Charles C. Price

July 13, 1913 – February 11, 2001

Charles Coale Price, III, was born to the Quaker couple, Thornton Walton Price of Plymouth Meeting, PA, and Helen Marot Farley of Swarthmore, PA, in 1913, the first of five children. His parents had married in 1911 under the care of Swarthmore Friends Meeting, both having attended Swarthmore College. Thornton graduated from the University of Pennsylvania in 1908 as a mechanical engineer and became an entrepreneur eventually moving his family to a two hundred acre farm in northern New Jersey, where Charles grew up. At age six, Charles had his right hand blown away by an exploding box of dynamite caps. In spite of this handicap, he excelled in sports all his life. At his graduation from the George School, his father presented him an 18-foot sailboat. This was the start of a devotion to sailing, which threaded through all his other life accomplishments and forged deep bonds with family and many lifelong friends.

In 1930, he entered Swarthmore College, receiving his B. A. in chemistry with high honors and Phi Beta Kappa. He played varsity lacrosse, was captain of the team and honorable mention All-American. He met his future wife and mother of his five children, Mary Elma White, while a junior at Swarthmore. They were married on June 1936, just after her graduation from Swarthmore and his from Harvard, where he received his Ph. D. in June 1936, finishing his doctoral thesis under Louis Fieser in only twenty months. His research resulted in four papers published in the Journal of the American Chemical Society. That fall he accepted an offer to do post-doctoral work with Prof. Roger Adams at the University of Illinois, where he remained on the faculty for nine more years.

The war years were busy with many active research programs related to the war effort. Three were of prime importance. First was a major project to devise testing for known chemical warfare agents in water and to design the field equipment to remove them. Second were key studies to formulate useful substitutes for no-longer-available quinine to treat malaria in the South Pacific, which led to development of a practical industrial synthesis of chloroquin. Third were studies to understand processes important to synthetic rubber production, such as emulsion polymerization and critical means of regulating molecular weight of the synthetic rubber. His growing interest in and contributions to understanding factors affecting polymer properties and polymerization processes led to his becoming founding co-editor of the Journal of Polymer Science. This wartime research at Illinois and the consequent pool of knowledge

and experience with chemical warfare agents led eventually to interesting work related to drugs for cancer.
Just before the end of World War II, Charles was invited to become the head of the Chemistry department at the University of Notre Dame, which had a good reputation in chemistry largely due to the involvement of Father Julius Nieuwland, C.S.C. with duPont in the development of the specialty rubber, Neoprene. He accepted the challenge and headed to South Bend in August 1946 with his growing family: Patricia, 8, Susanne, 6, Sarah Shoemaker, 2, and Judith Spencer, 3 months. The final family member, Charles Coale Price IV, would arrive two years later. Upon his arrival at Notre Dame, he initiated the Reaction Mechanisms Conference, a biennial event that continues to this day. At Notre Dame, Charles invented and patented polypropylene oxide-polyurethane rubber, which became the basis for most of the foam rubber produced in the world since. He was also asked to chair two national conferences on developing rubber, one for use in arctic conditions and a second for uses at high temperatures. Both conferences stimulated new approaches to practical answers for both needs. Also while at Notre Dame, Charles joined the Board of Editors of Organic Syntheses on which he served from 1946-1954. He was editor of Volume 33 of this series.

In 1947, influenced by his brother, Thornton, Charles became deeply involved with the World Federalists Association, which advocated strengthening the United Nations into a true world federal government to prevent world war through world law. Through this interest, Charles entered politics, running as the Democratic nominee for U.S. Senator from Indiana in 1950 and for the U. S. House congressional seat in the 3rd District in 1952. He became national president of the American World Federalists in 1958 and, later, chairman of the Federation of American Scientists and of the Council for a Livable World. He also held leadership positions in the Commission to Study the Organization of Peace. He was convinced to his death that law is the alternative to unbridled violence as a way to organize human beings in effective, orderly ways for the common good.

In 1953, he received an offer from the University of Pennsylvania, one of the oldest and most distinguished universities in the United States, which was also located in a major center of chemical industries. In 1954, he accepted the position as the Benjamin Franklin Professor of Chemistry and chairman of the Chemistry Department. In the transitional summer of 1954, he gave a series of lectures on polymer chemistry at the Brooklyn Polytechnic Institute, which became the basis of his first book, Reactions at the Carbon-Carbon Double Bond. An important original idea posited in this book was the phenomenon of pi-bonding. From the beginning of his doctoral research at Harvard, a major common thread to many of Charles' contributions was his keen interest in the detailed mechanisms by which chemical reactions occur.

His years at Penn were challenging and productive. His work with polymers at elevated temperatures was later used in commercial production and the research on anti-malarial drugs and chemical warfare agents that he had done previously at Illinois during World War II was further tested on cancer patients. He also served as chair of the Faculty Senate during the height of the student Vietnam protests, was a member of an open search committee for a new President when Gaylord Harnwell resigned, and successfully chaired a committee to solicit contributions from the faculty toward a major University fund-raising drive. In spite of these extra duties, his real love was always chemistry and the amazing and crucially important "universe" of the atoms and molecules that comprise the physical world around us. He felt that one of the great triumphs of human curiosity and human ingenuity has been the ability to develop instruments able to tell us about this "universe" and to teach us how to make use of that knowledge to improve the human condition. He was privileged to play a role in this great adventure.

