

PREFACE

Scaling Mount Impossible: A Festschrift for Dudley Herschbach

The title of this Festschrift is intended to reflect three dicta that the jubilarian has invoked with collegiate spirit throughout his career, and has passed on to his scientific progeny: “The difficult we do immediately. The impossible takes a little longer” (adopted from the Seabees [1]); “Ontogeny recapitulates phylogeny” (amplified in Richard Dawkins’ masterpiece on evolution, *Climbing Mount Improbable* [2]); and the “scaling laws and form factors” (including Dimensional Scaling) that Dudley has discovered in his scientific work and that have revealed so much about why things molecular – and other – are the way they are. The title also implies Dudley’s fourth dictum, “Keep going!” by which he has lived with an unmatched vigour and fortitude.

This Festschrift, comprised of papers written in Dudley Herschbach’s honour by his colleagues and former students and associates, celebrates his distinguished career. In addition, it offers a rich collection of prefatory material, including an extensive interview, a list of Dudley’s students and coworkers, as well as the Eighty Papers, a list of his own favourite publications that he has compiled for this occasion. The full list can be found at Dudley’s website at Harvard [3] or at Texas A&M [4], along with two definitive reviews of his scientific work [5,6], essays on issues ranging from teaching to science funding, and much more – including some of his treasured lecture notes. The prefatory section closes with Dan Kleppner’s essay on aspects of the well-known “Herschbach effect.”

Richard Feynman once asked himself “If we could pass on to posterity only one short sentence, what should it be?” His reply was “There really are atoms [7]”. Although a fervent believer in the immense

value of science, Dudley offered a different answer: “The most important thing really is love!” And here is why: “With love comes awe, reverence, and compassion. With love, you know that whatever disappointments or struggles lie behind or ahead, you are blessed. Beyond talent and energy, you can bring passion, vision, commitment to whatever you undertake. You can foster in yourself and others the awareness of opportunity, the fellowship of striving, the joy of discovery, the satisfactions of genuine service”. And he added “So I’m glad to confess unabashedly my love for my life in science and the many wonderful people, ideas, and molecules that have come with it [8]”.

We, in turn, likewise confess a similar affection, and on this special occasion of his grand personal anniversary it is all directed towards the jubilarian: Happy birthday, Dudley!

Bretislav Friedrich (Berlin)
Sabre Kais (West Lafayette)
David Mazziotti (Chicago)

References

- [1] <http://www.181seabees.com/>
- [2] R. Dawkins, *Climbing Mount Improbable* (W.W. Norton, New York, 1996).
- [3] <http://www.chem.harvard.edu/herschbach/>
- [4] <http://faculty.physics.tamu.edu/herschbach/>
- [5] D. Herschbach, *Angew. Chem. Int. Ed.* **26**, 1221 (1987).
- [6] D. Herschbach, *Ann. Rev. Phys. Chem.* **1**, 51 (2000).
- [7] Dudley Herschbach’s paraphrase of R. Feynman, *Six Easy Pieces* (Perseus Books, Caltech, 1963), p. 4.
- [8] D. Herschbach, Speech at the Research Corporation Centennial, Washington, D.C., March 14, 2012.

DUDLEY ROBERT HERSCHBACH

Frank B. Baird, Jr. Professor of Science, Emeritus,
Harvard University
Professor of Physics and Chemistry, Texas A & M
University

Dudley Herschbach was born in San Jose, California (1932) and received his BS degree in Mathematics (1954) and MS in Chemistry (1955) at Stanford University, followed by an A.M. degree in Physics (1956) and PhD in Chemical Physics (1958) at Harvard. After a term as Junior Fellow in the Society of Fellows at Harvard (1957–1959), he was a member of the Chemistry Faculty at the University of California, Berkeley (1959–1963), before returning to Harvard as Professor of Chemistry (1963), where he became Baird Professor of Science (1976–2003) and is now Emeritus. In 2005 he joined the Department of Physics and Astronomy at Texas A & M University, visiting each year in the Fall semester.

He is a Fellow of the American Academy of Arts and Sciences, the National Academy of Sciences, the American Philosophical Society, and the Royal Chemical Society of Great Britain; also an honorary life member of the Association for Women in Science, and the New York Academy of Sciences. His awards include the Pure Chemistry Prize of the American Chemical Society (1965), the Linus Pauling Medal (1978), the Michael Polanyi Medal (1981), the Irving Langmuir Prize of the American Physical Society (1983), the Nobel Prize in Chemistry (1986), jointly with Yuan T. Lee and John C. Polanyi, the National Medal of Science (1991), the Jaroslav Heyrovsky Medal (1992), the Sierra Nevada Distinguished

Chemist Award (1993), the Kosolapoff Award of the ACS (1994), and the William Walker Prize (1994). He was named by *Chemical & Engineering News* among the 75 leading contributors to the chemical enterprise in the past 75 years (1998). Recently he was awarded the Gold Medal of the American Institute of Chemists (2011).

Herschbach's recent research is chiefly devoted to methods for slowing, trapping, and orienting gas molecules, to gain access to quantum phenomena that arise at long de Broglie wavelengths; theoretical analysis of quantum entanglement, pertinent to design of quantum computers; a dimensional scaling approach to strongly correlated many-particle interactions; simulation of molecular motors, particularly enzyme-DNA systems; and molecular transformations induced by high-pressure, particularly related to formation of hydrocarbons in the earth's mantle.

He is engaged in several efforts to improve K-16 science education and public understanding of science. He served for 18 years as Chair of the Board of Trustees of the Society for Science and the Public, which publishes *Science News* and conducts the Intel Science Talent Search and the Intel International Science and Engineering Fair. He has also appeared in several TV and radio programs designed to foster appreciation of science and has given many lectures with that aim to school audiences, alumni clubs, and the like. Some recent titles: 'Einstein as a Student'; 'The Scientific Education of John Adams'; 'Benjamin Franklin's Scientific Amusements'; 'The Impossible Takes a Little Longer'.

