Harold A. Scheraga

This issue of *Macromolecules* marks the 65th birthday of a pioneer in the physical chemistry of macromolecules, Harold A. Scheraga. Professor Scheraga has made many important contributions in this field. More specifically, he has made many seminal contributions to the understanding of the structure and function of polymers of biological interest such as polypeptides, proteins, and nucleic acids. He was one of the pioneering physical chemists, who early in his career overcame great odds, as well as a great deal of skepticism by his peers, to demonstrate that these complex macromolecular systems can be rigorously treated by the accepted methods of physical chemistry. He has continued on this path, since his early days at Cornell in the 1940s, with ever-increasing success. His work has demonstrated how theory and experiment, including the most sophisticated instrumentation available today, can be effectively used to probe and elucidate protein and nucleic acid structure.

Within the very broad area that has today become physical biochemistry, Harold and his students have made a series of very significant contributions. These include, among others, studies of the hydrodynamic properties of polymers (as illustrated by the Scheraga–Mandelkern equation), a statistical mechanical and thermodynamic description of the structure of water and aqueous solutions and the interactions responsible for hydrophobic bonding, the development of conformational energy calculations for polypeptides, including an algorithm (ECEPP) for locating the stable conformations of such species, experimental and theoretical studies of the helix–coil transitions in polypeptides as well as helix formation in multichain structures such as collagen and nucleic acids, pathways in the folding and denaturation of globular proteins (with emphasis on ribonuclease), and the molecular processes involved in the clotting of blood (especially the action of the enzyme thrombin on fibrinogen).

The broad range of his activities is well illustrated by the series of papers on "host–guest" copoly(amino acids). The description of much of the host–guest research has been published in *Macromolecules* over the past 15 years. The objective of this project is the quantitative determination of the tendency for helix initiation and propagation in aqueous media by each of the amino acid residues commonly found in proteins. This host–guest project required development of a theory of helix–coil transitions in random copoly(amino acids) that would permit extraction of initiation and propagation parameters for one of the types of amino acid residues when the properties of the other type of residue were known. This initial phase of the host–guest project is illustrative of Professor Scheraga's well-known accomplishments in the theory of conformational properties of poly(amino acids). Implementation of the host–guest project required the synthesis of copolymers and the characterization of the composition, sequence distribution, and molecular weight averages of fractionated materials. To date, conformational characterization by spectroscopic techniques, notably circular dichroism, and interpretation via host–guest theory have yielded a thermodynamic characterization of helix formation in water by 18 of the 20 amino acid residues commonly found in proteins.

Harold brings to his research great enthusiasm and a boundless source of energy. To put things mildly, he never slows down. He is a great source of inspiration to his students, friends, and colleagues. Harold Scheraga is the author of over 690 research papers as well as two books. *Protein Structure*, a pioneering book at the time, was published in 1961. A treatise with Douglas Poland, *Theory of Helix–Coil Transitions in Biopolymers*, the widely acclaimed and basic reference work in the field, was published in 1970.

Professor Scheraga was born in Brooklyn, NY, and was educated in the public schools there. He received his Bachelor's degree from the College of the City of New York. He did his doctorate work at Duke University, under Professors Paul Gross and Marcus Hobbs. Duke also has awarded him an honorary degree. After spending a year as a postdoctoral associate with John Edsall at the Harvard Medical School, he joined the Chemistry Department at Cornell University in 1947 as an Instructor and has been associated with Cornell since then. Since 1965 he has been Todd Professor Chemistry. Harold's association with the Cornell Chemistry Department includes a 7-year stint as Chairman. However, dealing with administrative problems did not interfere in any way with his scholarly activities and the furthering of his research program.

Quite appropriately for one who has accomplished so much, Harold's work has not remained unnoticed. He is a member of the National Academy of Sciences (elected in 1966), and among his many awards are the ACS Eli Lilly Award in Biochemistry, the ACS Kendal Award in Colloid or Surface Chemistry, the Linderstrøm–Lang Medal from the Carlsberg Laboratory, the Nichols Medal from the New York ACS Section, and, most recently, the Pauling Medal from the Puget Sound and Oregon ACS Sections. Among many editorial responsibilities, he served *Macromolecules* well as a member of its Editorial Advisory Board from 1973 to 1984.

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