

Obituary

Peter John Hamersley Dunlop (1929 to 2009)

Peter Dunlop died on the first of February, 2009, in Adelaide, South Australia, three weeks before his 80th birthday. Born in Perth, Western Australia, on February 22nd, 1929, he was a fifth-generation Australian.

Peter was an experimental physical chemist who made significant contributions to the study of transport processes in dilute gases and liquids, primarily measurements of diffusion and thermal diffusion coefficients. He had a gift for building apparatus that yielded precise data. This saw application in the verification of the Onsager Reciprocal Relations, a central theorem in nonequilibrium thermodynamics, and in the determination of realistic intermolecular potential energy functions for gases.

Peter attended the South Perth School and Wesley College, followed by a Science degree at the University of Western Australia (UWA) between 1947 and 1949.

Peter began his research career in 1950 as an Honours student (one-year degree that is a prerequisite for higher degrees by research in Australia) at UWA as the first research student of Robin Stokes. In this year, Peter used the Stokes diaphragm cell to determine mutual diffusion coefficients in aqueous iodide solutions. After publishing his first paper with Stokes, Peter was awarded a Wisconsin Alumni Research Foundation Scholarship to study for his PhD under the supervision of Louis Gosting at the University of Wisconsin in Madison.

The Chemistry Department at the Madison campus in the early 50s was prestigious because of the influence of Daniels, Alberty, and Williams. In 1955, Baldwin, Dunlop, and Gosting provided the theoretical treatment needed to determine the Onsager 2×2 matrix of diffusion coefficients for a ternary system from the higher moments of the refractive index gradient obtained by Gouy interferometry. In a companion paper, Dunlop and Gosting verified the theory for ($\text{H}_2\text{O} + \text{LiCl} + \text{KCl}$), obtaining the first full matrix of diffusion coefficients. Subsequently, they used diffusion data for ($\text{H}_2\text{O} + \text{KCl} + \text{NaCl}$) combined with experimental activity coefficients determined by Robinson and Stokes to test the Onsager Reciprocal Relations.

In 1958, Peter took a postdoctoral position at the University of Uppsala in Sweden. While there, he formed a deep love of Scandinavia, learning both Swedish and Norwegian. Subsequently, he briefly returned to Madison to complete a seminal paper on frictional coefficients, coauthored with Kirkwood, Baldwin, Gosting, and Kegeles. This clarified Onsager's original work on friction coefficients by defining flow equations and frames of reference for isothermal diffusion, giving an exact phenomenological description of this transport process.

In 1959, Peter was appointed senior lecturer in the then Department of Physical and Inorganic Chemistry at the University of Adelaide, South Australia. There he built a new Gouy diffusimeter and began transport studies on liquid systems.

Peter looked for and encouraged intellectual promise in students: he had a strong sense of fairness in dealing with people and in mentoring his research students and junior colleagues. Several former students have gone on to take leading positions in industry or head academic departments. One student, Ian Shankland (Honeywell Specialty Chemicals), was awarded the 2008 Perkin Medal by the American Division of the Society of Chemical Industry as a scientist whose innovations have led to significant improvements in the quality of life.

Peter's research explored a new avenue in the late 60s, when he moved to the work on dilute gases that form one of his major contributions. This included the measurement of thermal diffusion coefficients, viscosity, and mixture second-virial coefficients that were ultimately used to calculate intermolecular potential energy functions.

A South Australian colleague at Wisconsin, Ross Inman, suggested to Peter another research activity, and together with co-workers from the University of New South Wales in Sydney, CSIRO in Canberra, and the Waite Institute in Adelaide, he developed a gas chromatographic technique to determine the components of essential leaf oils of the genus *Eucalyptus* for taxonomic purposes and for the study of species hybridization in the "gum-trees" of Australia. This work continued after his retirement from his position as Reader in 1994, when he was an Honorary Visiting Fellow of the University of Adelaide until 1998. Peter continued to publish until 2003, and his colleagues have continued this work with studies of other Australian native genera.

Peter was a keen sportsman, excelling at field hockey, and had a life-long love of the Australian bush. With his family, he regularly spent winter holidays in the Victorian high country for cross-country skiing.

Peter married in Adelaide in 1962. He is survived by his wife Elizabeth and their sons Erik and Roald. Our heartfelt sympathy goes to his family, which was very dear to his heart.

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