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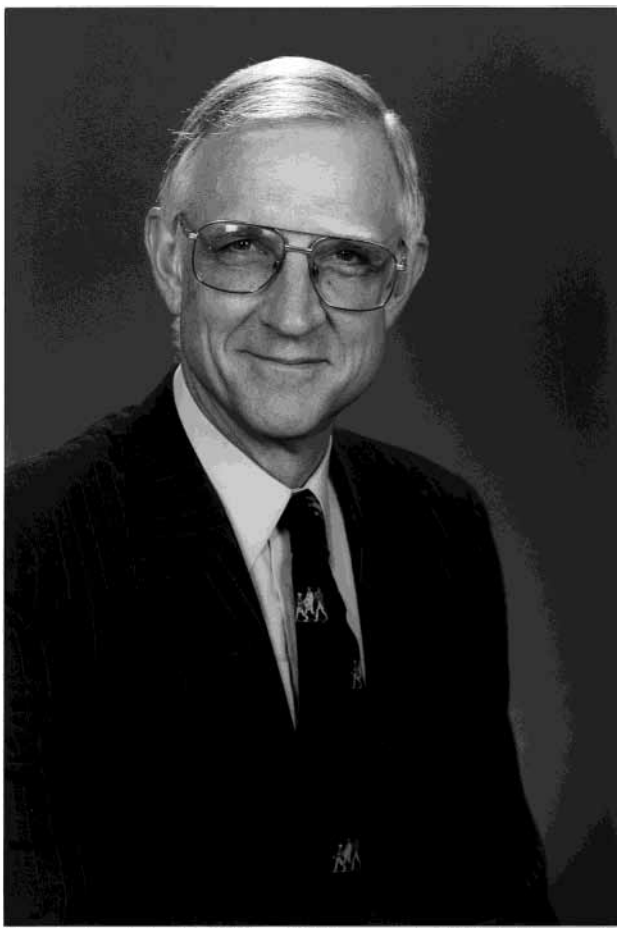

Photo courtesy of Kevin Fitzsimons

Biography of Professor C. Bradley Moore†

On behalf of all the students, postdoctorals, and visiting scholars who have worked with Professor C. Bradley Moore, we are delighted to dedicate this issue of *The Journal of Physical Chemistry A* to Brad Moore on the occasion of his 60th birthday. The breadth of scholarship that Brad Moore has brought to the field of physical chemistry is truly remarkable. His seminal use of lasers in physical chemistry, with pioneering measurements of molecular energy transfer, vibrational dynamics, and transition state processes, has revolutionized experiments as well as theory in these fields.

Professor C. Bradley Moore was born in Boston on December 7, 1939. Brad's preparation for a career in science began with the chemistry sets of the late 1940s and transitioned rapidly to the preparation of gunpowder and study of its chemical reactivity. He grew up on a small sheep farm in eastern Pennsylvania where he learned the work habits of a farmer. He assisted his father, Charles Walden Moore, in rebuilding pieces of old farm equipment. He also benefited from his father's early experience as a self-taught chemical engineer and as a laboratory

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assistant to Thomas Edison. During his high school years at Phillips Exeter Academy in New Hampshire, Brad obtained a strong background in physical science and mathematics.

It was an advanced course in chemistry from Charles Bickel that led him to select the chemistry major upon his arrival at Harvard in the fall 1957. During most of his undergraduate years at Harvard, he did physical organic chemistry research with Paul D. Bartlett. He spent the summer before his senior year at Arthur D. Little, Inc. and the summer after at the General Electric Research Laboratory in Schenectady, N.Y. As a senior, he took graduate courses in quantum mechanics, applied mathematics and experimental techniques in physical chemistry. He received his AB degree in spring 1960. That August he married Penny Percival. They set off for Berkeley on their wedding day.

Brad joined George Pimentel's research group to record the infrared spectrum of methylene and perform electronic structure theory calculations for free radicals. His thesis describes the spectroscopy of several photolytic precursors to methylene and the reactivity of methylene in "inert" matrices at liquid hydrogen temperature. Two decades passed before his half-year starter project with Pimentel was completed by his own group. He started as an assistant professor at Berkeley in July 1963.

His early work at Berkeley focused on vibrational and rotational energy transfer in collisions. This topic combined his experience in spectroscopy with his fascination for quantum mechanics and his study of collision theory for the Ph.D. prelim exam. His first experiment on quantum-state-resolved vibrational and rotational energy transfers in collisions of hydrogen with helium set the style for much of his work. His group was able to use the quantum-state dependence of energy transfer processes to develop a clear physical model for the transfer of vibrational excitation into translational and rotational degrees of freedom for the most theoretically tractable benchmark system.

In 1964, infrared lasers made it possible to vibrationally excite ground electronic states of small molecules and study the collisional transfer of excitation among the vibrational degrees of freedom of a molecule and between molecules. The recognition of this potential to use lasers for selective vibrational energy transfer experiments led to the first of Moore's ground-breaking research. State-to-state transfers were characterized for many small molecules, especially methane, carbon dioxide, and hydrogen halides with atomic and molecular collision partners and in solid rare gases. Studies with chemically reactive collision partners permitted reaction rates to be measured as a function of reagent vibrational state and the competition between chemical reaction and vibrational relaxation to be studied.

The early days of the Moore group were characterized by a "can-do" attitude, where every measurement brought something totally new. Brad's guidance in the selection of topics and his depth of understanding and knowledge in interpretation became models of scholarship for his students. No one was more passionate to pursue a new experiment than Brad himself.

Moore's group studied the radiationless processes and unimolecular reactions of formaldehyde for 25 years. The group was the first to separate isotopes using lasers, they elucidated internal conversion, intersystem crossing and collisional quenching and produced the first set of quantum-state-resolved unimolecular reaction rates. In this work, and especially in work on the unimolecular reactions of ketene, Moore's group probed the fundamental properties of transition states and how they control the reaction rate and the liberation of energy to reaction products. These experiments have provided important benchmarks for theoretical models of reaction dynamics. Over the years, Brad has enjoyed close collaborations with theoreticians and in sharing students and projects with his Berkeley colleagues Bob Bergman, John Hearst, Hal Johnston, Yuan Lee, Bill Miller, George Pimentel, Rich Saykally, and Herb Strauss, and with many others around the world.

George Pimentel's example inspired Brad's efforts as an undergraduate teacher and his contributions to the development of science education in the U.S. He helped construct the national standards for K−12 science education that were issued by the National Academy of Sciences and was the founding chair of the NAS/NRC Committee on Undergraduate Education. He was PI for the Modular Chemistry Consortium that developed materials for a modular approach to the introductory chemistry curriculum. He is a Trustee of Science Service, Inc.

Brad has served as Vice Chair and Chair of his Department, Dean of the College of Chemistry, and Director of the Chemical Sciences Division at Lawrence Berkeley National Laboratory. He has advised many universities, government agencies, and a few corporations. After forty years at Berkeley, Brad has moved to The Ohio State University where he is Vice President for Research and Professor of Chemistry. Brad's group will continue its focus on unimolecular reactions for which the energy randomization hypothesis of statistical transition state theory is not valid.

We enthusiastically acclaim this special issue of *The Journal of Physical Chemistry A* dedicated to C. Bradley Moore. The selection of articles represents cutting-edge research by many of his former students and colleagues. It is a tribute to Brad's outstanding and continuing scientific contributions, to his service to the community, as well as to the heartfelt support that he has provided to so many colleagues over the years.

Paul L. Houston

Stephen R. Leone