Lonny is much more organized than I am, organized in the sense that-- You simply would have to compare our offices: my office is a mess; his office is totally clean. If you would ask Lonny, "Where is this article?" he could send you up now and you would find it. If you would ask me, "Where is this article?" I would say, "It should be somewhere." And we would have to look for it ourselves, and it could be that you would stand there for twenty minutes and I still would look around. I could learn here from Lonny, but it's not me.

It's a lot of fun. Lonny and I go out on a regular [basis]--three times a week--for pizza. Our lunch meetings are simply scientifically good and personally [good]. This is where a lot of things happen, essentially outside the lab-- Talking about whatever goes through our minds-- Sometimes, really, new ideas develop there or most of our decisions happen there.

MAESTREJUAN: Well, you've had experience in kind of the German style of science of doing biomedical research, and you've certainly had experience doing American styles of biomedical research. It seems to me that this kind of collaboration--you've taken two Pis [principal investigator] and joined their labs--is somewhat, not unheard of, but unique in how most American laboratories are set up. What do you think are the implications of how you are doing science for how American science in general is run or how American laboratory science is structured?

BUCK: I'm convinced that the way Lonny and I have it at the moment, it's not two labs which add up. I think that, in a way, we are synergistic, so hopefully we have more than additive results. [laughs] It is clear-cut that we can do stuff neither of us could do.

MAESTREJUAN: But having two Pis at the helm, do you see that as being unique?

BUCK: I do not know of a situation like that, at least here in the neighborhood. However, it's no problem. We have a very simple deal on the outside. Wherever retro-retinoids are involved, I'm the senior author. It's finished. Wherever membrane cyclases are involved--even if I would do the majority of the work--it's Lonny's. Wherever soluble cyclase is involved-- For the first paper, we decided that we [would make ourselves the] first and last [authors], and we threw a coin. And from now on, simply, last authorship will switch. It's a total chance event [in terms

of] who gets the better paper, but so what? It's ours.

MAESTREJUAN: Then how does it work for grad students and postdocs and where they fall on the authorship line?

BUCK: Ah! For them, whoever has most of the creative work is the first author. It's totally independent of whether they are officially paid by my money or by his money. For example, last year I had about double the amount of money that Lonny had. But so what? I simply paid his people with part of my money.

MAESTREJUAN: How do students or postdocs react when they come to work for Levin or you and he end up working on somebody else's project?

BUCK: Most of them like it. However, there's a small problem and this has to do now with grad students. Our grad students here at Cornell normally have their supervisory committee. This committee is made out of the primary investigator in whose lab the student is and additionally two independent faculty members, who should help the students to go through the project. Now, with the students in our lab, most of the time they want both of us on the committee, so there's only one independent. And this is what, in the long-term, Lonny and I have to think a little bit through, because as long as it works well between the student, Lonny, and me, that's no problem at all. But it could become a problem the moment there are difficulties. Where else do I foresee difficulties? The department has absolutely nothing against it. The other junior guys may be a little bit jealous. It cannot be generalized. It happened here in this situation in time, and it seems to work at the moment.

MAESTREJUAN: So with the junior guys jealous, do you think that this perhaps might be a model for them to follow?

BUCK: To be honest, I could not imagine this with any of the other young people in the department. I could not do it with any of them. Lonny and I are people who are relatively open--not so protective of our stuff.

MAESTREJUAN: Well, to pursue this into a new area, with this kind of synergistic structure, how do you divide up things and account for money and account for resources and lab resources for grant agencies?

BUCK: We do not [do it] at all. What's happening is we play the game.

MAESTREJUAN: And what is that game?

BUCK: To get money for our lab. Essentially, I'm writing my retro-retinoid grants, he's writing his membrane cyclase grants, and then we write, together, the soluble cyclase grants and hope that two out of the three areas are funded. As long as that is the case, we are living well. Simply, the money will go in a pot and be used by whoever.

MAESTREJUAN: I might be jumping around--just because of the time-- You had mentioned yesterday that Pew [Scholars Program in the Biomedical Sciences] has been able to collect a group of really creative scientists. How much do you think the selection committee--the advisory committee and those who are making the decisions of choosing who becomes a Pew scholar--plays a role in bringing these creative scientists together?

BUCK: They choose us.

