

CHEMICAL HERITAGE FOUNDATION

DONALD S. NOYCE

Transcript of an Interview
Conducted by

Leon Gortler

at

University of California at Berkeley

on

22 January 1981

(With Subsequent Corrections and Additions)

CHEMICAL HERITAGE FOUNDATION
Oral History Program
FINAL RELEASE FORM

This document contains my understanding and agreement with Chemical Heritage Foundation with respect to my participation in a tape-recorded interview conducted by Leon Gortler on January 22, 1981.

I have read the transcript supplied by Chemical Heritage Foundation.

1. The tapes, corrected transcript, photographs, and memorabilia (collectively called the "Work") will be maintained by 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 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, and that the interviewer shall retain the right to use the Work without the permission of Chemical Heritage Foundation.
3. The manuscript may be read and the tape(s) heard by scholars approved by 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 Chemical Heritage Foundation.
4. I wish to place the conditions that I have checked below upon the use of this interview. I understand that 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, PA.

b. _____

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) _____

Donald S. Noyce
Donald S. Noyce

(Date) _____

April 9, 2001

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:

Donald S. Noyce, interview by Leon Gortler at University of California, Berkeley, CA, 22 January 1981 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0297).



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.

DONALD S. NOYCE

1923 Born in Burlington, Iowa on 26 May

Education

1944 A.B., chemistry, Grinnell College
1945 M.A., Columbia University
1947 Ph.D., organic chemistry, Columbia University

Professional Experience

1946 National Institutes of Health Fellow, Columbia University

University of California, Berkeley

1948-1950 Instructor
1950-1955 Assistant Professor
1952-1960 Assistant Dean for Undergraduate Affairs, College of Chemistry
1955-1960 Associate Professor
1960-1986 Professor
1974-1981 Assistant Dean for Undergraduate Affairs, College of Chemistry
1981-1986 Associate Dean for Undergraduate Affairs, College of Chemistry

Honors and Awards

1957 Guggenheim Fellowship (Europe)
1964 National Science Foundation Senior Fellow
1986 Berkeley Citation, University of California, Berkeley
1987 Establishment of the annual Donald Sterling Noyce Prize, University of California, Berkeley

ABSTRACT

Donald Noyce begins the interview with a discussion of his childhood home in Iowa. He discusses his family and their strong academic tradition, his years at Grinnell College, and his early training as a chemist. He also details his graduate training at Columbia University, including his work with Bill [William von Eggers] Doering, his courses, research, and the University's atmosphere. Next, he discusses his position at the University of California at Berkeley. He describes the faculty, the chemistry administration, and the changing atmosphere with respect to organic chemistry. He describes briefly his interaction with other faculty, his research, and his graduate students. Finally, he discusses the development of physical organic chemistry from the turn of the century to 1980.

INTERVIEWER

Leon Gortler is Professor of Chemistry at Brooklyn College of the City University of New York. He holds A.B. and M.S. degrees from the University of Chicago and a Ph.D. from Harvard University where he worked with Paul Bartlett. From 1961 to 1962 he worked as a postdoctoral fellow for Donald Noyce at the University of California. Professor Gortler has long been interested in the history of chemistry, in particular the development of physical organic chemistry. He has conducted over fifty oral and videotaped interviews with major American chemists.

TABLE OF CONTENTS

- 1 **Childhood and Education**
Brief discussion of family history. Attending college. Campus life during World War II. Chemistry faculty and graduates. Graduate applications to Illinois and Columbia. The Roberts Fellowship at Columbia.
- 7 **Graduate Research at Columbia University**
War research at Columbia. Thermo with V. K. LaMer. Natural products with Pop [John M.] Nelson. Organic lab with William von Eggers Doering. Alkaloids with Elderfield. Doering as a person and teacher. Choosing a research director. Postdoctoral work. Ruth Alice Weill and the Katonah Laboratory. Apocryphal tale of promotion meeting. Hammett course in 1945.
- 15 **University of California at Berkeley**
Being hired at Berkeley. Facilities and faculty. Influence of G. N. Lewis on the department. Influence of Wendell Latimer after Lewis' retirement. Changes in the role of organic chemistry. Lack of "political" orientation of Berkeley faculty. Bill Dauben. Melvin Calvin's teaching. Long term project on acid catalyzed reactions. Hiring Andrew Streitwieser at Berkeley.
- 20 **The Growth and Development of Chemistry**
Transition in organic chemistry. The development of physical organic chemistry. Changes at Berkeley. Effect of World War II. Physical organic chemistry today [1981]. Aborted beginning to physical organic chemistry circa 1900.
- 29 **Addendum — Note written by Donald S. Noyce in July 2000.**
- 30 **Notes**
- 32 **Index**

