

CHEMICAL HERITAGE FOUNDATION

FRED BASOLO

Transcript of an Interview  
Conducted by

James J. Bohning

at

Northwestern University

on

1 March 1991

(With Subsequent Additions and Corrections)

THE CHEMICAL HERITAGE FOUNDATION  
Oral History Program

RELEASE FORM

This document contains my understanding and agreement with the Chemical Heritage Foundation with respect to my participation in a tape-recorded interview conducted by

James J. Bohning on 01 March 1991.

I have read the transcript supplied by the Chemical Heritage Foundation and returned it with my corrections and emendations.

1. The tapes and corrected transcript (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 tape(s) heard 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.
4. I wish to place the following 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.
  - a.  No restrictions for access.
  - b.  My permission required to quote, cite, or reproduce.
  - c.  My permission required for access to the entire document and all tapes.

This constitutes our entire and complete understanding.

(Signature)

J. Basolo

Fred Basolo

(Date)

06/10/94

(Revised 17 March 1993)

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:

Fred Basolo, interview by James J. Bohning at Northwestern University, Evanston, Illinois, 1 March 1991 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0091).



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.

## FRED BASOLO

1920 Born in Coello, Illinois on 11 February

### Education

1940 B.Ed., Southern Illinois University  
1942 M.S., inorganic chemistry, University of Illinois  
1943 Ph.D., inorganic chemistry, University of Illinois  
(Mentor: John C. Bailar, Jr.)

### Professional Experience

1943-1946 Research chemist, Rohm and Haas  
Northwestern University, chemistry department  
1946-1948 Instructor  
1948-1953 Assistant Professor  
1953-1959 Associate Professor  
1059-1980 Professor  
1969-1972 Chairman of the Department  
1980-1990 Charles E. and Emma H. Morrison Professor  
1990- Emeritus Morrison Professor

### Honors

1954-1955 Guggenheim Fellow (University of Copenhagen)  
1961-1962 Senior NSF Fellow (University of Rome)  
1964 Award for Research in Inorganic Chemistry, American  
Chemical Society  
1971 North Regional Section Citation of Excellence,  
American Chemical Society  
1972 John C. Bailar, Jr. Medal, University of Illinois  
(first recipient)  
1974 Alumni Achievement Award, Southern Illinois  
University  
1975 Award for Distinguished Service in Inorganic  
Chemistry, American Chemical Society  
1976 Francis Patrick Dwyer Medal, University of New South  
Wales, Australia  
1977 Fellow, American Association for the Advancement of  
Science  
1977 Honorary Member, Phi Lambda Upsilon  
1979 Fellow, Japanese Society for the Promotion of  
Science  
1979 Member, National Academy of Sciences  
1981 Honorary Member, Italian Chemical Society  
1981 James Flack Norris Award for Outstanding Achievement  
in the Teaching of Chemistry, American Chemical  
Society, Northeastern Section