MAESTREJUAN: To get back to something we talked about in depth, does one creative scientist sense in another creativity? Or is it being able to hedge your bets, as Pew has, by the toss of the dice, being able to choose creative scientists?

BUCK: This is an extremely tough call and I'll tell you why. Because when I say that I can sense other creative people, then I can sense them when I'm in the same room with them and when I talk with them. On paper, it's extremely tough.

I'm pretty sure that one of the reasons that I was chosen as a Pew was that Ron [Ronald M.] Evans knew me. I bet that was an advantage.

MAESTREJUAN: What other funding organizations or granting agencies out there--whether it's public agencies or private agencies--are funding creative science, do you think?

BUCK: Creative science?

MAESTPEJUAN: Yeah, what other agencies are out there funding creative science?

BUCK: Now, that's an extremely tough question because I would say NIH [National Institutes

of Health]--the typical PO1 funding--does not fund the creative stuff. However, they fund us--Look, if you think now that I have-- There's a little bit of a pretentious assumption that all our stuff is creative. We played the game. All the money I ever got from NIH was essentially for the most boring grants I wrote.

I still did not learn my lesson here because what happened was that NIH funded me for characterizing the first retro-retinoid-using enzyme, a project which, in my opinion, went extremely well. Then for the competitive renewal, I wrote my ideas in the direction I thought it should go, and this thing was killed. At the same time, three months before, the same study section gave me a totally boring grant. And what will I do with my enzyme grant, now with the coming renewal? I will write, in the experimental part of this grant application, a proposal which will work if it's done as proposed. Already, 80 percent of the data are in, and essentially it could be done in two years. I will make it a five-year period in the hope that they will give me money for five years that I can put in the pool and that we can do whatever [with].

MAESTREJUAN: What was the lesson to be learned then after you got your rejection?

BUCK: The lesson to be learned is a lesson which I do not want to learn. It's the following: simply propose non-innovative stuff--stuff I'm sure about, which should work--and don't write any speculations about ideas which would change the world.

Typical example: I proposed that there is a new sort of cell death out in insects. What do I get back as a criticism? "There's already one sort of cell death that is well characterized in insects. Why do we need a second one?" Come on, this is a creative [theory], you know?

MAESTREJUAN: So a second type of cell death rather than the apoptotic model that we understand now?

BUCK: Yeah, my assumption is the following: anhydroretinol is inducing cell death, it does not have the features of apoptotic cell-death, and a lot of anhydroretinol is produced in early pupae. Early pupacean in insects is the time you have this larvae, this wiggling worm, which suddenly decides to not eat any more, to stick to a branch, to become a pupa, and then you get this really beautiful, new creature developing--later the butterfly or the moth. That's a totally different organism than this wiggling worm, you know? But in between, they do not eat. So what's happening is that during early pupacean, 95 percent of the cells die. And it's not apoptotic. They make a sort of yolk, and this yolk is then used to make the new organism. All of our data hint that if anhydroretinol really is involved or may be involved in this event, that would be different from apoptosis.

MAESTREJUAN: Did you resubmit this grant?

BUCK: No. I will resubmit it, but I will switch study sections. Now, why will I switch study sections? Because I think two things come together with this study section. The study section already gave me money and thinks that I'm relatively well funded, so it's better to have it in another study section. And the study section I'm trying to channel it to now has members who should be friendly to the ideas that I have.

MAESTREJUAN: Okay, which study section is that?

BUCK: The new nutrition study section looks like it became a good study section. The nutrition study section was an awful study section, very nutrition-centered. [mutual laughter]

MAESTREJUAN: How will they be interested in your work?

BUCK: Why? Because as a nutrition study section, they are interested in vitamins. Now, the retinoid work is vitamin A work--what's happening to vitamin A--and this is why we can send it to a nutrition study section.

MAESTREJUAN: Well, besides changing your study section, how will you rewrite your proposal in order to get it funded?

BUCK: One thing is I will take my fly stuff out, because many study sections still have many difficulties funding research which is not done in humans or mammals. The other thing is I will write an absolutely clear-cut proposal--A, B, C, D, E, F--which in itself is logical. And contrary to what I did a few years ago, I do not write anymore about the parts where I really foresee difficulties. I only write now about parts where I have solutions. I write about it if I can tell them, "If this happens, I will do this." In a way, I'm not as honest anymore as I was.

