

CHEMICAL HERITAGE FOUNDATION

JAMES C.A. BARDWELL

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

William Van Benschoten

at

University of Michigan, Ann Arbor
Ann Arbor, Michigan

on

5 and 6 April 2004

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

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 Pew Biomedical Scholar Advisory Committee members.

This oral history was completed under the auspices of the Oral History Project, University of California, Los Angeles (Copyright © 2007, The Regents of the University of California) and is made possible through the generosity of



**From the original collection at the Center for
Oral History Research, UCLA Library, UCLA.**

The following oral history, originally processed at the UCLA Center for Oral History Research, has been reformatted by the Chemical Heritage Foundation. The process involved reformatting the front matter, adding a new abstract, replacing the table of contents, and replacing the index. The paragraph spacing and font of the body of the transcript were altered to conform to the standards of the Oral History Program at the Chemical Heritage Foundation. The text of the oral history remains unaltered; any inadvertent spelling or factual errors in the original manuscript have not been modified. The reformatted version and digital copies of the interview recordings are housed at the Othmer Library, Chemical Heritage Foundation. The original version and research materials remain at the Darling Library, University of California, Los Angeles and at the Bancroft Library, University of California, Berkeley.

REFORMATTING:

Kim Phan, Program Intern, Oral History, Chemical Heritage Foundation. B.A. expected 2011, Anthropology, Cornell University.

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.

I, James Bardwell, do hereby give to the Regents of the University of California the series of interviews the UCLA Oral History Program recorded with me beginning on or about April 5, 2004, to be used for any research, educational, or other purpose that the University may deem appropriate. I give these as an unrestricted gift and I transfer to the Regents of the University of California all rights, including the copyright. I understand that I may still use the information in the recordings myself without seeking permission from the University.

I have read the UCLA Oral History Program Use Policy, which outlines the current and likely future uses of interviews donated to the Oral History Program's collection.

Unless otherwise specified below, I place no restrictions on access to and use of the interviews.

X James Bardwell
(Signature)

James Bardwell
(Typed Name)

Department of Biology, University of Michigan
4003 Natural Sciences, 830 No. University Drive
Ann Arbor, MI 48109-1048
(Address)

734.764.8028 jbardwell@umich.edu
(Phone Number) (E-mail Address)

X 4/5/03
(Date)

The Regents of the University of California hereby acknowledge this deed of gift

Janice L. Ruff
(Director, UCLA Oral History Program)

4/12/04
(Date)

This interview has been designated as **Free Access**.

One may view, quote from, cite, or reproduce the oral history with the permission of CHF.

Please note: Users citing this interview for purposes of publication are obliged under the terms of the Chemical Heritage Foundation Oral History Program to credit CHF using the format below:

James C.A. Bardwell, interview by William Van Benschoten at the University of Michigan, Ann Arbor, Ann Arbor, Michigan, 5-6 April 2004 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0626).



Chemical Heritage Foundation
Oral History Program
315 Chestnut Street
Philadelphia, Pennsylvania 19106



The Chemical Heritage Foundation (CHF) serves the community of the chemical and molecular sciences, and the wider public, by treasuring the past, educating the present, and inspiring the future. CHF maintains a world-class collection of materials that document the history and heritage of the chemical and molecular sciences, technologies, and industries; encourages research in CHF collections; and carries out a program of outreach and interpretation in order to advance an understanding of the role of the chemical and molecular sciences, technologies, and industries in shaping society.