1982 Illinois House of Representatives Resolution No. 686  
Honoring Fred Basolo as a Resident of Illinois

1983 President, American Chemical Society

1983 Oesper Memorial Award, American Chemical  
Society, Cincinnati Section

1983 Corresponding Member, Chemical Society of Peru

1983 Fellow, American Academy of Arts and Sciences

1985 Honorary Professor, Lanzhou University, People's  
Republic of China

1984 Doctor of Science (Honorary), University of  
Southern Illinois

1987 Foreign Member, Academia Nazionale dei Lincei  
(National Academy of Science), Italy

1988 Laurea Honoris Causa, University of Turin

1988 IX Century Medal, Bologna University

1988 Award for Research in Inorganic Chemistry, Società  
Chimica d'Italia

1988 Honorary Professor, Zhongshan University, People's  
Republic of China

1990 Harry and Carol Mosher Award, American Chemical  
Society, Santa Clara Valley Section

1991 Padova University Medal

1991 Distincion Bicentenario Medal, University of  
Los Andes in Merida

1991 Chinese Chemical Society Medal

1992 Chemical Pioneer Award, American Institute of  
Chemists

1992 Monie A. Ferst Award, Sigma Xi

1992 Humboldt Senior U.S. Scientist Award

1993 Gold Medal Award, American Institute of Chemists

## ABSTRACT

Fred Basolo begins this interview by discussing his childhood in Coello, Illinois, and his elementary and high school education. He attended Southern Illinois University where he studied to be a chemistry teacher but his instructors encouraged him to attend graduate school in chemistry. At University of Illinois, he studied inorganic chemistry with John Bailar. After receiving his Ph.D., he worked at Rohm and Haas in Philadelphia for three years. He decided to return to academia and accepted a position as professor of Chemistry at Northwestern University. His research interests have included kinetics and mechanisms, and metal carbonyls. Basolo describes the connections he made with Italian scientists and his American Chemical Society presidency and concludes by offering his opinion of how general and inorganic chemistry courses should be taught.

## INTERVIEWER

James J. Bohning, Assistant Director for Oral History at the Chemical Heritage Foundation, holds the B.S., M.S., and Ph.D. degrees in chemistry. He was a member of the chemistry faculty at Wilkes University from 1959 until 1990, where he served as chair of the Chemistry Department for sixteen years, and chair of the Earth and Environmental Sciences Department for three years. He was Chair of the Division of the History of Chemistry of the American Chemical Society in 1986, and has been associated with the development and management of the Foundations's oral history program since 1985.

## TABLE OF CONTENTS

- 1 Family Background  
Born in coal mining town, Coello, Illinois. Parents become U.S. citizens. Brother and sister. Affect of the Depression on family.
- 2 Early Education  
Elementary school. Influence of high school teacher on decision to go to college. Public Works Administration youth program provides college tuition. High school science and laboratory experiments.
- 3 Southern Illinois University  
Studies to be a high school teacher. Influence of professors. Chemistry courses, textbooks, and laboratory work. Fellow students.
- 7 University of Illinois  
Passes German and French exams. Chemistry instructors. Studies inorganic chemistry with John Bailar. Laboratory instruments. Early research and publications.
- 13 Rohm and Haas  
Impression of Philadelphia. Works on mica project and synthesis of zirconium compounds. Decides to return to academia.
- 16 Northwestern University  
Small number of graduate students in chemistry department. Colleagues. Gets first graduate student. Works on solution kinetics and mechanisms. Collaboration with Ralph Pearson. Disagreement with Christopher Ingold.
- 23 Guggenheim Fellowship in Copenhagen  
Introduced to crystal field theory. Attends international conference on coordination chemistry and meets Walter Hieber. Begins work with metal carbonyls. Collaborates with Arthur Adamson.
- 29 Return to Northwestern  
Inorganic chemistry graduate students. Makes connections with Italian scientists. Helps Luigi Sacconi publish papers in English journals. Reasons for not getting involved with photochemistry. Interaction among university departments. Return to carbonyl work.

- 41 American Chemical Society Presidency  
Proposes term limits for committee appointees.  
Insists on one national meeting. Wants to reduce  
number of committees. Academic/industrial  
interface. Represents ACS at Priestley anniversary.
- 48 Other Activities  
Involvement with Beckman Center funding. Opinion  
on how general and inorganic chemistry should be  
taught.
- 53 Notes
- 56 Index

