

CHEMICAL HERITAGE FOUNDATION

MARION C. THURNAUER

Transcript of an Interview
Conducted by

Hilary L. Domush

at

Boulder, Colorado

on

7 and 8 April 2010

(With Subsequent Corrections and Additions)

CHEMICAL HERITAGE FOUNDATION
Oral History Program
FINAL RELEASE FORM

This document contains my understanding and agreement with the Chemical Heritage Foundation with respect to my participation in the audio- and/or video-recorded interview conducted by Hilary Domush on 7 and 8 April 2010. I have read the transcript supplied by the Chemical Heritage Foundation.

1. The recordings, transcripts, photographs, research materials, and memorabilia (collectively called the "Work") will be maintained by the Chemical Heritage Foundation and made available in accordance with general policies for research and other scholarly purposes.
2. I hereby grant, assign, and transfer to the Chemical Heritage Foundation all right, title, and interest in the Work, including the literary rights and the copyright, except that I shall retain the right to copy, use, and publish the Work in part or in full until my death.
3. The manuscript may be read and the recording(s) heard/viewed by scholars approved by the Chemical Heritage Foundation subject to the restrictions listed below. The scholar pledges not to quote from, cite, or reproduce by any means this material except with the written permission of the Chemical Heritage Foundation. Regardless of the restrictions placed on the transcript of the interview, the Chemical Heritage Foundation retains the rights to all materials generated about my oral history interview, including the title page, abstract, table of contents, chronology, index, et cetera (collectively called the "Front Matter and Index"), all of which will be made available on the Chemical Heritage Foundation's website. Should the Chemical Heritage Foundation wish to post to the internet the content of the oral history interview, that is, direct quotations, audio clips, video clips, or other material from the oral history recordings or the transcription of the recordings, the Chemical heritage Foundation will be bound by the restrictions for use placed on the Work as detailed below.
4. I wish to place the conditions that I have checked below upon the use of this interview. I understand that the Chemical Heritage Foundation will enforce my wishes until the time of my death, when any restrictions will be removed.

Please check one:

a. _____

No restrictions for access.

NOTE: Users citing this interview for purposes of publication are obliged under the terms of the Chemical Heritage Foundation Oral History Program to obtain permission from Chemical Heritage Foundation, Philadelphia, Pennsylvania.

b. X _____

Semi-restricted access. (May view the Work. My permission required to quote, cite, or reproduce.)

c. _____

Restricted access. (My permission required to view the Work, quote, cite, or reproduce.)

This constitutes my entire and complete understanding.

(Signature) Marion C. Thurnauer
Marion C. Thurnauer

(Date) 12/21/2010

This interview has been designated as **Semi Restricted Access**.

One may view the oral history.
However, the permission of the interviewee is required to quote from, cite,
or reproduce the oral history.

Please contact CHF to request permission.



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.

MARION C. THURNAUER

1945 Born in Chattanooga, Tennessee, on 21 March

Education

1968 B.A., Chemistry, University of Chicago
1969 M.S., Chemistry, University of Chicago
1974 Ph.D., Chemistry, University of Chicago

Professional Experience

Argonne National Laboratory, Argonne, Illinois

1974-1977 Postdoctorate, Chemistry Division, under J.J. Katz and J. R. Norris

1977-1981 Assistant Chemist, Chemistry Division

1981-1991 Chemist, Chemistry Division, Argonne National Laboratory

1991-2004 Senior Chemist, Chemistry Division

1995-2003 Division Director, Chemistry Division

2003 Argonne Distinguished Fellow, Chemistry Division

2006-present Argonne Distinguished Fellow, Emeritus, Chemical Sciences and Engineering Division

Honors

1984 NATO Grant for International Collaborative Research with Professor K. Mobius and Dr. R. Furrer, Freie Universität Berlin, Berlin, West Germany

1989 Argonne National Laboratory Pacesetter Award for Outstanding Contribution to the Organization of the Conference, "Science Careers in Search of Women"

1990 ANL Director's Award for Extraordinary Effort involved in Organizing "Science Careers in Search of Women" Conference

1990 Award of Merit of Chicago Association of Technological Societies

1991 University of Chicago Award for Distinguished Performance at Argonne

1996 YWCA Outstanding Women Leaders of DuPage County Award

1997 Fellow of the American Association for the Advancement of Science

1997 Agnes Fay Morgan Research Award by Iota Sigma Pi, National Honor Society for Women in Chemistry

2002 Francis P. Garvan-John M. Olin Medal Award, National American Chemical Society

2007 Science Careers in Search of Women Conference, Founders Award
2007 University of Chicago-Argonne Pinnacle of Education Award
2010 Council for Chemical Research Diversity Award