JAMES C. A. BARDWELL

Born in Saskatoon, Saskatchewan, Canada

Education

1981 B.Sc., University of Saskatchewan
1987 Ph.D., University of Wisconsin, Madison

Professional Experience

1987-1989 National Cancer Institute, Frederick, Maryland
Fogarty Fellow

1989-1993 Harvard Medical School, Boston, Massachusetts
Helen Hay Whitney Fellow

1993-1995 University of Regensburg, Regensburg, Germany
Visiting Professor and Alexander von Humboldt Fellow,
Institute of Biophysics and Physical Biochemistry

1996-2001 University of Michigan, Ann Arbor, Ann Arbor, Michigan
Assistant Professor, Department of Biology
2001-2006 Associate Professor, Department of Molecular,
Cellular and Developmental Biology
2005-present Investigator, Howard Hughes Medical Institute
2006-present Professor, Department of Molecular, Cellular and
Developmental Biology University of Michigan

ABSTRACT

James C. A. Bardwell was born and raised in Saskatoon, Canada. He was influenced early on by his family and by his religion, and knew that he had the interest and drive to go into science. Bardwell entered the University of Saskatchewan and was introduced to research and laboratory work by Louis P. Visentin at the Canadian National Research Council, where he focused his work on recombinant DNA.

Bardwell's interest in the outdoors led him to take two trips between his undergraduate and graduate work to Papua, New Guinea and the Northwest Territories, Canada. He continued to travel throughout his graduate career at the University of Wisconsin, Madison and his postdoctorates at the National Cancer Institute and Harvard Medical School. While at Wisconsin, Bardwell worked in Elizabeth Craig's laboratory on heat-shock proteins, which remain an interest of his to this day. His postdoctoral work included research in genetics on protein disulfide isomerase. After his postdoctoral research and several publications, Bardwell travelled to Germany for a guest professorship, where he gained experience in running a small lab.

He left Germany for a position at the University of Michigan, where he has continued his research on protein folding, and where he has had to juggle between family and career—specifically the two-body problem. Bardwell's roles as principal investigator and as an associate chair of his department have required him to take on many responsibilities, including administrative work and recruitment. These duties are in addition to his more “everyday” duties, which include publishing, grant writing, overall laboratory management, and his time at home. He begins to conclude the interview by reflecting on the wider scope of national scientific policy, public awareness of science, and scientific funding, and how these broader themes have influenced his own work and that of his peers. Drawing from his own experience with recruiting, his graduate work with Craig, and his interactions with his wife and peer Ursula Jakob, Bardwell also discussed in detail the state of women in science—in the United States, in Germany, and in his own lab. The interview ends with a discussion of the Pew Scholars Program in the Biomedical Sciences, which united Bardwell's love for travel and open discussions of scientific research.

UCLA INTERVIEW HISTORY

INTERVIEWER:

William Van Benschoten, Interviewer, UCLA Oral History Program; B.A., History, University of California, Riverside, 1990; M.A., History, University of California, Riverside, 1991; C.Phil., History, University of California, Los Angeles, 1995.

TIME AND SETTING OF INTERVIEW:

Place: Bardwell's office at the University of Michigan.

Dates of sessions: April 5, 2004; April 6, 2004.

Total number of recorded hours: 6.0

Persons present during interview: Bardwell and Van Benschoten.

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, Van Benschoten held a telephone preinterview conversation with Bardwell to obtain written background information (curriculum vitae, copies of published articles, etc.) and agree on an interviewing schedule. He also reviewed documentation in Bardwell's file at the Pew Scholars Program office in San Francisco, including Bardwell's proposal application, letters of recommendation, and reviews by Pew Scholars Program national advisory committee members.

ORIGINAL EDITING:

Carol Squires 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.

Bardwell reviewed the transcript. He verified proper names and deleted some material.

Carol Squires prepared the table of contents and TechniType Transcripts compiled the index.