## NOTES

1. James B. Conant, Chemistry of Organic Compounds (New York: Macmillan, 1933).
2. Frederick H. Getman and Farrington Daniels, Outlines of Physical Chemistry, 6th ed. (New York: John Wiley & Sons, Inc., 1937).
3. Maurice L. Dolt, Chemical French, 3rd. ed. (New York: Chemical Publishing Co., Inc., 1931).
4. Fred Basolo, John C. Bailar, Jr., and Betty Rapp Tarr, "The Stereochemistry of Complex Inorganic Compounds. X. The Stereoisomers of Dichlorobis-(ethylenediamine)-platinum (IV) Chloride," Journal of the American Chemical Society, 72 (1950): 2433-2438.
5. Louis P. Hammett, Physical Organic Chemistry (New York: McGraw-Hill Book Company, Inc., 1940).
6. Therald Moeller, Inorganic Chemistry (New York: John Wiley & Sons, Inc., 1952).
7. H. J. Emeléus and J. S. Anderson, Modern Aspects of Inorganic Chemistry, 1st. ed. (New York: D. Van Nostrand Company, Inc., 1938).
8. Malcolm Dole, The Glass Electrode: Methods, Applications, and Theory (New York: John Wiley & Sons, Inc., 1941).
9. Malcolm Dole, Principles of Experimental and Theoretical Electrochemistry (New York: McGraw-Hill Book Company, 1935).
10. Fred Basolo, "Quadridentate Amines. I. Some Coordination Compounds of Cobalt (III) and Triethylenetetramine," Journal of the American Chemical Society, 70 (1948): 2634-2638.
11. Fred Basolo, "Absorption Spectra of Some Cobalt(III) Coordination Compounds," Journal of the American Chemical Society, 72 (1950): 4393-4397.
12. Arthur A. Frost and Ralph G. Pearson, Kinetics and Mechanism: A Study of Homogeneous Chemical Reactions, 2nd. ed. (New York: John Wiley & Sons, Inc., 1961).
13. For a review, see Fred Basolo, "Retrospective on Studies of Ligand Substitution Reactions of Metal Complexes," Coordination Chemistry Reviews, 100 (1990): 47-66, especially pp. 52-54.
14. Fred Basolo and Ralph G. Pearson, Mechanisms of Inorganic Reactions: A Study of Metal Complexes in Solution (New York: John Wiley & Sons, Inc., 1958).

15. Fred Basolo and Ralph G. Pearson, Mechanisms of Inorganic Reactions: A Study of Metal Complexes in Solution, 2nd. ed. (New York: John Wiley & Sons, Inc., 1967).
16. Fred Basolo, C. J. Ballhausen, and Jannik Bjerrum, "Absorption Spectra of Geometrical Isomers of Hexacoordinated Complexes," Acta Chemica Scandinavica, 9 (1955): 810-814; Arthur W. Adamson and Basolo, "Deuterium Isotope Effect on the Aquation and Hydrolysis Rates of Aqueous  $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{+2}$  and  $[\text{Co}(\text{NH}_3)_5\text{Br}]^{+2}$ ," Acta Chemica Scandinavica, 9 (1955): 1261-1274.
17. H. B. Gray, E. Billig, R. Hall, and L. C. King, "Metal Complexes of Pyrones and Thiopyrones," Journal of Inorganic and Nuclear Chemistry, 24 (1962): 1089-1092.
18. See Note 13, p. 60.
19. F. Basolo, J. Chatt, H. B. Gray, R. G. Pearson, and B. L. Shaw, "Kinetics of the Reaction of Alkyl and Aryl Compounds of the Nickel Group with Pyridine," Journal of the Chemical Society, (1961): 2207-2215.
20. Harry D. Gafney, James L. Reed, and Fred Basolo, "Photochemical Reaction of the Azidopentaammineiridium(III) Ion. Coordinated Nitrene Intermediate," Journal of the American Chemical Society, 95 (1973): 7998-8005; Reed, Gafney, and Basolo, "Photochemical Reactions of the Azidopentaamminerhodium(III) Ion. Nitrene and Redox Reaction Paths," Ibid., 96 (1974): 1363-1369.
21. Mark Wrighton, Inorganic and Organometallic Photochemistry (Washington: American Chemical Society, 1978).
22. A. D. Allen and C. W. Senoff, "Nitrogenpentaammineruthenium(II) complexes," Chemical Communications, (1965): 621-622.
23. Gordon M. Barrow, Robert H. Krueger, and Fred Basolo, "Vibrational Assignments for Metal Ammines," Journal of Inorganic and Nuclear Chemistry, 2 (1956): 340-344.
24. See Chemical Heritage Foundation oral history research file #0090.
25. Fred Basolo, "Can Descriptive Inorganic Chemistry be Taught in General Chemistry Courses?" Journal of Chemical Education, 57 (1980): 45-46; Basolo, "Systematic Inorganic Reaction Chemistry," Journal of Chemical Education, 57 (1980): 761-762.

26. Fred Basolo and Robert W. Parry, "An Approach to Teaching Systematic Inorganic Reaction Chemistry in Beginning Chemistry Courses," Journal of Chemical Education, 57 (1980): 772-777.
27. Note 13; Fred Basolo, "Kinetics and Mechanisms of CO Substitution of Metal Carbonyls," Polyhedron, 9 (1990): 1503-1535.
28. See Chemical Heritage Foundation oral history research file #0091.

