

CHEMICAL HERITAGE FOUNDATION

MARIO J. MOLINA

Transcript of an Interview
Conducted by

David J. Caruso and Jody A. Roberts

at

The Mario Molina Center
Mexico City, Mexico

on

6 and 7 May 2013

(With Subsequent Corrections and Additions)

CHEMICAL HERITAGE FOUNDATION
Center for Oral History
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MARIO J. MOLINA

1943 Born in Mexico City, Mexico, on 19 March

Education

1965 BS, Universidad Nacional Autónoma de México, Chemical Engineering
1967 MS, University of Freiburg, Germany, Polymerization Kinetics
1972 PhD, University of California, Berkeley, Physical Chemistry

Professional Experience

1967-1968 Universidad Nacional Autónoma de México
Assistant Professor
University of California, Irvine
1975-1979 Assistant Professor
1979-1982 Associate Professor
California Institute of Technology
1982-1984 Member of Technical Staff, Jet Propulsion Laboratory
1984-1989 Senior Research Scientist, Jet Propulsion Laboratory
Massachusetts Institute of Technology
1989-2003 Professor, Department of Earth, Atmospheric and Planetary
Sciences and Department of Chemistry
1992-1997 Lee and Geraldine Martin Professor of Environmental Studies
1997 Institute Professor
University of California, San Diego
2003-present Professor, Department of Chemistry and Biochemistry and
Scripps Institution of Oceanography
2003-present President, Mario Molina Center for Strategic Studies on Energy
and the Environment

Selected Honors and Awards

1976 University of California, Irvine, Alumni Association Special Recognition
for Contributions in Basic Research
1976-1978 Alfred P. Sloan Foundation Fellow
1978-1982 Camille and Henry Dreyfus Teacher-Scholar
1983 Tyler Ecology and Energy Prize
1983 Society of Hispanic Professional Engineers Award for Achievement in
Science and Technology
1984 Council for Recognition of Hispanics, Science Honoree

1987	American Chemical Society Esselen Award
1987-1988	American Association for the Advancement of Science, Newcomb-Cleveland Prize
1989	NASA Medal for Exceptional Scientific Achievement
1989	United Nations Environment Program Global 500 Award
1990-1992	Pew Scholar on Conservation and the Environment
1993-present	Member, National Academy of Sciences
1993-present	Member, Institute of Medicine
1993-present	Member, Academia Mexicana de Ingenieria
1993-present	Member, Academia Mexicana de Ciencias
1993-present	Member, Pontifical Academy of Sciences
1993-present	Fellow, American Association for the Advancement of Science
1993-present	Associate Fellow, Third World Academy of Sciences
1994-1996	Max Planck Research Award
1995	Nobel Prize in Chemistry
1995	United Nations Environment Program Ozone Award
1996	Walker Prize, Boston Museum of Science
1996	Titular Member, European Academy of Arts, Sciences and Humanities
1997	Honorary Member, American Meteorological Society
1997	Associate Fellow, Third World Academy of Sciences
1997	Honorary Degree, Doctor of Science, Yale University
1997	Honorary Degree, Doctor of Laws, University of Calgary, Canada
1998	American Chemical Society Award for Creative Advances in Environmental Science and Technology
1998	American Geophysical Union Fellow
1998	Doctor of Science, Honoris Causa, Connecticut College, New London, CT
1998	Honorary Degree, Doctor of Science, Occidental College, Los Angeles, CA
1998	Willard Gibbs Medal
1998	American Physical Society Fellow
1999	UNEP Sasakawa Prize
2000	Doctor Honoris Causa, Pontifica Universidad Católica del Perú
2000	Doctor Honoris Causa, Universidad Nacional Mayor de San Marcos, Perú
2000	Honorary Member, Sociedad Química del Perú
2000-present	Member of the Pontifical Academy of Sciences, Vatican
2001	Doctor Honoris Causa, Universidad de las Américas, Puebla, Mexico
2001	Honorary Degree, Doctor of Science, Trinity College, Connecticut
2001	Honorary Degree, Doctor of Science, University of Miami
2002	Fellow of the American Association for the Advancement of Science
2002	Honorary Degree, Doctor of Science, University of Waterloo, Canada
2002	Honorary Degree, Florida International University
2002	Honorary Degree, Utah State University
2002	Doctor Honoris Causa, Universidad de Pachuca, Mexico