NOTES

1. Reynold C. Fuson and H. R. Snyder, *Organic Chemistry* (New York: John Wiley and Sons, Inc., 1948).
2. Louis P. Hammett, *Physical Organic Chemistry* (New York: McGraw-Hill Book Co., 1940).

J. W. Mellor, *A Comprehensive Treatise on Inorganic and Theoretical Chemistry*, 16 volumes (London; New York: Longmans, Green and Co., 1922-1937).
3. Andrew Streitwieser, interview by Leon Gortler at Latimer Hall, University of California, 22 January 1981 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript #0007).
4. Robert Burns Woodward and William von Eggers Doering, "The Total Synthesis of Quinine," *Journal of the American Chemical Society*, 66 (1944): 849.

Robert Burns Woodward and William von Eggers Doering, "The Total Synthesis of Quinine," *Journal of the American Chemical Society*, 67 (1945): 860-874.
5. Lyndon Small and Henry Rapoport, "Nuclear Substituted Morphine Derivatives," *Journal of Organic Chemistry*, 12 (1947) 284-292.
6. See Note 2.
7. D. S. Noyce, W. G. Dauben, and G. J. Fonken, "The Stereochemistry of Hydride Reductions," *Journal of the American Chemistry Society*, 78 (1956): 2579-2582.
8. Gerald E. K. Branch and Melvin Calvin, *The Theory of Organic Chemistry, an Advanced Course* (New York: Prentice-Hall, Inc., 1941).
9. J. Williard Gibbs, *Elementary Principles in Statistical Mechanics, Developed with Especial Reference to the Rational Foundation of Thermodynamics* (New York: Dover Publishers, 1960).
10. D. S. Noyce, "A Rearrangement of Camphenilone," *Journal of the American Chemistry Society*, 72 (1950): 924-925.
11. D. S. Noyce and J. W. Weldon, "2-(2-Hydroxyphenoxy)-benzoic Acid Lactone, a Simple Analogue of the Depsidones," *Journal of the American Chemistry Society*, 74 (1952): 401-403.
12. James B. Conant, revised with the assistance of Max Tishler, *The Chemistry of Organic Compounds; A Year's Course in Organic Chemistry* (New York: Macmillan, 1939).

13. Howard J. Lucas, *Organic Chemistry* (New York: American Book, 1935).
14. Louis Hammett, "Physical Organic Chemistry in Retrospect," *Journal of Chemical Education*, 43 (1966): 464-469
15. G. Wagner, *Journal of the Russian Physical Chemistry Society* 31 (1899): 690.
H. Meerwein, *Annales de chimie* 405 (1914): 129.
16. G. N. Lewis, *The Valence and Structure of Atoms and Molecules* (New York: Chemical Catalog Company, 1923).

INDEX

A

Ashner, Tom, 27
Aspergillus ustus, 10
Atlantic, Iowa, 1
Atomic Energy Commission [AEC], 23

B

Bartlett, Paul D., 8, 18, 21
Beringer, Marshall, 11-12, 22
Branch, Gerald E. K., 16, 18, 19-20, 24
Bunton, Clifford A., 21
Burlington, Iowa, 1

C

California Institute of Technology [Caltech], 6
Calvin, Melvin, 17, 19-20
Carbonium ion theory, 27
Carnegie Mellon University, 12
Cason, James, 16-18, 23-24
Celanese Corporation, 27
Chicago, University of, 4, 24
Clafflin, Betsy, 11
Columbia University, 6-10, 13-15, 27
 Havemeyer Hall, 7
 Nash Building, 7
Conant, James B., 24-25
Cope, Arthur C., 9
Cronyn, Marshall, 16
Curtin, David Y., 9, 14