## INDEX

### A

Abbott, Talbert W., 4  
Absorption spectra, 10  
Accademia Nazionale dei Lincei, 35  
Actinides, 23  
Adams, Roger, 8  
Adamson, Arthur, 27, 36, 3  
Allen, Albert D., 36  
American Chemical Society, 39, 46  
American Institute of Chemical Engineer [AIChE], 49  
American Chemical Society [ACS], 20, 22, 34  
    ACS Award, 20  
    Middle Atlantic Regional Meeting, 43  
    Priestley Award, 45  
Anderson, J. S., 16  
Angelici, Robert J., 26, 30, 32  
Arnold, Richard T., 6  
Audrieth, Ludwig F., 9, 13

### B

Bailar, John C., Jr., 6, 8-9, 12-13, 15, 19  
Ballhausen, Carl, 24  
Barrow, Gordon, 37  
Basolo, Fred  
    American Chemical Society presidency, 41-45, 48, 49  
    Bachelor of Education [B.Ed.], 1, 4  
    brother, 1, 2  
    children, 25, 35  
    elementary school, 2  
    father, 1  
    high school, 2-3  
    on academic-industrial interface, 45-46  
    on teaching chemistry, 49-52  
    participation in Public Works Administration youth program, 2  
    Ph.D., 10  
    sister, 1-2  
Basolo, Mary [wife], 25, 35  
Beckman DU, 10-11, 17  
Beckman Center for the History of Chemistry, 48  
Bjerrum, Jannik, 23, 27, 28  
Bjerrum, Niels, 24  
Brown University, 32  
Burmeister, John L., 26

### C

Caglioti, Vincenzo, 34, 35  
California Institute of Technology [Caltech], 46  
Calvin, Melvin, 39  
Carassiti, Vittorio, 36

Carlsburg A/S [Copenhagen], 24  
    Foundation, 24  
    laboratory, 28  
Castor, William S., 19  
Chatt, Joseph, 30  
Chemical Abstracts, 44  
Chemical French, 7  
Chicago, Illinois, 10, 13, 18  
Chicago Cubs, 20  
Chicago, University of, 9  
CHOC News, 49  
Christopher Community High School, 2  
    principal, 2  
Ciamician, G., 36  
City University of New York, 37  
Coello, Illinois, 1  
College of Arts and Sciences, 32  
Colorado State University, 40  
Colorado, University of, at Boulder, 16  
Conant, J. B. [textbook], 5  
Concilio Nacionales de Research [Italy], 35  
Congress on Inorganic Chemistry [Mexico], 45  
Copenhagen, Denmark, 23, 25, 27, 29  
Cotton, Albert F., 32  
Council for Chemical Research, 46  
Crumbliss, Alvin L., 39  
Crystal field theory, 12, 24

## D

Depression, 1  
Dicobaltoctacarbonyl, 36  
Diels-Alder reaction, 15  
Dimethylsulfoxide, 22  
Dinitrogen, 36  
Dole, Malcolm, 18  
Dolt, Maurice L., 7  
Duke University, 39

## E

Emeléus, H. J., 16  
Evans, Ward, 18

## F

Fernelius, W. Conrad, 29  
Fischer, Ernest O., 30  
Florence University, 34  
Franklin and Marshall College, 32  
Frost, Arthur, 21  
Fuson, Reynold C., 8

**G**

Gafney, Harry D., 37  
Galileo, 35  
General Electric Company, 11  
Gray, Harry B., 20, 26-27, 30, 36, 45  
Guadalcanal, 14  
Guggenheim Fellowship, 29

**H**

Hammett, Louis P., 15  
Hardy, A. C., 11  
Harvard University, 29  
Hieber, Walter, 25-26  
Hopkins, B. Smith, 16  
Hume, David N., 27-28  
Hurd, Charles D., 17, 37, 38, 46, 52  
Hurd, Loren C., 14

**I**

Ibers, James A., 32  
Illinois, University of, at Champaign-Urbana, 6-8, 12-13, 15, 16  
    laboratory facilities, 10-11  
Ingold, Sir Christopher K., 21-23  
Ipatieff, Vladimir, 17, 18  
Iridium, 36  
Italy, 8, 29, 34-36