MAESTREJUAN: How do you account for that?

BUCK: You have to see study sections: these people are overflooded with material and they want to take stuff apart. So whatever honest application you write, they will find points they can criticize. I don't give them opportunities.

MAESTREJUAN: What do you think accounts for this situation in which NIH is funding

boring science?

BUCK: You know, I would not say it as strong as that. I think that they really try hard. I believe that most members of study sections try hard. However, there are also many political restrictions. You have to know that study sections must have members from all over the country: they must have as many women as possible, as many minorities as possible, as many people from Arkansas. If you have to make study sections under this context--that, really, all universities are similarly represented--if you also see that many good people do not have enough time to do it, it's tough to get good peers, you know? It's tough.

[END OF TAPE 5, SIDE 1]

BUCK: Am I to complain? At least in my six years now where I've been independent, I never had real money trouble.

MAESTREJUAN: Where has your funding come from?

BUCK: I had funding from Pew [Scholars Program in the Biomedical Sciences], from NIH [National Institutes of Health], from the American Cancer Society, from a small private foundation-- Hirschl: it's somewhere on my CV.

MAESTREJUAN: Norman and Rosita Winston Foundation?

BUCK: It's Hirschl. The Rosita Winston Foundation I had as a postdoc.

MAESTREJUAN: Okay. So the Hirschl/Weill Caulier Medical Scholar is also a defined period?

BUCK: Five years.

MAESTREJUAN: Is that a local foundation?

BUCK: That is a foundation which gives one slot per year to Rockefeller [University], Sloan-Kettering, Cornell, [Albert] Einstein [College of Medicine of Yeshiva University], Columbia

[University], and NYU [New York University]. It's a sort of middle-career award.

MAESTREJUAN: One question I have is--I'll ask this because it's at the top of my mind--this week, Tuesday, I guess, the *New York Times* reported, and it's been reported before, that [the share of federal science funding for] New York City, which has received the lion's share of federal funding, in recent years has dropped significantly and that this ten-institution kind of New York consortium has been created in order to address that problem and reestablish the funding levels. That includes NYU and Cold Spring Harbor [Laboratory] and Cornell and Sloan-Kettering and Rockefeller. How do you account for this supposed problem in New York City in getting federal funding?

BUCK: On a personal level I cannot account for it. I do not experience it.

MAESTREJUAN: Cornell has not gathered its Pis around and said, "We need to create this larger, institutional infrastructure in order to get--"?

BUCK: No, this did not happen. In my microenvironment, I really have to say that the chair here of the department, Lorraine [J.] Gudas--she became chair of pharmacology in '91--did, really, an excellent job. All the young people she hired had no difficulty in getting money and most of them are really good scientists, good people. No, personally, I do not feel the pressure.

MAESTREJUAN: What difference does it make whether charitable organizations like the Pew Charitable Trusts or the Hirschl/Weill or the Norman and Rosita Winston Foundation fund your science versus a nonprofit agency with specific goals, like the American Cancer Society, versus federal or public sources of funding? What difference does it make where that funding is coming from to the kind of science, the kinds of questions, the kinds of experiments you propose?

BUCK: The Pew, in a way, was a dream, because what happened was that we were given money to do whatever we wanted to with it--the more creative the better. This is, in a way, what you want. However, the moment the money is in the pot, nobody cares what you do with it. It is clear-cut that the university is interested to get as much NIH money as possible because the indirect costs they get from NIH are way higher than what they get from other sources. So we have a certain pressure to go for NIH grants.

NIH grants are restricted. I like to have some money on the side to which I have nonrestricted access, which I do not have with the NIH money. For example, for me, at the moment it's very good for me to have this Hirschl money. Even if it's only $20,000 per year, I can do with that [what I want], as I did today-- I simply said, "Let's buy a computer with that"

because the computer broke. With NIH money, it's not so easy.

So I really need both sorts of money. I need NIH money due to pressures from the university and I additionally need, for myself, at least one other source of money which I can use for whatever is happening on a day-to-day level.

MAESTREJUAN: What kinds of opportunities are there to search out these kinds of no-strings-attached funds?