TABLE OF CONTENTS

Early Years and Thoughts about Wife and Daughter	1
Growing up in Saskatoon, Saskatchewan, Canada. Family background. Sisters. Childhood interests and experiences. Parents. Meets his future wife. Wife's career. Daughter. Early schooling. Influential teacher. Extracurricular Activities. Religion.	
Undergraduate and Graduate Education and the National Cancer Institute	34
Decision to pursue science as a career. Attends the University of Saskatchewan. First laboratory experience working on recombinant DNA in Louis Visentin's laboratory at the Canadian National Research Council. Attends graduate school at the University of Wisconsin. Doctoral research on heat-shock proteins in Elizabeth Craig's laboratory. Postdoctoral fellowship in Donald Court's laboratory at the National Cancer Institute. Craig's management style.	
Harvard Medical School, the University of Regensburg, and Becoming Faculty	55
Postdoctoral fellowship in Jonathan Beckwith's laboratory at Harvard Medical School. Research in genetics on protein disulfide isomerase. Love of travel. Beckwith's management style. Guest professorship in Germany. Accepts a position at University of Michigan. Setting up his laboratory. Tenure at University of Michigan. Current research in protein folding studying heat shock proteins and proteins that catalyzing disulfide bond formation. Balancing family and career. Clinical applications of research. Funding history. Creativity in science.	
Laboratory Life and Management	83
Role in the lab. Administrative duties. Prominence of German students in his Laboratory. Teaching responsibilities. Travel commitments. Duties to professional community. Process of writing journal articles. Grant-writing process. Laboratory management style. Patents. National scientific agenda. Role of the scientist in educating the public about science. Gender. Women in science in Germany. More on balancing family and career. Competition and collaboration. Science in Germany. Pew Scholars Program in the Biomedical Sciences.	
Index	117

INDEX

A

Africa, 26, 30, 54, 63, 110
African Americans, 106, 109, 110, 111
Alexander von Humboldt Fellowship, 64
Amalfi, Italy, 80
Angola, 102
Anthonsen, Thorlief, 59
Appin, Ontario, Canada, 4, 5, 6, 9

B

Bader, Martin, 68, 96, 113
Bahamas, 10
Banff, Alberta, Canada, 47
Bardwell, Alfred Henry (paternal grandfather), 1, 4
Bardwell, Alina Rebecca (daughter), 26, 39, 97, 108
Bardwell, Jennifer (sister), 6, 19, 32
Bardwell, John A. E. (father), 9, 18, 20, 36, 78
Bardwell, Millicent (mother), 2, 4, 20, 29, 36, 44, 84, 86
Bardwell, Vivian (sister), 6, 19, 32
Basel, Switzerland, 70
Beckwith, Jonathan, 30, 47, 48, 53, 55, 58, 60, 62, 63, 64, 65, 68, 69, 80, 95, 96, 101, 113, 114
Belgium, 89, 114
Berman, Mike, 51
beta galactosidase, 58
Bietenholtz, Michael, 15, 32
Blattner, Fred, 58, 60, 98
Boquet, Paul, 60
Boston, Massachusetts, 21, 22, 25, 26, 31, 49, 52, 53, 55, 63, 64
Boy Scouts of Canada, 6, 7, 27
Boyd, Dana, 62
Brazeau River, 47
Brown, Wesley, 11
Brunskill School, 27
Buchner, Johannes, 21, 67, 75

Bush, President George W., 101

C

California, 10
Canada, 3, 4, 7, 13, 25, 28, 42, 46
Caribbean Sea, 106
Chang, Amy, 107
Chatham, Ontario, Canada, 5
Chicago, Illinois, 82
Cockrem, Michael, 10
Cold Spring Harbor Laboratory, 49, 51, 52
collaboration, 91, 113
Collet, Jean-Francois, 38, 113, 114
competition, 48, 111, 112, 113, 115
Cornell University, 49
Costa Rica, 10, 11, 25, 26
Court, Donald L., 52
Craig, Elizabeth, 49, 50, 51, 52, 53, 55, 56, 57, 62, 69, 95, 106
Creighton, Tom E., 60
Cribb, Alistair, 7
Curry, Juanita Eliza (maternal grandmother), 3

D

Denmark, 80
Derman, Alan, 59
Detroit, Michigan, 4
Dick, Mr., 27
disulfide bond formation, 25, 59, 65, 68, 75
disulfide bond formation protein A, 25, 59, 60, 64, 68, 77, 80, 81
DNA, 36, 42, 52
DnaK, 51
Drosophila, 50
DsbA. *See* disulfide bond formation protein A
A
DsbD, 81