ABSTRACT

Marion C. Thurnauer was born in Chattanooga, Tennessee and moved with her family to Minnesota when she was still young. Her father, a ceramic engineer, introduced her to rocks and minerals and encouraged her to follow her curiosity. Her maternal aunt, an astrophysicist, inspired her to look up at the stars and planets. Thurnauer credits her mother, who died when Marion was only fourteen, with supporting her interests in all things natural. Thurnauer attended the University of Chicago for her undergraduate and graduate degrees in chemistry, working with Gerhard Closs, her doctoral thesis advisor. She completed the final experiments for her thesis at Argonne National Laboratory (ANL) because the required electron paramagnetic resonance (EPR) spectrometer at the University of Chicago was severely damaged by a chemical explosion that occurred in the University's chemistry building. Working at ANL, she believes, was probably a factor for her to secure a postdoctoral position in the ANL Chemistry Division (CHM) with James R. Norris and Joseph J. Katz, studying, primarily by EPR spectroscopy, photochemical energy conversion in natural photosynthesis. She was promoted to Assistant Chemist, a staff position, and was, for a few years, the only female staff scientist in CHM and rose to become the first woman CHM Director. Along the way she established "Science Careers in Search of Women," a conference currently held annually for high school students. The second conference led to discussions between ANL leadership and a grass-roots group of female scientists. The outcome of these meetings was the formulation and launching of the ANL Women in Science and Technology (WIST) program. Thurnauer served a term (two years, 30% effort) as the WIST Program Initiator and for several years as a member of the WIST Steering Committee. When WIST was first established she believed that by now (more than twenty years later) WIST would have put itself out of business; but each generation has been faced with variations of the same issues of underrepresentation, promotion, bias, et cetera. According to Thurnauer, under sponsorship of the ANL Director's office, WIST continues to hold outreach activities and works to recruit, retain, and promote women at ANL in an effort to ensure equity for all staff and to diversify and strengthen the scientific workforce.

As division director, Thurnauer once again was the only woman among her peers, i.e., division directors and ANL leadership. She had to choose frequently among competing goals and priorities and she had to maintain CHM's shrinking core funding while working with scientists to secure additional funding. The latter was a new challenge, as historically CHM's budget was based primarily on core funding; and going after 'outside funding' not only involved writing proposals but also finding the 'DOE-Lab appropriate' funding sources. She analogizes the situation to her brief experience with skydiving. During her tenure as director, CHM was involved with the ANL Materials Science Division (MSD) both at the new Advanced Photon Source and with efforts to secure funding for ANL's Center for Nanoscale Materials (CNM). Thurnauer felt that she was often defending chemistry (and CHM) with respect to materials science (and MSD). She worked to ensure that the initial proposals for the CNM included chemical sciences, in addition to materials sciences, in order to foster scientific excellence at the CNM. Nevertheless, in addition to all her administrative work, Thurnauer was able to continue to be involved with science mainly because her co-workers kept her informed and up to date on their results.

As she reminisces, Thurnauer discusses the general state of women in science, but particularly at ANL. She stresses the importance of mentoring, reinforcing, and building networks for women; she talks about having her husband in her division; she explains e-

mentoring and recommends it; and she names and describes the work of some of the women who have served as her role models. At the end of the interview, Thurnauer discusses how she finds some satisfaction with the increase in the number of women in the sciences while at the same time warning about reality versus mere perception, also noting the visible differences in same gender versus mixed gender interactions. Thurnauer concludes with the reminder that there is “joy [in] doing science,” and that keeps women ‘going,’ in spite of issues that are extraneous to science.

INTERVIEWER

Hilary Domush completed a B.S. in chemistry at Bates College before earning an M.S. in organic chemistry and an M.A. in the history of science at the University of Wisconsin. As a graduate student, her research focused on 19th-century chemistry in Edinburgh. As program associate for the oral history program, Domush helps manage the program and conducts oral histories for the Women in Chemistry project.

