

CHEMICAL HERITAGE FOUNDATION

RUDOLPH A. MARCUS

Transcript of an Interview  
Conducted by

James J. Bohning

in

Pasadena, California

on

20 June 1991

(With Subsequent Corrections and Additions)

THE CHEMICAL HERITAGE FOUNDATION  
Oral History Program

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## RUDOLPH A. MARCUS

1923 Born in Montreal, Canada, on 21 July

### Education

1943 B.Sc., chemistry, McGill University

1946 Ph.D., chemistry, McGill University

### Professional Experience

1944-1946 Research Staff Member, RDX Project

1946-1949 Junior Research Officer in Photochemistry, National Research Council of Canada

1949-1951 Postdoctoral Research Associate in Theoretical Chemistry, University of North Carolina

1951-1954 Polytechnic Institute of New York  
Assistant Professor of Physical Chemistry

1954-1958 Associate Professor of Physical Chemistry

1958-1964 Professor of Physical Chemistry

1964-1978 University of Illinois  
Professor of Physical Chemistry

1978-present California Institute of Technology  
Arthur Amos Noyes Professor of Chemistry

### Honors

1943 Anne Molson Prize, McGill University

1972 Senior Fulbright-Hayes Scholar, Fulbright Program

1976 Senior U.S. Scientist Award, Alexander von Humboldt-Stiftung Foundation

1978 Irving Langmuir Award in Chemistry and Physics, American Chemical Society

1979 The Electrochemical Society Lecture Award

1982 Robinson Medal, Faraday Division of the Royal Society of Chemistry

1983 Chandler Medal, Columbia University

1983 D.Sc., honorary, University of Chicago  
1985 Wolf Prize in Chemistry  
1986 D.Sc., honorary, Polytechnic University  
1987 D.Sc., honorary, University of Göteborg, Sweden  
1988 Centenary Medal, Faraday Division of the Royal Society of Chemistry  
1988 D.Sc., honorary, McGill University, Canada  
1988 Peter Debye Award in Physical Chemistry, American Chemical Society  
1988 Willard Gibbs Medal, Chicago Section, American Chemical Society  
1989 National Medal of Science  
1990 Evans Award, Ohio State University  
1990 Theodore William Richards Medal, Northeastern Section, American Chemical Society  
1991 Edgar Fahs Smith Award, Philadelphia Section, American Chemical Society  
1991 Ira Remsen Memorial Award, Maryland Section, American Chemical Society  
1991 Pauling Medal, Portland, Oregon and Puget Sound Section, American Chemical Society  
1992 Nobel Prize in Chemistry  
1993 Hirschfelder Prize in Theoretical Chemistry, University of Wisconsin  
1993 D.Sc., honorary, University of New Brunswick, Canada  
1993 D.Sc., honorary, Queen's University, Canada  
1993 American Academy of Achievement Gold Plate Award  
1994 Lavoisier Medal, Société Française de Chimie  
1995 D.Sc., honorary, University of Oxford, England  
1996 D.Sc., honorary, University of North Carolina at Chapel Hill  
1996 D.Sc., honorary, Yokohama National University, Japan  
1996 Auburn-Kosolapoff Award, Auburn Section, American Chemical Society  
1997 D.Sc., honorary, University of Illinois at Urbana-Champaign  
1997 Award in Theoretical Chemistry, American Chemical Society  
1997 Oesper Award, Cincinnati Section, American Chemical Society  
1998 D.Sc., honorary, Technion-Israel Institute of Technology, Israel  
1998 Top 75 Award, *Chemical and Engineering News*, American Chemical Society

## ABSTRACT

Rudolph Marcus begins the interview with a discussion of his family background and early education. Though he spent some of his early years in Detroit, Michigan, he primarily grew up in a Jewish neighborhood in Montreal, Canada. Marcus was encouraged to continue his education by his parents and his uncles. He enrolled in the twelfth grade, the equivalent of the first year of college, to save money for the university. Marcus then attended McGill University, majoring in chemistry. He graduated with a B.Sc. in 1943; due to the war, he was able to take his fourth year in the course of a summer. Marcus went directly to graduate school, also at McGill, and studied physical chemistry with Carl Winkler. His research, RDX, was determined by war needs, and he received his Ph.D. in 1946. He spent an additional two and a half years on a National Research Council of Canada post-doc with Edward W. R. Steacie. In 1949, Marcus moved to the University of North Carolina, accepting a position with Oscar Rice, who had received an Office of Naval Research contract. It was there that Marcus began to focus on theory, particularly unimolecular and transition state theory. The result of this work was the development of the RRKM theory. In 1951, Marcus moved again, this time to Brooklyn Polytechnic University, where he became an assistant professor in the chemistry department. Marcus discusses his colleagues, including Herman Mark, Herbert Morawetz, and Charles Overberger, as well as the atmosphere of the institution. He became interested in electrostatics and polyelectrolytes. He also began some polymer research, and pursued work on electron transfer. In 1964, Marcus left Brooklyn Polytechnic for the University of Illinois. During his time there, he spent a few semesters at Oxford University as a visiting professor. In 1978, Marcus accepted a position at Caltech, where he began collaborating with Ahmed Zewail. His desire to pursue his research led him to decline administrative work. At Caltech, Marcus continued his electron transfer research. Marcus concludes with a discussion of his family, the challenges of research, and thoughts on his electron transfer work.

## INTERVIEWER

James J. Bohning is currently Visiting Research Scientist at Lehigh University. He has served as Professor of Chemistry Emeritus at Wilkes University, where he was a faculty member from 1959 to 1990. He served there as chemistry department chair from 1970 to 1986 and environmental science department chair from 1987 to 1990. He was chair of the American Chemical Society's Division of the History of Chemistry in 1986, received the Division's outstanding paper award in 1989, and presented more than twenty-five papers before the Division at national meetings of the Society. He has written for the American Chemical Society News Service, and he has been on the advisory committee of the Society's National Historic Chemical Landmarks committee since its inception in 1992. He developed the oral history program of the Chemical Heritage Foundation beginning in 1985, and was the Foundation's Director of Oral History from 1990 to 1995.

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