E

E. coli, 50, 51, 52, 58, 59, 65, 79

Eagle Hills, 15
Ecuador, 10, 26, 57
Eddie, Christena (paternal grandmother), 4,
5
England, 9, 17, 20
Enquist, Lyn, 51
ethnicity, 110, 111
Europe, 38

F

FDA. *See* U.S. Food and Drug
Administration
Federation of American Societies for
Experimental Biology, 21
Florida, 48
Fort Detrick, Maryland, 53
France, 80
Frederick, Maryland, 54

G

Genentech Inc., 80, 93
Georgiou, George, 80, 113, 114
Germany, 2, 21, 25, 26, 56, 63, 64, 66, 67,
68, 69, 70, 75, 91, 98, 99, 108, 112, 114
Gleiter, Stefan, 114
Glockshuber, Rudy, 64, 67
Grand Cayman, 48
grants/funding, 44, 45, 56, 65, 66, 68, 70,
74, 75, 81, 82, 83, 85, 89, 90, 93, 95, 99,
102, 104, 109, 112, 113
Grauschopf, Ulla, 68
Great Britain, 3, 10
Great Depression, 3
GroEL, 51
Gross, Carol, 51, 106
Grunberg-Monago, Marianne, 54

H

Hanshelwood, Sir Cyril, 9
Harvard Medical School, 47
Harvard University, 21, 23, 30, 31, 49, 50,
58, 72, 88, 99, 114
Hawaii, 114
Hays, Sidney, 48

heat-shock proteins, 50, 51, 66, 76, 77
Heidelberg, Germany, 60
Hiniker, Annie, 105, 114
Hong Kong, 63
Horowitz, Arthur, 71
Houston, Don, 7, 27, 44
Hsp90, 51, 52
Human Genome Project, 101

I

Iceland, 30, 31
Icelandic Mountain Rescue Corps, 31
Imperial Cancer Research Fund, 20
India, 13
Indonesia, 47, 72
Institut für Biophysik and Physikalische
Biochemie, Regensburg University, 64

J

Jackfish Lake, 3, 6, 15
Jaenicke, Roni, 64, 65, 66, 67, 68, 69
Jakob, Adolf (father-in-law), 37
Jakob, Ursula (wife), 18, 20, 25, 39, 63, 64,
65, 66, 67, 68, 70, 72, 75, 77, 81, 82, 94,
96, 98, 99, 105, 107
Jander, George, 47, 60
Jasper National Park, 47
Johnson, Kit, 30
Jones, Jonathan, 110

K

Kachetorian, George, 45, 48
Keflavik, Iceland, 30
Kenya, 48, 54, 55, 109
Kincaid, Mr., 27
Kleinjans, Aaron, 114
Korber, Philipp, 68
Kreutzin, Dr., 36, 86
Kuriyan, John, 60

L

Lake Bogoria, 55
Laos, 47, 72
Latinos, 109, 111

Loire River, 80
London School of Economics, 19
London, England, 20
London, Ontario, Canada, 5, 9

M

Madagascar, 60, 61
Maddock, Janine, 103, 107
Madison, Wisconsin, 20, 46, 57, 58, 59, 70, 71
Maniatis, Thomas, 53
Manseau, Lynn, 49
Martin, Jenny L., 25, 60, 68
Marx, Karl, 37
Maryland, 114
McGovern, Karen, 58
Mexico, 22, 48
Minneapolis, Minnesota, 19
Montana, 55
Morgan, James (maternal grandfather), 2
Mother Jones, 53
Mount Albert Edward, 46

N

National Academy of Sciences, 38, 49, 52, 74, 106
National Cancer Institute, 54
 Frederick Cancer Research Facility, 54
National Institutes of Health, 44, 53, 74, 81, 82, 89, 99, 100, 103, 112
National Research Council, 20, 42, 64
Neisseria, 45
Nepal, 72
New England Greenpeace, 22
New York City, New York, 26, 37
New York Times, 37, 38, 57
New Zealand, 113
Newsweek, 53
NIH. *See* National Institutes of Health
Nobel Prize, 101
North Battleford, Saskatchewan, Canada, 15
North Dakota, 1
Northwest Territories, Canada, 8, 47
Novagen, 80
NRC. *See* National Research Council

