**Sidney Golden (1917-2003)**

By Thomas Tuttle

Sidney Golden died on February 28th, after a mercifully brief illness. He was 85. He is survived by his wife, Muriel, and his older daughter, Harriet.

Sidney came to Brandeis as an Assistant Professor of Chemistry in 1951. He was granted tenure in 1955 and became a Full Professor in 1959. He retired as Emeritus Professor in 1981, but he continued his scholarly work until his confirmed diagnosis of ALS (Lou Gehrig's disease) in December of last year. His scholarly contributions included more than seventy publications in peer reviewed professional scientific journals, three books and a monograph.

Sidney will perhaps be best remembered by members of the faculty outside of the sciences as the originator of and contributor to the singles table at the Faculty Center dining facility. Those of you who are not too young will also remember Sidney's contributions to faculty meetings which consisted, in part, of his consistently positioning himself so as to draw the attention of the meeting chair, be it Dean or Provost or President, to a lack of quorum or other procedural flaw.

To both the Chemistry Department and the University, Sidney brought dedicated teaching, the distinction of his scholarly work, and his concern for correct and fair procedures. With regard to the latter, his unfailing and active presence at all faculty meetings insured that departmental and university policies and proposals would be carefully reviewed. He was a model of responsible academic citizenship.

His professional colleagues will remember him as insightful and generous, thoroughly lacking in guise or deceptive intention. He leaves behind an impressive lifetime of work. Sidney regarded himself as a formal theoretician, and that he was, par excellence. But, in truth, he was much more. His devotion to pedagogy is epitomized by his three books: *An introduction to theoretical physical chemistry*. published in 1961; *Elements of the theory of gases.* published in 1969; *General university chemistry: a developmental approach.* published in 1975. They are texts, or can be used as such, at various levels of sophistication, in which the relation between experimental facts and theory is repeatedly emphasized and illustrated. The last of these is a text for honors freshman chemistry, a course which he taught many times in developing the text and many more in using it. Although this text never gained much popularity, it has been called the chemical analog of Richard Feynman's *Lectures in Physics*, high praise indeed.

Sidney earned his BS in Chemistry in 1938 at CCNY and his PhD at Harvard in 1948 with E. Bright Wilson. Prior to his two years at Harvard, he spent two years at Purdue, but the year 1939 seems to be missing. This may be when he was involved in developing the bazooka, but I'm not sure. While at Harvard, he was a National Research Council Predoctoral Fellow and earned a Presidential Certificate of Merit in 1948, at the end of his stint there.

At Brandeis he earned an NSF Senior Postdoctoral Grant for his first sabbatical in 1959-60. He was also awarded both a Guggenheim and a Fulbright. He spent the year at Cambridge University in England collaborating with Professor H.C. Longuet-Higgins during which time he

began work on his monograph, “Quantum statistical foundations of chemical kinetics.”. A preliminary, incomplete account of the monograph was written in 1963 to accompany a series of lectures at the University of California at Berkeley in the spring of that year.

A large number of Sidney’s papers were contributions as sole author, but he also collaborated effectively with many investigators. This was true during his second sabbatical in 1967-68 at the Hebrew University in Jerusalem, when his collaboration with Michael Ottolenghi and his students led to an experimental demonstration of the presence of alkali metal anions in solutions of the metals in organic amines and ethers.

My collaboration with Sidney began practically as soon as I joined the Chemistry Department as an Assistant Professor in 1960. Our first joint publication, which also had to do with alkali metal solutions, appeared in *The Journal of the American Chemical Society* in 1965. Our collaboration lasted long after Sidney retired in 1981 and moved to Arizona. In all, our joint publications number 40. Nearly all of our collaborative work pertains to metal solutions, excess electrons and/or ionic solvation. Our last joint effort appeared in *Physical Review* in 1994.

Sidney’s scientific interests extended far beyond those just mentioned. In *American Men and Women of Science* his research interests are listed as theoretical chemical kinetics, quantum mechanics, free radicals, ionic solvation, metal-ammonia solutions, quantum statistical inequalities, temporal irreversibility, temporal quantization. But such a litany fails to convey the flavor of Sidney’s science. As a theoretician Sidney was very much aware of the need for theory to produce experimentally testable results. He was also very much aware of the limitations of available theory to do so especially for the richly complicated systems ordinarily studied by chemists. As a result, it is almost always necessary to employ theory in an approximate form. Under such circumstances any resultant comparisons between theory and experiment can be problematic. Any disagreement between the two may now be attributed to the approximations rather than a real flaw in the theory. In fact, numerical agreement between theoretical prediction and its experimental counterpart may just be fortuitous. One way Sidney had of dealing with such a serious fundamental problem was to formulate the approximate theory so that it assuredly gives a value on one side or the other of the true theoretical value. Then if the experimental value is on the wrong side of the approximate theoretical value the theory is wrong even though approximate.

A final taste of Sidney’s science can be had just by reading the titles of a few of his individual contributions. His last publication appeared in *Zeitschrift für Naturforschung* in 2000 entitled “Non-kinematicity of the dilation-of-time relation of Einstein for time-intervals”, and before that one in *Molecular Physics* in 1998 entitled “Minimal adiabatic approximation of molecular energies”, and skipping back to 1995 in *Physica* one entitled “Temporally quantized theory of exponential radioactive decay: resolution of Zeno’s paradox of quantum theory”, and finally way back in 1957 in *Physical Review* one entitled “Statistical theory of many-electron systems. Discrete bases of representation”.

The loss of Sidney Golden leaves me with a deep sadness. He was my best friend. I shall honor his memory and his ideas, which have shaped my own so profoundly. This world of ours is a poorer place without him.