2002 Medalla al Mérito Ciudadano, Legislature of the Mexico City Government

2002 Presea Ezequiel Montes Ledesma, Querétaro, Mexico

2002 John P. McGovern Medal, Sigma Xi

2003 Environment Award, Heinz Family Foundation

2003 National Hispanic Scientist of the Year, MOSI, Tampa, Florida

2003 Doctor of Science Honoris Causa, Tufts University, Massachusetts

2003-present Member of the Mexican National College (Colegio Nacional de México)

2003 Member of the *International Council on Clean Transportation*

2004 Doctor Honoris Causa, Benemérita Universidad Autónoma de Puebla

2004 Doctor Honoris Causa, Universidad Autónoma Metropolitana, Mexico

2005 Doctor of Science Honorary Degree: University of South Florida

2005 Award for Leadership in Science and Education, Merage Foundation for the American Dream

2006 Doctor Honoris Causa, Universidad Autónoma del Estado de México

2006 Doctor Honoris Causa, Universidad de Chile

2007 Honorary Member, Society of Toxicology

2007 Premio Nacional a la Excelencia Jaime Torres Bodet, Mexico

2007 Premio Nacional Benito Juárez García al Mérito Ciudadano, Mexico

2007 Doctor Honoris Causa, Colegio de Postgraduados (Institución de Enseñanza e Investigación en Ciencias Agrícolas), Mexico

