

CHEMICAL HERITAGE FOUNDATION

THOMAS C. ALBER

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Neil D. Hathaway

at

The University of California, Berkeley
Berkeley, California

on

15 March, 9 April, 16, 23, 28, and 29 July, and 15 December 1993

From the Original Collection of the University of California, Los Angeles

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Hilary Domush, Program Assistant, Biomedical Sciences and Technologies, Chemical Heritage Foundation. B.S. Chemistry, Bates College, M.S. Chemistry, University of Wisconsin, M.A. History of Science, University of Wisconsin.

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

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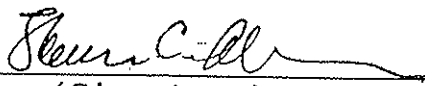
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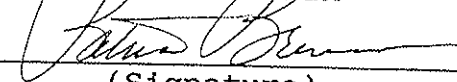
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 (Typed Name)

University of California,
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THOMAS C. ALBER

1954 Born in Tokyo, Japan on 5 January

Education

1976 B.A., University of California, Santa Cruz
1981 Ph.D., Massachusetts Institute of Technology

Professional Experience

1981 Massachusetts Institute of Technology
Research Associate

1982-1987 University of Oregon
Research Associate

1987-1992 University of Utah
Assistant Professor, Associate Professor

1992-present University of California, Berkeley
Associate Professor

Honors

1975 University of California President's Undergraduate Fellowship
1976 Graduate Fellowship, Danforth Foundation
1983 Postdoctoral Fellowship, Helen Hay Whitney Foundation
1985 Fellowship, Medical Research Foundation of Oregon
1988-1992 Pew Scholar in the Biomedical Sciences

Selected Publications

Alber, T. et al., 1976. Crystal structure of elastase-substrate complex at -55°C . *Nature* 263: 297-300.

Alber, T. et al., 1981. Crystallization of yeast triosephosphate isomerase from polyethylene glycol: Protein crystal formation following phase separation. *Journal of Biological Chemistry* 256:1356-61.

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- typhimurium*. *Journal of Molecular Biology* 147:471-74.
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- Alber, T. and J.A. Wozniak, 1985. A genetic screen for mutations that increase the thermal stability of phage T4 lysozyme. *Proceedings of the National Academy of Sciences USA* 82:747-50.
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- Alber, T. et al., 1987. Crystallography and site-directed mutagenesis of yeast triose phosphate isomerase: What can we learn about catalysis from a "simple" enzyme. *Cold Spring Harbor Symposia on Quantitative Biology* 52:603-13.
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- Alber, T. et al., 1988. Replacements of pro⁸⁶ in phage T4 lysozyme extend an α helix but do not alter protein stability. *Science* 239:631-35.
- Alber, T., 1989. Mutational effects on protein stability. *Annual Review of Biochemistry* 58:765-98.
- Alber, T., 1992. Structure of the leucine zipper. *Current Opinion in Genetics and Development* 2:205-10.
- Alber, T., 1993. How GCN4 binds DNA. *Current Biology* 3:182-84.

ABSTRACT

Thomas C. Alber grew up as an American in post World War II Japan and had to deal with issues related to his bilingualism and biculturalism. After moving to Los Angeles with his mother in 1964, Alber was encouraged in all areas of study, including the sciences, through his involvement with the Independent Program School at University High School in Los Angeles. This unique high school experience helped Alber choose the University of California, Santa Cruz for his undergraduate studies because of its non-traditional structure. At Santa Cruz, Alber worked in Anthony L. Fink's enzyme mechanism laboratory and pursued an opportunity to perform research with Gregory A. Petsko at Wayne State University. This research experience solidified his future interests in chemistry and biochemistry over other fields, such as the history of science. With a Danforth Foundation Graduate Fellowship, Alber undertook graduate research at the Massachusetts Institute of Technology (MIT), first under Alexander Rich and later under Petsko (when Petsko joined the MIT faculty). Alber traveled as a graduate student to do research at various laboratories including those at the University of California, San Diego, the University of California, Berkeley, and the University of Oxford. After earning his Ph.D., Alber started his postdoctoral research with Brian W. Matthews at the University of Oregon. Since Matthews was involved with the interdisciplinary Institute of Molecular Biology, Alber continued his pattern of research and study in a non-traditional setting. While finishing his postdoctoral research, Alber authored "Mutational effects on Protein Stability," in the *Annual Review of Biochemistry* in 1989. In this article, he proposed departing from the traditional model system of structural protein research and instead stressed the importance of all possible hydrogen-binding sites, the external amino acids on the rigid portion of the active site, the relative unimportance of the so-called 'floppy part,' and the necessity for flexibility in a protein. Alber's movement from the University of Oregon to the University of Utah and then on to the University of California, Berkeley allowed him to reflect on the American model of university science, the ways in which that model differs at a range of institutions, and the ways in which it varies from science in other nations. Alber's oral history ends with a discussion of the ways in which Alber's laboratory life changed over a ten-month period in 1993 right after he joined the faculty at Berkeley.

UCLA INTERVIEW HISTORY

INTERVIEWER:

Neil D. Hathaway, Interviewer, UCLA Oral History Program. B.A., English and History, Georgetown University; M.A. and C. Phil., History, UCLA.

TIME AND SETTING OF INTERVIEW:

Place: Alber's office, University of California, Berkeley.

Dates, lengths of sessions: March 15, 1993 (75 minutes); April 9, 1993 (85) ; July 16, 1993 (93) ; July 23, 1993 (83) ; July 28, 1993 (85) ; July 29, 1993 (108) ; December 15, 1993 (76).

Total number of recorded hours: 10

Persons present during interview: Alber and Hathaway.

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' 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, from 1988 through 1992.

In preparing for this interview, Hathaway, in consultation with the director of the UCLA Oral History Program and three UCLA faculty project consultants, developed a topic outline to provide an overall interview framework. Hathaway and the director of the UCLA Oral History Program then held an in-person pre interview conversation with Alber to obtain extensive written background information (curriculum vitae, copies of published articles, etc.) and agree on a research and interviewing timetable. Hathaway further reviewed the documentation in Alber's 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 general background on the recent history of the biological sciences, Hathaway consulted such works as: J.D. Watson et al., *The Molecular Biology of the Gene*. 4th ed. 2 vols. Menlo Park, CA: Benjamin/Cummings, 1987; Lubert Stryer, *Biochemistry*. 3d ed. New York: W.H. Freeman, 1988; *The Journal of the History of Biology*; and H.F. Judson, *The Eighth Day of Creation: Makers of the Revolution in Biology*. New York: Simon and Schuster, 1979.

The interview is organized chronologically, beginning with Alber's childhood and education in Tokyo and Los Angeles and continuing through his education, his postdoctoral work at the University of Oregon, and his career at the University of Utah and University of California, Berkeley. Major topics discussed include low-temperature x-ray crystallography, protein structure and folding, and the training and funding of research scientists.

ORIGINAL EDITING:

Kristian T. London, editor, edited the interview. He 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.

Alber declined to review the transcript but did respond to editorial queries by telephone.

Steven J. Novak, senior editor, prepared the table of contents and index. London assembled the biographical summary and interview history.

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