TABLE OF CONTENTS

Early Years	1
<p>Grows up in Tennessee and Minnesota, one of three children. Mother's early death. Father's and aunt's influence. Emphasis on curiosity. Does well in school. Love for rocks and minerals. Anecdote about Thomas Cech.</p>	
First Job at Argonne National Laboratory (ANL)	11
<p>For several years, only female staff scientist in chemistry division. Men's reactions to her. Establishes Career Conference, "Science Careers in Search of Women," initially for college students and now held annually for high school students. Conference leads to formulation and launch, with ANL leadership, of Women in Science and Technology (WIST). WIST meant to continue outreach and to recruit, retain, and promote women's careers. Surgery for breast cancer. Becomes WIST Program Initiator. Janet Osteryoung, Mildred Dresselhaus, Jean'ne Shreeve, Virginia Valian as role models. Diversity Award from Council for Chemical Research.</p>	
College, Graduate School, and Postdoctoral Years	30
<p>University of Chicago for bachelor's, master's, and doctoral degrees in chemistry. University's rigorous reputation. Decision to pursue chemistry. Thesis research employed electron paramagnetic resonance spectroscopy. Few female chemistry students at Chicago, e.g. Jeannette Manello and Barbara Warren. Took postdoc with James Norris at ANL studying natural photosynthesis.</p>	
From Senior Chemist to Division Director	38
<p>Continues to be involved with WIST. Evolution of understanding experiences of women in science: from outright discrimination against women to subtle biases. Return of same issues every generation. Becomes scientific Group Leader, then Division Director of Chemistry Division. Dealing with other Division Directors. Occasional dichotomy between duty to women and duty to ANL. Continuing lab work with colleagues such as Tijana Rajh, visiting chemist from Yugoslavia. Challenges maintaining division's budget within DOE's funding structures; analogy to skydiving. Using science to solve real-world problems, especially cleanup and storage of nuclear waste. Materials Sciences Division. Advanced Photon Source. Center for Nanoscale Materials.</p>	
Looking Back	55
<p>Collaborations. Other women group leaders and division directors. Structural changes at ANL. Students of today versus students of twenty years ago. Importance of mentoring, building networks. Example of Lisa Utschig, first named postdoc award, Fermi Scholar. Having husband in her division. E-mentoring. Increase in number of women in sciences. Differences between same gender and mixed gender interactions.</p>	
Index	73

INDEX

A

AAUW. *See* American Association of University Women
ACS. *See* American Chemical Society
Advanced Photon Source, 46, 64
American Association of University Women, 3, 4, 15, 16, 17, 19, 20, 54, 55, 65, 67
American Chemical Society, 15, 62
 Women Chemists Committee, 55, 62
American Physical Society, 22, 64, 70
APS. *See* Advanced Photon Source
Argonne National Laboratory, 2, 4, 6, 7, 8, 9, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 27, 30, 31, 32, 36, 38, 42, 45, 46, 50, 51, 52, 53, 54, 57, 58, 60, 61, 64, 65, 66, 67, 68
 Career Conference, 7, 14, 34, 35, 36, 54, 55, 69
 Center for Nanoscale Materials, 46, 52, 53, 64
 Materials Science Division, 46, 52, 53
Argonne News, 65
Asbury, Joseph G., 11, 12, 13, 65
Association of Women in Science, 7, 18, 66
AWIS. *See* Association of Women in Science

B

Bates College, 24, 25
Bell Laboratories, 15
Berkeley, California, 62
Bhattacharyya, Maryka, 21
Boulder, Colorado, 1, 2, 4, 52
Breast Cancer Network of Strength, 48
Brookhaven National Laboratory, 21, 22, 51
Bryn Mawr College, 24, 25

C

California, 24
CCR. *See* Council for Chemical Research
Cech, Thomas R., 2

Chemical & Engineering News, 10, 31, 61, 63
Chemical Heritage Foundation, 55
 High School Girls in Chemistry Day, 56
Chicago, Illinois, 3, 15, 39, 57
Cleveland State University, 62
Cleveland, Ohio, 62
Clinton, Secretary Hillary Rodham, 26
Closs, Gerhard, 30, 31
collaborations, 44, 47, 48, 49, 50, 52, 53, 54
Colorado, 52
Colorado Springs, Colorado, 28
Columbia University, 25
Council for Chemical Research, 6, 8, 10, 15, 59
cryostat, 29, 30, 31, 32

D

DEP. *See* Division of Educational Programs
Division of Educational Programs, 6, 9, 14, 36, 64
DNA, 54
DOE. *See* U.S. Department of Energy
Dow Chemical Company, 28
Dresselhaus, Mildred S., 15, 16, 20, 21, 38, 59, 69

E

electron paramagnetic resonance, 29, 30, 31, 32
electron-nuclear double resonance spectrometer, 32
Environment Management Science Program, 44
EPR. *See* electron paramagnetic resonance

F

Facebook, 28, 29, 62
Fermi Scholar, 58
Fermilab, 22
Fitch, Alanah, 39
Florida, 29