**J**

Jorgensen, C. Klixbull, 24  
Jorgenson, Sophus Mads, 28  
Journal of Chemical Education, 49  
Journal of Organometallic Chemistry, 30

**K**

Kinetics and mechanisms, 15, 19-20, 21, 24  
King, Carroll L., 20, 30  
Lanthanide-type metals, 23  
Letsinger, Robert L., 37  
Lewis, Frederick D., 37  
Lewis, Jack, 22  
Linderdtrom-Lang, Kai Ulrik, 28  
London, England, 34  
Loyola University, 18

**M**

Malatesta, Lamberto, 34, 35  
Manhattan Project, 9, 23  
Mansfield, Michael ["Mike"], Senator, 38  
Marks, Tobin, 32  
Marvel, Carl S., 8, 13  
Massachusetts Institute of Technology [MIT], 14, 27, 29, 32, 46  
Metal carbonyls, 25, 26-27, 36, 38, 39  
Metal complexes, 15, 39

Mexico City, Mexico, 45  
Mica project, 14  
Milan, Italy, 34,  
Moeller, G. Therald, 9, 16  
Mond, Ludwig C., 25  
Munich, Germany, 26

## N

National Academy of Sciences, 32  
National Institute of Health [NIH], 38-39  
Neckers, James W., 4, 5, 6, 15  
Nitrogenase, 36  
Nobel Prize, 24  
Northumberland, Pennsylvania, 47  
Northwestern University, 10, 16, 17-19, 22, 26, 29, 33, 37-38  
    Ipatieff Professor, 37  
Nyholm, Sir Ronald, 21, 22

## O

Occupational Health and Safety Administration [OSHA], 10  
Office of Naval Research [ONR], 39  
Oppenheimer tribunal, 18  
Outlines of Physical Chemistry, 5

## P

Padua University, 34  
Palermo University, 34  
Parry, Robert W., 50  
Pauling, Linus, 27  
Pearson, Ralph, 15, 18, 19, 20, 22-23 24, 29, 30, 31, 37, 39  
Pennsylvania State University, 36, 29  
Petroleum Research Fund, 47  
Philadelphia, Pennsylvania, 10, 13  
    Bridesburg, 13  
    North, 13  
Phipps, Thomas E., 8  
Photochemistry, 35-37  
Piedmontese, 1  
Pines, Herman, 17, 26, 52  
Politicken, 29  
Priestley, Joseph 47-48  
Public Works Administration youth program, 2

## R

Research Corporation, 17  
Rhodium, 36  
Rodebush, Worth H., 8  
Rohm and Haas, 9-10, 14-15, 16, 19  
Rome University, 34  
Rome, Italy, 35  
Roosevelt, Franklin D., 2

**S**

Sacconi, Luigi, 34, 35  
Sachtler, Wolfgang, 37  
Saint Olaf College, 32  
Schäffer, Claus, 24  
Selwood, Pierce Wilson, 16  
Senoff, C. V., 36  
Shaw, Bernard, 30  
Shriver, Duward F., 32, 40  
S<sub>N</sub>1CB, 21, 28  
Solvolysis, 15, 16  
Southern Illinois Normal University, 1, 3-4, 7-8, 9  
Strauss, Steven H., 40  
Summerbell, Robert K., 18-19

**T**

Tarr, Betty Rapp, 12, 19  
Taube, Henry, 22, 23, 25, 28, 36, 38, 45  
Technical University, Munich, 26  
Thackray, Arnold, 48, 49  
Tobe, Martin L., 23  
Transition metals, 23  
Trogler, William C., 39  
Turco, Aldo, 34  
Turin, Italy, 35

**U**

Unitarian church, 47  
United States Congress, 38  
University College, London, 21

**V**

Valparaiso University, 40  
Van Lente, Kenneth A., 5

**W**

Washington, D.C., 47  
Werner complexes, 26, 28  
Werner, Alfred  
Western Kentucky State College, 30  
Whitmore, Frank C., 18  
Wilkinson, Geoffrey, 30  
Wisconsin, University of, 14  
Wojcicki, Andrew, 26-27, 30, 36  
World War II, 13, 15, 39  
Wrighton, Mark, 36

**Z**

Zirconium, 14, 19