During this time, he also served on the College Board of Managers for his alma mater, Swarthmore College, from 1954 to the mid-1970s, the last five years as Chairman. In addition, his return to Philadelphia presented many opportunities to participate in Quaker activities, such as five years as clerk of the Philadelphia Yearly Meeting working group on world federal government and Clerk of the Old Haverford Meeting. After eighteen years away from the game of lacrosse, he enjoyed playing with the Philadelphia Lacrosse Club for four years. In the fall of 1962, he spent four months in Japan with his wife and three younger children, where he taught as a Fulbright Professor at the Universities of Osaka and Kyoto.

Charles' passion for sailing started in his boyhood, racing Barnegat Bay sneak boxes, and brought him dozens of championship trophies in various classes. In 1954, he sailed his 48' sailboat from Lake Michigan to the Chesapeake Bay where he raced extensively, winning many season trophies and participating in six Newport-to-Bermuda races (1960 to 1970). He was a longtime member of the Cruising Club of America. In 1970, he sailed his 45' boat from Bermuda to Ireland and England, representing the CCA in the prestigious Cowes Race in which he competed against Prince Phillip and Prime Minister Ted Heath. He then went on to Munich for a five month sabbatical leave where he wrote the first draft of his last and most important book, entitled Energy and Order, Some Reflections on Evolution (1983). He owned many racing and cruising sailboats until, in 1993, at the age of eighty, he finally sold his last boat. However, he continued to sail, borrowing and single-handing a 37-foot ketch that belonged to a close friend and former crewmember.

In the summer of 1982, after devoting a year to her home care, he lost his wife, Mary Elma, to cancer. His marriage to Mary Elma had been such a mainstay of his life that he was committed to the institution of matrimony. Within the year he fell in love with and married Anne Parker Gill, of Swarthmore, PA, thus expanding his family to include the growing families of her two sons, Bill and Doug, to whom he devoted much time in his later years. Within the next few years, he and Anne visited the USSR, invited by the Soviet Peace Committee to promote the World Federalists Association position, and China, invited by Academia Sinica. His five children, Patricia (b. 1938), Susanne (b. 1940), Sarah Shoemaker (Sally, b. 1944), Judith Spencer (b. 1946) and Charles Coale IV (b. 1948) were a source of much pride and pleasure to him.

An activity that started at Penn, becoming his primary effort after retirement, was his role as founding Board Chair for the Chemical Heritage Foundation, an organization intended to collect and record the history of chemical sciences and industries, further chemical research and education, and enhance the public's understanding of the chemical sciences. While President of the American Chemical Society in 1965, Charles chaired their newly founded committee on Chemistry and Public Affairs. With Prof. Arnold Thackray, head of the Penn department of History and Sociology of Science, he took on the major task of finding funding, space, and staff for the Chemical Heritage Foundation. CHF is now magnificently housed in a remodeled 150-year-old neo-classical structure at the heart of Independence National Historical Park in Philadelphia. Charles' personal interest in this venture was due in part to his strong conviction that chemistry has been the central science of the 20th century. The great accomplishment of chemists has been in revealing that long-chain molecules – polymers – can be formed into such wonders as nylon and other modern plastics and fibers, and that they form the very structure of the human genome and thus of life itself. He believed that the CHF would play a key role in helping to shape a "survivable future" for mankind and was honored that a Charles C. Price Fellowship in Polymer History was established through the Beckman Center at CHF to investigate the discoveries of the next century.

After a long bout with multiple strokes, Charles passed away peacefully in his bed at the Quadrangle in Haverford, where he lived with his wife, Anne, for the last ten years. Present with him were his son, Charles, his wife, Anne Gill Price, and her son, Douglas Gill. His

brother, Thornton Price, and his sisters, Jeanne Price Norman and Helen Belser, predecease him. He is survived by his youngest sister, Elizabeth Price, of Maui, his son, Charles C. Price, IV, of San Diego, CA, and his four daughters, Patricia Paxson of London, Susanne Neal of San Diego, CA, Sally Lindsay Honey of Palo Alto, CA, and Judith Price Waterman of Redwood Valley, CA. The American Chemical Society recognized his scientific and societal interests by its Award in Pure Chemistry (1946), its Award for Creative Invention (1974), and its Parsons Award for Distinguished Public Service (1973). In 1966, the American Institute of Chemists awarded him their Chemical Pioneer Award. He was elected as president of the American Chemical Society in 1965. His ACS presidential address was on "The Synthesis of Life," which attracted considerable notoriety. It also led to a continuing interest in the origin and evolution of the universe and the solar system, and of life on planet Earth, culminating in two books: The Synthesis of Life (1974) and Energy and Order: Some Reflections on Evolution (1983). In addition to these books, he edited the text book, Coordination Polymerization (1981) and wrote Geometry of Molecules (1971), Reactions at the Carbon-Carbon Double Bond (1955), and more than three hundred scientific parpers. He was awarded more than twenty patents and fourteen honorary degrees.

He repeatedly expressed the concurrence of the two main themes of his life, one scientific and professional, the other social and political, in the following statement:

> "An essential lesson for humans is to recognize the absolutely fundamental importance, throughout the sweep of evolutionary history, of ENHANCED CAPABILITIES from INCREASED ORDER by the INVESTMENT OF ENERGY through COOPERATIVE PHENOMENA. This principle has governed the creation and function of stars, of atoms, of molecules, of living cells, of living beings, of the human brain and of human society. Humans can and must apply this principle to their evolution."

Sally Lindsay Honey
Daughter
Palo Alto, CA

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