- G**
- Germany, 44
- H**
- Hanford Site, 44
Hanson, Deborah K., 11
Harvard University, 66, 67, 72
helitran, 30
helium, 29, 30, 32
Herzberg, Luise (aunt), 2
Herzberg, Paul (cousin), 2
Hopkins, Nancy, 16
Howard Hughes Medical Institute, 2
- I**
- Illinois, 1
International Year of Chemistry, 27
Iowa State University, 26
- J**
- Jacobs Engineering Group, 23
Journal of the American Physical Society, 15
- K**
- Katz, Joseph, 23
- L**
- Las Vegas, Nevada, 29
Lawrence Berkeley National Laboratory, 23, 51
Lawrence Livermore National Laboratory, 21, 57
Los Alamos National Laboratory, 21, 22, 51
Loyola University, 39
- M**
- Madison, Wisconsin, 10, 21, 24, 25, 26
Maine, 24
Manello, Jeannette S., 28
Maria Goeppert Mayer Distinguished Scholar, 52
Marrett, Cora B., 21
- Massachusetts Institute of Technology, 15, 16
Massey, Walter, 70
McGrayne, Sharon Bertsch, 4
MD Anderson Cancer Center, 64
Mentornet, 61, 63
Meshkov, Natasha, 11, 12
Mičić, Olga, 42, 52
Minneapolis, Minnesota, 4
MIT. *See* Massachusetts Institute of Technology
Myron, Harold, 6, 11
- N**
- nanoscience, 42, 46, 51, 52, 53, 54
National Renewable Energy Lab, 52
National Research Council, 71
National Science Foundation, 4, 7, 8, 42, 43, 47, 51, 65
Nellis Air Force Base, 29
Ng, Lilly, 62
Nobel Prize, 2
Nobel Prize Women in Science, 4
Norris, James R., 32, 50
Northwestern University, 48, 50, 57, 67
Nozik, Arthur J., 52
NSF. *See* National Science Foundation
- O**
- Oak Ridge National Laboratory, 22, 37, 51
Osteryoung, Janet G., 16
- P**
- Pennsylvania, 8
Philadelphia, Pennsylvania, 56
photochemistry, 27, 45
photosynthesis, 27, 32, 45, 50, 58
- R**
- Radcliffe College, 24
Rajh, Tijana, 42, 52, 53, 54, 57, 65, 70, 71
Richland Center, Wisconsin, 25
Rolison, Debra, 18

S

Sandia National Laboratory, 51
Schiffer, Marianne, 15
Schriesheim, Alan, 9
Science Careers in Search of Women
Conference, 13
Shreeve, Jean'ne M., 21
Snyder, Seth, 39, 53
Solar Energy Research Institute, 52
Spring Green, Wisconsin, 25
Stock, Leon, 50

T

Tennessee, 2
tenure, 6, 23, 46, 58, 65, 66
titanium dioxide, 42, 54
Trifunac, Alexander D. (husband), 6, 12

U

U.S. Air Force Academy, 28
U.S. Atomic Energy Commission, 42
U.S. Congress, 7, 20, 44, 46
U.S. Department of Defense, 48, 49
Breast Cancer Research Program, 48
U.S. Department of Energy, 13, 15, 21, 42,
43, 44, 45, 46, 47, 49, 51, 53, 54, 58, 69
Basic Energy Sciences, 43, 46, 47
U.S. Energy Research and Development
Administration, 42
UChicago Argonne, LLC, 23
Union Carbide Corporation, 28
United States of America, 7
University of California, Berkeley, 16, 23
University of Chicago, 2, 15, 18, 19, 23, 24,
25, 32, 44, 50, 57

University of Idaho, 21
University of San Francisco, 62
University of Wisconsin, 10, 21, 24, 25
Utschig, Lisa M., 57, 58, 70

V

Valian, Virginia, 16, 18, 68

W

Wall Street Journal, 51
Warren, Barbara, 28, 31
Washington, D.C., 3, 4, 16, 53, 54, 62
Wasielewski, Michael R., 50
Wellesley College, 6
West Virginia, 28, 29
Widnall, Sheila E., 16
WIS. *See* Women in Science
Wisconsin, 25
WIST. *See* Women in Science and
Technology
Women in Science, 3, 4, 7, 11, 13, 14, 15,
16, 20, 21, 36, 69
Program Initiator, 14, 21, 22, 35, 36, 60,
64, 69, 71
Women in Science and Technology, 14, 15,
16, 23, 34, 35, 36, 37, 54, 55, 57, 60, 69
Women in the Chemical Workforce, 16, 20

Y

Y-ME, 48
Young, Hoylande D., 50
Yugoslavia, 42, 52

Z

Zare, Richard N., 10, 12, 15, 17, 18, 66