BUCK: The good ones are the ones where, similar to Pew or to Hirschl, simply, the university has to propose people and then it goes through a screening system. I like these sorts of applications because really these are the applications where I can write whatever I want, the nonrestricted ones. I do not hide anything.

MAESTREJUAN: Well, Pew is no longer an option: one, because you've already had it, and two, you're kind of this middle-aged PI.

BUCK: Now I simply have to look. Now I have Hirschl. When Hirschl runs out--a year before--I'll have to think.

MAESTREJUAN: You have a little time yet.

BUCK: Yeah, perhaps I'm a little bit naive here. I'm simply living a little bit from year to year.

MAESTREJUAN: So you aren't waking up at three in the morning figuring out how you can get a Howard Hughes [Medical Institute]?

BUCK: No, definitely not. It happens or it does not happen.

MAESTREJUAN: Is that something you would want?

BUCK: Do I want a Hughes? I'm not sure. I experienced an ex-Hughes and saw the difficulties he had after Hughes did not fund him anymore. It was nasty, because he had incredible difficulties afterwards getting NIH funding back.

It's a little bit like the situation five years ago, or let's say ten years ago. My dream would have been to be a primary investigator at one of the Hoffmann-La Roche institutes, because this would have meant you were a PI in a surrounding where you did not have to look for money and excellent science was done there. But then from one day to the next you were told, "In six months, the institute will close." Now these middle-level guys had incredible difficulties: they were at the mid stage of their careers, had labs of eight people, had spent ten years as Pis and never got one cent of outside funding. They had difficulties in getting positions; they had years where they needed to reestablish funding. Luckily, I did not go for something like that.

Yeah, on one side, a Hughes position would be a great thing, it would be good, but I'm not hustling for that.

MAESTREJUAN: Well, it seems to me that there are two kinds of pots of money: there is the NIH pot of money that funds somewhat boring--

BUCK: Wait, wait, wait-- At the moment I do not want Hughes, and I'll tell you why: because I only would like to get Hughes if Lonny [R. Levin] would get it at the same time, because otherwise our relationship would become unequal and I would not like that. At the moment I would not like to have Hughes, or [if I got it] together with Lonny, then it would be fine.

MAESTREJUAN: In terms of what kind of money this would be, what does Howard Hughes Medical Institute money mean?

BUCK: The thing is, I see in this case--[Hughes] Institute money--not the money value. I, at the moment, have enough money for my lab; I have always had enough money for my lab. The good thing would be a little bit more prestige in getting good postdoc applicants. That would be the one positive side.

MAESTREJUAN: How much money is enough, or how much funding is enough for you and your lab?

BUCK: I also have to say the following: I do not want to work in a huge lab.

MAESTREJUAN: Okay. Why?

BUCK: I, myself, want to work at least forty percent of my time with my own hands and work on my own project. The way I had it in the last years and the way I still want to have it in the

next years is that grad students and postdocs in my lab do the mainstream research of the lab--let's say, characterizing the enzymes in the retro-retinoid field, which really will be a major effort in the next years in the lab. However, I, for myself, want to go on as I did for the last six, seven years--following ideas which could be in this context or which could be totally independent of it, and work with my own hands [on something] like purifying soluble cyclase or purifying--[like] with a postdoc friend in Ron Evan's lab--a new retinoid. If my lab is too big, then it would be too much administrative work, and then I could not do that. I do not want to lose that.

So essentially, long-term, my lab can survive well on two RO1's and something additional. Sizewise, I would like to have a lab of perhaps, with Lonny and me, twelve people--and good people. I think it's better to have three good people than ten workers. We are not doing the human genome project. [laughs]

MAESTREJUAN: Well, it seems to me that you're describing two kinds of opportunities for funding: the NIH type that's funding somewhat boring science but is important for you because your institution wants it for its own reasons, and then there's the second kind of opportunities for funding that comes from private organizations and is basically no-strings-attached, but is essentially very small in comparison. What kind of changes do you think should or can be made to create the best possible funding system for biomedical research?

BUCK: What would I change? In applications, what I would change is I would give money not [based] on a proposal but more on what people already did and what they show they are able to do-- I do not have good answers here. I do not have them. I also do not want to criticize NIH--the funding mechanisms as they are at the moment--because I would not know how to do it better. I do not have a valuable alternative.