D

Dauben, Jr., Hyp J., 18
Dauben, William (Bill), 16-19, 23-25
Dawson, Charles, 9
Decorah, Iowa, 1
Denney, Donald (Don), 22
DeWolfe, Robert Hill, 27
Doering, William von Eggers (Bill), 8-9, 11-15, 18, 21-22, 25, 27
 seminars of, 11
Dreyfus, Richard, 12

E

Elderfield, Robert C., 7-9, 13-14

F

Fieser, Louis, 18
Fuson, Reynold C., 4, 17

G

Grinnell College, 1, 3, 6
 laboratories, 5
Grinnell, Iowa, 1

H

Haines-Doering-Zeiss, Ruth, 11-12
Hammett, Louis Plack, 5, 10, 14-15, 20, 22, 25-26
Harvard University, 8, 15, 18, 24
Hildebrand, Joel, 18, 23-24

I

Illinois, University of, 4, 6
 teaching scholarship, 6
Ingold, Christopher, 21, 24, 26
Intel Corporation, 2
International Business Machines Corporation [IBM], 2

L

Lactone synthesis, 22
LaMer, V.K., 7
Lapworth, Arthur, 26
Latimer, Wendell, 17
Levy, Harold, 9
Levy, Lillian, 9, 12
Lewis, Gilbert Newton, 16-18
Linstead, Sir Reginald Patrick, 8
Lithium aluminum hydride, 22
Los Angeles, University of California at [UCLA], 15, 27
Lucas, Howard J., 25
Lydia C. Roberts Fellowship, 6

M

Manhattan Project, 7
Massachusetts Institute of Technology [MIT], 2, 10, 14
McEwen, William (Bill) E., 25
Meerwein, Hans, 26
Meerwein-Ponndorf-Verley Reduction, 28
Michael, Arthur, 12, 24
Morrison, Dwight, 9

N

National Institutes of Health [NIH], 13
Nature, 11
Nebraska, University of, 2
Nef, John U., 4
Nelson, John M. (Pop), 7
Noyce, Donald S.
 as high school chemistry teacher, 3
 brother [Gaylord Noyce], 1
 brother [Robert N. Noyce], 1
 brother [Ralph Noyce], 2
 classified 4-F, 4
 father [Ralph Noyce], 1
 mother [Harriet Noyce], 1

O

Oberlin College, 2
Oelke, Bill, 4
Officer's Candidate School [OCS], 3

P

Patterson, Claire, 6
Pauling, Linus, 24
Phi Beta Kappa, 5
Physical organic chemistry, 13, 16, 24-26
Pitzer, Kenneth, 15, 23
Porter, Charles W., 16
Prelog, Vladimir, 21

R

Rapoport, Henry, 16, 19, 23-25
Rhoads, Sarah Jane, 12
Roberts, John (Jack) D., 14, 21, 24-25
Robinson, Sir Robert, 8, 11, 26

S

Santa Barbara, University of California at, 27
Santa Clara, California, 2
Schoenewaldt, Erwin, 27
Scholastic Aptitude Test [SAT], 5
Schreiber, Kurt C., 12
Schrödinger equation, 24
Sherman, Leo P., 4
Smith, Kline, and French Company, 27

Snyder, H. R., 4
Stewart, Thomas Dale, 16
Streitwieser, Andrew (Andy), 8, 11, 19, 23-24
Swain, Gardiner, 25

T

Tuberculosis [TB], 10

U

United States Army Engineering Corps, 3
University College London, 24

W

Webster City, Iowa, 1
Weill, Ruth Alice, 11-12
Weldon, John, 22
Westheimer, Frank W., 21
Wheland, George, 24
Whitmore, Frank, 27
Winstein, Saul, 12, 21
Woodward, Robert Burns, 8
World Series [1946], 10
World War II, 3, 25

Y

Yale University, 1, 17-18
Young, William (Bill) G., 27