2007 Honorary Degree, The City College of New York

2008 Máster de Oro, Spain

2008 Gran Cruz de la Orden de Isabel la Católica, Spain

2008 Doctor Honoris Causa, Universidad de Santiago de Chile, Chile

2008 Presea Estado de México, “José María Luis Mora”, Mexico

2008 Honorary Member of Instituto Mexicano de Ingenieros Químicos, Mexico

2009 Honorary Member of Fundación Carlos III, Spain

2009 Doctor Honoris Causa: Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional, Mexico

2009 Doctor Honoris Causa, Universidad Alfonso X El Sabio, Spain

2009 Honorary Degree, Duke University, USA

2009 Doctor Honoris Causa, Universidad Michoacana de San Nicolás de Hidalgo

2010 Doctor Honoris Causa, Universidad de Guadalajara, Mexico

2010 Doctor Honoris Causa, Univesité libre de Bruxelles, Belgique

2010 Doctor Honoris Causa, Universidad del Valle de México, Mexico

2011 Doctor Honoris Causa, Universidad Nacional de San Luis Potosí, Mexico

2011 Honorary Degree, Washington College, United States

2011 Honorary Degree, University of British Columbia, Canada

2011 Officer in the Order of Oranje-Nassau, Netherlands

2011 Doctor Honoris Causa, Washington College, Maryland

2011 Doctor Honoris Causa, University of British Columbia, Canada

2012 Doctor Honoris Causa, Whittier College, California

2012 Doctor of Science Honorary Degree, Harvard University, Cambridge, Massachusetts

2012 Doctor Honoris Causa, Universidad Complutense de Madrid, Spain

2013 Doctor Honoris Causa, The University of Manchester, UK

2013 Medal “San Ignacio de Loyola”, Iberoamericana University, Mexico

2013 Gold Medal of the President of the Italian Republic

2013 Presidential Medal of Freedom, United States of America

2014 Knight of the Legion of Honour, France

2014 University of California San Diego Medal

2014 United Nations Champion of the Earth Award

2014 Doctor of Science (Honorary Degree), John Jay College of Criminal Justice, New York University, USA

2015 Doctor Honoris Causa, Williams College, Williamstown, Massachusetts, United States

2015 Doctor Honoris Causa, Texas A&M University, Texas, United States

2015 Award "Salvador de la Capa de Ozono", Instituto Mexicano del Aerosol A.C. / CANACINTRA, Mexico

2015 Award for his Professional Career, Cámara Nacional de Fabricantes de Envases Metálicos, Mexico

2015 Primer Ejemplar de la Moneda Conmemorativa del 45° Aniversario del Consejo Nacional de Ciencia y Tecnología, Mexico

2016 “Spirit Awards”, Latino Caucus of the California State Legislature, USA

2016 Award “Corazón de León”, Universidad de Guadalajara, Mexico

2016 Award “Global Quality Gold” Elite Category, Global Quality Foundation, Mexico

2016 Received the “Keys of the City” of Ensenada, Mexico

2016 Doctor Honoris Causa, National University of Cordoba, Argentina

2016 Member of the National Academy of Science of the Argentinian Republic

2017 Doctor Honoris Causa, Boston University

2017 Doctor Honoris Causa, King’s College London, United Kingdom

ABSTRACT

Mario Molina grew up Mexico City, Mexico, one of eight children. His father was a lawyer and judge, his stepmother a teacher and housewife. Molina liked music and played the violin seriously. He also loved science, particularly chemistry; encouraged by a chemist aunt, he set up a home lab in a bathroom. He spent his middle-school years in Switzerland in order to learn German, and returned to Mexico for high school. He liked physics and math.

Molina studied chemical engineering at Universidad Nacional Autónoma de México (UNAM). On his own he developed a chemical catalyst to blow polyurethane foam; with friends he established a monopolistic business in a garage. He did a master's degree in polymer kinetics at the University of Freiburg, where he met Theodore Vermeulen and decided to apply to the University of California, Berkeley. Using lasers, he completed a PhD and did postdoctoral work in molecular dynamics in George Pimentel's lab. He also married during this time.

Molina next moved to the University of California, Irvine, to F. Sherwood Rowland's lab, becoming interested in certain industrial chemicals, chlorofluorocarbons (CFCs) and their movements in the atmosphere, discovering that the dissolution of CFC affected the ozone layer. This led to a publication in *Nature* of his ozone depletion theory and the recognition of ozone as chemically active. Molina moved to the California Institute of Technology's Jet Propulsion Laboratory (JPL) to do more hands-on experimentation on the Antarctic ozone hole, with particular attention to the relationship between chlorine and ozone. Reaction from the scientific community and the public was at first muted or even skeptical, but media publication and Congressional testimony eventually convinced everyone, including even E.I. du Pont de Nemours and Company, of the seriousness of the problem. CFC aerosols and coolants were banned; ultimately the Montreal Protocol, the first global attempt to limit harm to the atmosphere, was signed.

Wanting to return to academic life, to deal with policy issues, and to have more influence in the environmental chemistry field, Molina accepted a professorship at the Massachusetts Institute of Technology (MIT). His focus turned to the more complicated chemistry on the surface of the planet, especially in Mexico City. His work has improved the air quality in Mexico City considerably. He won the first Nobel Prize for environmental science and is one of only three Mexicans to have won the prize. He has established scholarships at MIT and in Mexico City. He was selected to the President's Council of Advisors on Science and Technology (PCAST) and the Union of Concerned Scientists.

Wanting to continue in PCAST, to open the Mario Molina Center for Strategic Studies on Energy and the Environment in Mexico City, and to do research – which he could not do while at MIT - Molina moved to the University of California, San Diego. There he collaborates on research into particles in the lower atmosphere, working on air quality with Mexican government, and contributing to policy ideas about climate change. He says the Montreal Protocol was relatively easy because it was focused on a small conclusion that all signatories could easily see and that was relatively inexpensive to alter, whereas climate change is much more complex and diffuse.

INTERVIEWERS

David J. Caruso earned a BA in the history of science, medicine, and technology from Johns Hopkins University in 2001 and a PhD in science and technology studies from Cornell University in 2008. Caruso is the director of the Chemical Heritage Foundation's (CHF) Center for Oral History, president of Oral History in the Mid-Atlantic Region, and the book review editor for the *Oral History Review*. In addition to overseeing all oral history research at CHF, he also holds an annual training institute that focuses on conducting interviews with scientists and engineers, he consults on various oral history projects, like at the San Diego Technology Archives, and is adjunct faculty at the University of Pennsylvania, teaching courses on the history of military medicine and technology and on oral history. His current research interests are the discipline formation of biomedical science in 20th-century America and the organizational structures that have contributed to such formation.

Jody A. Roberts is the Director of the Institute for Research at the Chemical Heritage Foundation. He received his PhD and MS in Science and Technology Studies from Virginia Tech and holds a BS in Chemistry from Saint Vincent College. His research focuses on the intersections of regulation, innovation, environmental issues, and emerging technologies within the chemical sciences.

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