MAESTREJUAN: You talked about, yesterday, that really, to do the best creative science, scientists need to be able to play; they need to be able to play in the lab.

BUCK: Right, right, right, right.

MAESTREJUAN: At what point should scientists, and you specifically, become concerned enough about funding mechanisms and the implications they have for science and the kind of science that's been done to start thinking about alternatives--that may be looking at the situation as very dire--as opposed to as long as you've been able to get enough money to play, then the system isn't broke?

BUCK: I do not know.

MAESTREJUAN: Okay. Well, to switch directions again, when you originally came to the United States, your intentions were to do your two years of postdoc, get the techniques you needed, and go back to Tübingen--perhaps, finishing your residency. What happened to that? Why do you stay in the United States? Why do you not return to finish your residency?

BUCK: What happened was that while working in Hämmerling's lab, I became really interested in this project, I wanted to finish it, and one step led to the next. It was suddenly clear after four years that I did not want to go back to clinics. I wanted to go on. I became more and more fascinated with basic biology, and to say to you, "There was a conscious decision--" No, there was not. Suddenly, it was clear that I wanted to go on to this basic academic research. And I never had any bad feelings about that even with the knowledge that I did not have comparable amounts of money and stuff like that. But the thing I really like in basic research is that essentially I can do whatever I want. I have these freedoms that I would not have in a clinical surrounding, and I like them.

Also, in the beginning I thought I should do translational research, because I was coming from this medical background. But to be honest, I'm as interested in what's happening in yeast as what's happening in mutant tumors. The fascinating story is that from other model systems we often can learn a lot.

MAESTREJUAN: I was going to ask you what happened to this interest. Is it an issue of what you thought was translational research at the time--taking the cells from the patient to the bench? Is there still clinical relevance to your work, or is that even an issue any more?

BUCK: The hopes which we had, a little bit naively, in the early seventies did not work out. The science stuff--we could use cells and predict when these cells would respond against this sort of chemotherapy--did not work out. I also had, a little bit, this idea then of-- Let's say we treat a bone marrow, get rid of the tumor cells, we heal this bone marrow-- I do not have these ideas any more.

MAESTREJUAN: Well, you had mentioned in the first session that it was attached to youth and optimism. Is that the case--that to be optimistic about clinical translational research--? Is it attached to a period of time--perhaps a period of time in an individual's life or perhaps a period of time in a scientist's training--and that as you get older, that optimism fades?

BUCK: No, I do not see that. I think I am, today, as enthusiastic as ever. Essentially, my fascination for life did not diminish over the years. It's different today than it was, but the base is the same. Thinking back to my very early experiences in the stuff I told you about--doing

pediatric oncology and this idea of translational research at that time--I think we were naive. On the other side, sometimes you may need that. I do not know.

MAESTREJUAN: Do you have any clinical responsibilities here?

BUCK: Not at all. I would not do that.

MAESTREJUAN: To return a little bit to funding and things like that, yesterday we had talked about scientific creativity and science as an intellectual endeavor and how publication and grant writing was just cleanup work. But what role does the energy and time it takes to write grants and to get publications and to get the right kind of publications play in your daily life?

BUCK: It [happens] in phases. For example, at the moment I'm in a grant-writing phase, and I cannot do bench work, so I'm a little bit more annoyed at the moment than I would be. What I would prefer, instead of staying tomorrow at home and working on my application, is I would like to come in and start a knockout experiment which I have to postpone now to the middle of next month. But that is what I have to do.

The thing is grant writing is also an exercise for me in thinking through "What do I have?" and "Where can it lead to?" This helps--going back to this white sheet of paper. And I have to do it. I even enjoy it sometimes, if I have enough time. This is one of the things: I will never write a grant application anymore in six weeks or so. I start three months before and sit on it, I have after six weeks my first draft, I let it sit, and I come back. Then it's a good experience. If it's done in a rush, then I have difficulties with English. Here, I'm different than Lonny. Lonny can write a thing in two weeks; it sounds great, it reads great. But I could not do that, and it would not be me.

MAESTREJUAN: Where do you see your research going in the next ten years?

BUCK: In the next ten years? In the next two years—

MAESTREJUAN: Okay.