Nutana Collegiate School, 28, 29

O

O'Neil, Edward, 115
Oklahoma, 113
Olsen, Laura, 107, 108
Ottawa, Ontario, Canada, 20, 42, 45
Outer Banks, North Carolina, 48
Oxford, England, 9

P

Pacific Ocean, 46
Papua, New Guinea, 7, 46, 47
Pardoe, Brian, 7
Parish, Christy, 82, 108, 114
Pascoe, Frank, 6
patents, 80, 99, 100
Pew Scholars Program in the Biomedical Sciences, 10, 11, 26, 57, 81, 89, 92, 102, 114, 115
Pfizer Inc., 104
Pharmacia and Upjohn Company, 104
Philadelphia, Pennsylvania, 114
PIBS. *See* Program in the Biomedical Sciences
Program in the Biomedical Sciences, 87, 88, 91, 108, 109
Ptashne, Mark, 49
publish/publication, 36, 56, 63, 68, 72, 74, 75, 94, 96, 100, 112, 113

R

Ramsay Fellow, 9
Reagan, President Ronald W., 53
Regeimbal, Jimmy, 114
Regensburg University, 108
religion, 33, 34, 35, 36, 38, 39, 40, 83
 Christianity, 33, 34, 37
 (Roman) Catholic, 39
 Crusades, 33
 Holy Bible, 33, 34, 40
 New Testament, 34
 New Testament Apocrypha, 33, 34
 Presbyterian, 33

the Christ
Jesus, 33, 34
Rifkin, Jeremy, 102
Rimel, Rebecca, 102
Rocky Mountain National Lab, 55
Rocky Mountains, 27, 47
Royal Academy of Ballet, 19
Russia, 109
Rwanda, 33

S

Saint Johns, Elizabeth, 22
Salk Institute, 92
San Francisco, California, 21
Saper, Mark A., 113
Saskatchewan, Canada, 1, 2, 7, 33, 44, 49
Saskatoon, Saskatchewan, Canada, 1, 2, 9,
15, 16
Saxtons River, Vermont, 21
Seattle, Washington, 48
Sidmouth, England, 17
Silhavy, Tom, 51, 53
Singapore, 114
Slater, Michael, 49
Smith, Daniel, 91
South Africa, 63
South America, 10, 30, 40
Spinks, John W.T., 13
St. Paul, Minnesota, 19
Stanford University, 49, 50, 87, 88
Stevens, Elizabeth, 22
Sulawesi, 72
Sultanate of Oman, 63
synchrotron, 82

T

Taiwan, 63
Tan, Jaqueline, 37, 105, 114
tenure, 48, 67, 71, 73, 74, 75, 113
Thailand, 47, 63
thioredoxin, 59, 60, 80
Tilly, Kit, 48, 52
tissue plasminogen activator, 79
Tok Pisin, 46
Tufts University, 70

Tunisia, 26, 110

U

U.S. Congress, 101
U.S. Food and Drug Administration, 79, 84,
105
U.S. Supreme Court, 39
Ulaby, Fawwaz T., 106
United States of America, 38, 40, 48, 52,
102, 104, 110
University of California, Berkeley, 49
University of California, Irvine, 48
University of California, Los Angeles, 70
University of California, San Francisco, 72,
88
University of California, Santa Barbara, 64
University of Connecticut, Farmington, 70
University of Michigan, 48, 69, 70, 75, 82,
88
University of Saskatchewan, 13, 41, 44
University of Wisconsin, 20, 48, 49, 70
Utah, 48, 63, 85

V

Victoria, British Columbia, Canada, 63
Visentin, Louis P., 42, 45

W

Walsh, Christopher A., 21
Washington, D.C., 53, 54, 57
Wickens, Marvin, 20
Wilson, Gisela, 107
Winther, Jakob, 68, 80
World War I, 2, 3
World War II, 3, 46

Y

Yale University, 71

Z

Zaire, 102
Zander, Thomas, 68