

George Hess: A scientific appreciation

Harold A. Scheraga^{a,1}

The recent passing of George Hess (1926–2015) has left a deep void in Cornell University's Biochemistry department, and in the hearts of his many friends and admirers. He is sorely missed by his scientific friends and by his loving family.

George Hess was born in Vienna, Austria, where he lived in an apartment on the Ringstrasse with his parents, Heinrich and Edith Mueller Hess, and maternal grandparents. Other relatives and members of his grandfather's architectural studio (which was in the same building) would join the family for lunch each day. On weekends, George walked with his grandfather, Sigmund Mueller, and attended concerts and the opera, and in the summer the family spent time in the Austrian Lake District, Salzkammergut. Even as a young child, George conducted imaginative scientific experiments, although the results were not always appreciated by the adults. Initially, George enjoyed his education at a gymnasium and the friends he made there. But the atmosphere changed and eventually he and other non-Aryan children were forced to move to a school with a much weaker academic program.

At age 16, George escaped from a round-up by the Austrian police, in danger for not wearing the yellow Jewish Star of David. George was lucky and managed to elude the police with the help of a teenage couple, but he was unable to return to his home. The next day, with the assistance of an Austrian guide that his family knew, George and his father escaped to Turin, Italy, where they were further helped by an uncle by marriage, Hugo Rossi. Later, as an adult, George commemorated this experience by a lifelong habit of drinking a Martini & Rossi vermouth each evening.

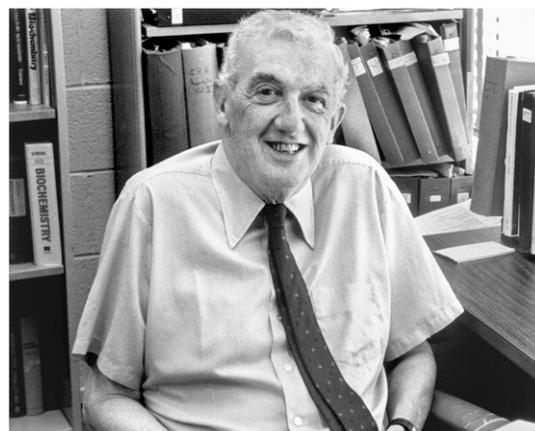
George and his father spent nine months in Italy, leaving him with great affection for the country and a language he spoke with little accent, unlike his English. Eventually, a sympathetic American consul in Naples provided father and son with visas so that they could be admitted to the United States. Many relatives and friends did not survive, but George's mother and paternal grandparents also managed to reach the United States.

In 1939, the family settled in California, where George entered school and joined the US army

in 1944. In the army, George worked first in a tuberculosis/meningitis pathology laboratory (where he was expected to mouth pipet samples) and then interviewed German scientists who were prisoners of war. As a result of his army service, George became a United States citizen in 1945. Army service provided a

wealth of stories which, with later experiences, were modified and recounted in bringing up his children and in mentoring students. It also provided a link with his first graduate student, John Wootton. John became a close friend without whom, George claimed, he would not have achieved tenure. George, John, and Michael Kazarinoff—joined at times by others—had lunch together on Fridays until the last week of George's life.

George went to the University of California, Berkeley, and received a bachelor's in 1949 and a doctorate with Choh Hao Li in 1952. For some of the time he lived in the International House, which he always visited when he returned to Berkeley. This was a period when biochemists like Fred Sanger were trying to sequence proteins. Li worked on adrenocorticotrophic hormone (ACTH), which he believed was a protein, and determined its amino acid sequence. Determining the amino acid sequence of a protein was not a mean feat at that time, but George showed that ACTH was a peptide hormone, not a protein. However, his mentor, Li, accepted George's results for his doctoral thesis. George obtained his doctorate within two years, a fact that his own students sometimes heard about in later years. Because he had not done a great deal of bench work, George's committee arranged for him to do his postdoctoral training in an organic chemistry group.



George Hess. Image courtesy of Cornell University.

^aDepartment of Chemistry and Chemical Biology, Cornell University, Ithaca, NY 14853

Author contributions: H.A.S. wrote the paper.

The author declares no conflict of interest.

¹Email: has5@cornell.edu.