BUCK: In the next two years we should be able to characterize the way retro-retinoids are produced. We should be able to determine whether they are really important in biology by knocking the corresponding enzymes out. This will be exciting in the next two, three years--the retro-retinoid field.

With soluble cyclase, this could go really in multiple directions. I'm convinced it has to do with sperm development and it may be that it could go in the direction of male contraception, which would be great. But it also could go in the direction where it may be involved in diabetes. To work this part out should be fun. Also, there are some biochemical problems behind this molecule which I'm really looking forward to looking into. For example, this is a molecule, but I purified the protein as 50,000 daltons. The CDNA predicts that the molecule is 180,000. So how does it come from the 180 to the 50? Is this physiological or not? This is fun--to do that.

This is stuff which, if nothing new is happening, I think my lab should be busy for another four or five years. In the long term--after that it's evolution and revolution. It could be that simply new, evolutionary questions have to be asked. Or the other thing is that I could do something different, something new. Like soluble cyclase: it has happened now in the last fifteen months.

Ten years? In ten years I will be fifty-two, and then I will have to ask myself again, "What do I want to do in ten years?" Because I told you, I want to be a park ranger.

MAESTREJUAN: Okay.

BUCK: My kids will grow.

MAESTREJUAN: You came to the United States married to your first wife; since then that marriage ended, you married, and had two kids. How has the way you do science been impacted by family responsibilities and child rearing?

BUCK: There were really two big changes since I've been here in the States. The first change was when I got my own lab and was there in front of an empty room and had to develop something. The second change was Hannes [Buck], our first son. Science is important to me, yes. However, even before Hannes, there were more things to my life than science. Sure, I have periods where I spend sixty hours per week in the lab, but this is, with me, always on and off, depending on what's needed. But there was always other stuff which was important to me. Music-- If I did not go to the Knitting Factory, let's say, during that time twice a month, I was unhappy. If I did not go hiking twice a month, if I did not go for vacation for three weeks, I was unhappy. That was as important as science. And now with this new change of having our first kid--now we have two--one more important thing in my life happened. And to be honest, if you asked me, "What's more important?" I think Hannes is more important than science.

Another change is that we moved out of the city. This changed the way I worked. We were living, until a few months ago, only five blocks from here and essentially I could lead my life the following way: I could come in and go whenever I wanted. I could come in at five

o'clock in the morning, work for two hours, go home, have breakfast, sleep a little bit, come in again, go home, read-- Whenever I did not want to see anybody, I went home. This has changed now, and I miss, a little bit, this flexibility.

Also, now for experiments, because many of the experiments I do myself have strange timing-- I mean, sometimes I should be here, let's say, at one o'clock at night, and this is now more difficult to do, living outside in Connecticut. However, it still is possible. Shortly after we moved I had a period where I had to be in every day--I had weekends that I had to work through--and it was doable because, I think, in the short term, my wife [Chantal Duteau-Buck] accepted it, knew that it was important for me, and additionally she knew there were other times where I would have time.

The great thing about being independent is that I can have time. And I have to play with my kids. One thing is a little bit stupid: Hannes was born here and he was born one year after I started this lab. The first year Hannes spent a lot of time in the lab and it was fun having him here. He enjoyed it and he still enjoys coming to the lab. He enjoys doing small experiments and it's fun to have him around. I cannot give this to Pike [Friederike Buck]--this is our second one--because it's not so easy. It was easy to come with Hannes for half an hour. For half an hour, it's nice to have Hannes [in the lab]. But to drive in with Pike here, and then to drive out after her attention span is over--it's not doable. So yeah, I would like that Pike would have a similar experience as Hannes. Hannes is so proud of growing *Drosophila;* now we have to grow crystals at home.

MAESTREJUAN: There are two different areas I want to pursue here. How do you think this will influence your children's development and attitudes towards science--when Hannes was able to come into the lab and play in the lab like his dad and Friederike does not get that same opportunity?

BUCK: I hope that I can give to both of my kids an enthusiasm for life--let's say it that way. If my kids become scientists, fine. They do not have to. However, what I would like is that they learn to love nature and the excitement of nature because, really, it's fascinating. Perhaps this I may have gotten from my father. I do not want to bring over my math abilities. But what I would like is that they like nature. Nature means, also, what's here on this earth. Evolution-- It's fascinating, what's happening.