As a National Foundation for Infantile Paralysis postdoctoral Fellow at the Massachusetts Institute of Technology (MIT) with John Sheehan, George developed the dicyclohexylcarbodiimide method for forming peptide bonds, and later collaborated in this research with a Berkeley friend, Murray Goodman, who had also joined the Sheehan laboratory. As an aside from serious research, Murray and George patented a method for dehydrating beer to reduce the cost of transport. The patent was taken up by the Schlitz brewing company.

After his postdoctorate at MIT, George spent a year as an instructor with Vincent du Vigneaud at the Cornell Medical School in New York City, and used the dicyclohexylcarbodiimide method in the synthesis of vasopressin. George came to the Nutrition Laboratory in Ithaca at Cornell in 1956. He and I quickly became good friends; we had mutual scientific interests, and George and his students joined my weekly research group meetings.

Physical chemistry was always an underlying theme in George's thinking and research, and we gave him an appointment in the Chemistry department although he remained in the Nutritional Biochemistry space. When Efraim Racker came to Cornell as chair and reorganized the Biochemistry department, George became a member of that department.

In 1975, George's laboratory was moved to Clark Hall, which housed the Physics Department, including Aaron Lewis and Watt Webb, and productive research collaborations developed. His group was later joined by two other biochemists, Keith Moffat and Jerry Feigenson, and their students in a tight space that encouraged many interactions. The origins of the Biophysics Graduate Field lay in this period. Clark Hall was next door to the Department of Chemistry, where Gordon Hammes and I had our laboratories, further strengthening the interactions between us. With the construction of the Biotechnology Building, all members of the Biochemistry Department were finally housed in one building.

Early in his career as an independent investigator, George and a postdoctorate student, Shumpei Sakakibara, developed the anhydrous hydrogen fluoride method for specific chemical cleavage of peptide chains. Sakakibara later founded the Protein Institute in Osaka, exploiting the hydrogen fluoride method, providing an indication of George's talent as a research mentor. George, an excellent biochemist, turned to work on the properties and mechanisms of proteins in aqueous solution, specifically those of chymotrypsin and lysozyme. He went on to develop and use innovative rapid-reaction techniques to determine

the mechanisms and pertinent rate and equilibrium constants of membrane-bound, channel-forming proteins. This included the development, with Barry Carpenter and later Bruce Ganem, of caged neurotransmitters that were biologically inactive until the active compound was released by a pulse of light of appropriate wavelength, energy, and duration.

George spent his sabbaticals learning from the research of colleagues and exploring new techniques, at the Max-Planck Institutes in Goettingen and Frankfurt, the Medical Research Council Laboratory of Molecular Biology in Cambridge, United Kingdom, the University of Konstanz, the National Institutes of Health, and MIT. George was invited to visit many universities around the world, served twice as a US Department of State cultural exchange professor in Europe, and also served on the advisory board of the Center for Molecular and Behavioral Neuroscience in Puerto Rico, on the Editorial Advisory Board of *Biochemistry*, and on numerous review panels.

George was recognized for his important contributions to the field of Biochemistry and received many honors, among them memberships in the National Academy of Sciences and the American Academy of Arts and Sciences. He was a Fulbright Scholar, a Guggenheim Fellow, an NIH Fogarty Scholar, an Alexander von Humboldt Awardee, and a Fellow of the Biophysics Society, of the American Association for the Advancement of Science, and of the American Academy of Microbiology.

George loved the Finger Lakes area, hiking, sharing meals with family and friends, and classical music and opera. There were regular trips to the Metropolitan Opera and the Glimmerglass Festival. He loved to return to the European Alps; for the last three decades he spent three weeks every summer with extended family at Le Tour in the Chamonix-Mont Blanc valley.

George was greatly helped in research, and in running his laboratory, by his wife Susan Coombs. My wife, Miriam, and I were close friends with George and Susan, and the four of us had many Friday night dinners together at the Moosewood restaurant in upstate New York.

George Hess is survived by his wife Susan, and by four sons, Peter, Richard, Paul, and David, and daughters-in-law Natalie Mahowald, Chris Colbath-Hess, Katherine Childs, and Andrea Kahn, together with eight grandchildren, Gabriel, Noah, Jacob, Alan, Sophie, Elias, Rowan, and Lyndon. He was predeceased by his daughter, Alvis Wieder, and his first wife, Jean Ray. George is survived by his second wife, Betsey Williams, the mother of his sons.