MAESTREJUAN: You had mentioned before that part of the problem with peer review is that NIH has to serve a variety of interests, and one has to make sure that everything is spread out equitably and to address issues like minorities' representation and institutional representation. There is the situation where women and minorities are underrepresented in science, and you had mentioned off tape that you had known colleagues that may, not for malicious reasons, but just may not be able to deal with women in their lab in the same way as men. How do you see these issues of gender playing out in your lab or minorities as well?

BUCK: No, let's first stay with gender. At the moment, both postdocs are women and the grad students--there is one woman and one man. It seems there is equality, and I think they like it in the lab; we have a lot of fun. I do not see a problem for women on a graduate level or on a postdoc level.

But I see real problems coming the moment the decision comes [about whether] women should have kids or not. Looking at my own family, my kids are extremely well off because Chantal--she's a genetic counselor--decided only to work for two days per week. Under these conditions, it's easy for me too. I think I would have major difficulties if Chantal would also [work] full-time, because then our kids would grow up with a baby-sitter, and this would give me difficulties. This is a thing which we discuss often in the lab, and we do not have solutions. We really do not have solutions, because I see it as the old, traditional way where women scientists do not have families or do not have kids. Come on, this is not satisfying.

I think this is one of the tensions we should be aware of and which we should really work on in the next years. But the models do not exist yet. It's tough because-- I wanted to say that if you want to do science, you have to commit yourself. I think that's only partially true. We have to find models where women-- Look, the male-female problem is also not such a problem in our department. The department chair is a woman, and of the older faculty members, out of seven full professors, three are women and some of them are older. I see a problem here, but we have to live with the tension.

Now, with minorities-- Chantal is black; my kids are half-black. Would my kids need affirmative action? No way. This is extremely tough because I totally understand why we need it, but I see, also, the negative sides. One example is one of Chantal's brothers-in-law. He is a child of affirmative action: he came to Harvard [University] and made his career very likely with the help of affirmative action. But he hated it because his gut always told him, "I'm here only due to my color." This is an awful feeling that should not happen.

It's one of these big problems where I do not have a clear-cut answer. I get, always, chills when in the M.D./Ph.D. program we have two piles: the regular pile and the minority pile. It gives me the chills.

[END OF TAPE 5, SIDE 2]

MAESTREJUAN: Well, to get back to your own experiences in both these issues, your wife [Chantal Duteau-Buck] is a genetic counselor, so at least in the clinical aspects of biomedical research, she's very involved. You talked off tape about how some of the projects that she's been involved in have been because she's black, and there's this blanket assumption that she can speak for all black experiences in New York City. How much did race and gender play in this decision to work part-time and stay at home part-time with the children [Hannes and Friederike

Buck]?

BUCK: Race? I think not at all. Gender? It was absolutely clear from the beginning that Chantal wanted to nurse the kids, and she has the breasts, so-- This is why, automatically, it was clear that she would have more responsibilities in the first two years. We have the luxury that Chantal does not have to work full-time. I think she's totally content with that; I think she found a good balance. It may change the moment both kids are in school, but--

MAESTREJUAN: Are you content with it?

BUCK: Sure. Sometimes it gets stressful. The two days that Chantal works are stressful days, but I'm absolutely for her doing it, and we simply have to do it together.

MAESTREJUAN: While your children are past breast-feeding --I'm assuming--how now does it divide in terms of household responsibilities? You have a house and a yard-- Besides child raising, how does that split?

BUCK: Now, how do we split it? I 'm responsible for the outside. Now, you think it's traditional; no, it's not. I'm the better cook, so I'm responsible for cooking during weekends, and I'm responsible for breakfast. Chantal is responsible for buying stuff during the week and taking care that we have stuff around during the week and that the kids are fed. Cleaning-wise, it's sixty-forty: I'm responsible for the floor, and she's responsible for the bathrooms. The kitchen we share. Sure, Chantal does more in the house because she is normally five days at home and I'm three days at home.

MAESTREJUAN: How much do your daily activities and your conversations at the dinner table or at the playground revolve around science or medicine, genetic counseling, whatever--?

BUCK: It is totally variable. What is happening is that we are talking about Chantal's problems with patients.

MAESTREJUAN: Okay.

BUCK: It has to do with [the fact] that Chantal likes to talk more than I do-- It does not seem like that in this interview, but it may be also a male-female thing. I'm not sure about that. Chantal, in her cancer--genetic-- counseling of minority people here in New York City really

has exciting stories to tell. We often have a lot of interesting stuff to talk about.

Now, does Chantal understand what I do? I think she has a little bit of an overview, but in detail she does not know it. And sometimes she complains that I do not share it enough.

MAESTREJUAN: And how do you think your children receive these discussions? How do they receive science? Is it a job or do they receive it as something fun to do?

BUCK: Oh, science is fun. Absolutely, absolutely. For Hannes, the lab is one of the greatest places to be. But we have way more to talk about than the lab.

MAESTREJUAN: How would you describe your mentoring abilities--we're going to shift here again--in the lab?

BUCK: It's a tough question. The reason is that I really enjoy talking science with interested people. It absolutely does not matter--the background of the people--but they should be interested in it.

I am not good sometimes with technical personnel; I have difficulties teaching them. What happens is that I lose patience, and sometimes what drives me nuts is when people cannot calculate concentrations. And I think sometimes it comes over that I can be impatient. I cannot, for example, understand how if you calculate a concentration, the numbers can be right but it's a thousand times off. It's always the tens that people cannot deal with. It drives me crazy because you can see it. I understand that they have difficulties, but my gut doesn't understand it because it's so obvious.

So [in terms of] teaching abilities, I think that sometimes I'm very good and sometimes I'm impatient too. And for sure, I'm not a good guy then.

MAESTREJUAN: Do you have tenure here at Cornell [University]?

BUCK: Not yet. The way it is--the tenure decision will be next year.

MAESTREJUAN: How does it look?

BUCK: Good.

MAESTREJUAN: And what will it mean? What does tenure mean here at Cornell?

BUCK: Tenure at Cornell means that for the rest of your life a basic salary is guaranteed and some space is guaranteed. However, that's it.

MAESTREJUAN: So your grant-writing days won't be over.

BUCK: Oh, definitely not.

MAESTREJUAN: How do you think having an M.D. attached to your Ph.D. has affected the kind of opportunities you had to do the science--where you were going to do your science?

BUCK: Where I would do it? The thing is if you would ask me, "How do you feel today?" A basic biological scientist totally independent of an M.D. or a Ph.D.

Now, the question: "Would I recommend somebody to go for the M.D./Ph.D.?" Absolutely. And the reason is that it's really the broadest education possible--the M.D./Ph.D.

Would I have gone for a Ph.D. in Germany at that time? No. That I'm here is the event of chances. With my knowledge today, if I would be twenty, what would I do? I do not know.

MAESTREJUAN: Well, finally--for my questions-- How has the Pew [Scholars Program in the Biomedical Sciences] funding--getting the Pew grant--affected the kinds of questions you ask at the bench as well as the directions your career has taken?

BUCK: You know what? The most important thing with the Pew was that it strengthened my self-confidence. Pew was the first application which I got. My first NIH [National Institutes of Health] application was rejected; my first ACS [American Cancer Society] application was rejected. Pew went through. It was so great at the first meeting, sitting with one of the advisers [who was] telling me, "You will have no difficulties getting funded. It's not possible--" Stuff like that helped. This is perhaps one of the major experiences of my life. When I was a small kid, I saw those big boys and I was "Wow!" Then when I was at this age--okay, fine. Then there were these people going to the *Gymnasium;* these were the "wow" guys. This went on. Then it was the scientists in America; they were "wow." I could do it. This went on, and now Pew was a similar thing. Essentially, I met there people who were good, and I'm as good, no doubt. I think that was the major experience--and meeting good people.

And ideas-- What I really enjoyed was the Pew meetings. [There was] this diverse group of people with different backgrounds, but really, most of them had something to say. I like that. I think this was way more important for me than the money. My lab would have survived with or without that money. However, Pew was very, very good.

MAESTREJUAN: Well, at this point I'll turn it over to you and ask you what would you like to add to the record that we haven't already discussed?

BUCK: What did we discuss? No, I do not know anything at the moment.

MAESTREJUAN: Okay. Well, this has been a great pleasure, and thank you for the opportunity.

BUCK: Sure.

[END OF TAPE 6, SIDE 1]

[END OF INTERVIEW]

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