

The Phoenix INTERVIEW

Morris Kates: Chemist and Composer



In his distinguished career in biochemistry at the National Research Council of Canada (1950–1968) and the University of Ottawa (1968–present), Morris Kates is a legendary figure for all lipid chemists. His book, *Techniques of Lipidology: Isolation, Analysis, and Identification of Lipids*, has become a constant lab bench companion for those working in the field of lipids. Kates's works on lipids from bacteria that live in extreme environments and the structure of other lipids have formed the basis of ongoing research projects around the world. He has published more than 200 articles and several books and is one of the most frequently cited authors in the field of lipids. His achievements were recognized in 1994, when he was honored with the Biochemical Society's Morton Lectureship. Now an emeritus professor, he maintains an active interest in the analysis, structure determination, biosynthesis, and function of membrane phospholipids and in the nutritional value of lipids. He has been a member of the ACS for more than 50 years.

Few of those acquainted with Kates's books and articles know that he has an equally noted career entirely outside the bounds of science. He is a successful composer, with a musical curriculum vita as lengthy and noteworthy as that for his chemical work. He is an Associate Composer with the Canadian Music Centre and a member of the Canadian League of Composers.

Music was more than a hobby for Kates. He developed his twin passions for science and music during his youth and has sustained these interests successfully for more than half a century. Born in Romania in 1923, he moved with his family to Toronto in 1924. He began studying violin at the age of 11. By the time he was in high school, he began composing music and exploring the world of laboratory science. At the University of Toronto in the 1940s, a somewhat unusual course list on the way to a PhD in biochemistry included studies in music harmony, counterpoint, and composition. He combined long hours in the laboratory with concert experience with the University of Toronto orchestra. When he assumed his position with the National Research Council in 1950, he played in orchestras and string quartet groups in Ottawa. His first formal composition, *Themes and Variations for Piano* (1946; revised 1969), has been followed by numerous pieces, many of which have been performed in North America and Europe. In 1997, a concert at the Kennedy Center for the Arts included several of Kates's works and was given as a benefit for the DC Children's Hospital.

Since his retirement, he has expanded his interest in combining symphonic and choral music while remaining a living resource for chemists around the world. He remains intrigued by the contrapuntal intricacies of science and the arts that continue to fuel his extraordinary creative energy. *The Phoenix* was fortunate to interview Morris Kates recently about his two careers.

Phoenix: Enthusiastic chemistry graduate students have referred to you as “the God of Lipids.” What do you consider the highlight of your scientific career, either from a personal or professional viewpoint?

Kates: The highlight of my scientific career, from a professional point of view, was the discovery that membrane lipids of halophiles (bacteria living in environments

of high salt concentration), methanogens (anaerobic autotrophs that obtain energy from the synthesis of methane gas), and thermoacidophiles (bacteria growing at high temperature and low pH) have structures different from all other organisms and are synthesized through a very unusual and unexpected pathway. Our findings provided an important clue that was used by Carl Woese in proposing the existence of a third class of organisms called Archaea, to which the extreme halophiles and methanogens belong. A survey of lipids from many species of extreme halophiles showed there was a good correlation between the lipid structures and the genus of the species and made it possible to classify these species taxonomically on a generic level.

I have also enjoyed teaching, and I am happy that my books have helped young chemists acquire the skills of isolating and identifying the components of lipids—skills that are not easy to learn and perfect, because of the complex nature of these chemical compounds.

Phoenix: Some people would look at your remarkable talents and say, “He’s using BOTH sides of his brain!” Others, however, would point out that both music and chemistry have elements of beauty that depend on symmetry, form, function, and that ineffable “aha!” factor. Is your musical self different from your scientific self, or are these two endeavors linked for you in some ways?

Kates: My musical self differs from my scientific self with respect to the products that are created, but both utilize the left side and the right side—but in different ways. The right brain has the musical, artistic, speech, and spatial centers, whereas the left brain has the organizational, mathematical and critical centers and also some speech centers. The two brains communicate with each other via the connecting neurons (fibers) in the corpus callosum. Scientists derive their creative ideas from the mathematical left and creative right brains, but utilize the critical left brain more than the right to organize and refine their initial concepts. Composers and artists in general also obtain their inspirations from the right brain and use the left brain to organize, revise, and refine these inspirations. So in both activities, a close communication between the two brains is essential for effective creativity. An example of this is the anatomical

finding that the corpus collosum of Einstein's brain is unusually thick, indicating very effective communication between the left and right brains. Note that Einstein was also an excellent musician (violinist).

Phoenix: Are there ways in which your "musical side" has benefited your scientific work or vice versa? What influenced your decision to make your primary career one in science rather than in music?

Kates: Yes, my scientific self has often benefited from my musical self. Often when I felt overburdened with scientific data and the problems that they sometimes raised, I would "escape" or obtain some respite by working on a musical composition. I could then return to the scientific problems with a refreshed and clearer mind. In regard to my choice of science as a career, as opposed to music, I had no difficulty in deciding on science as my primary career because I simply did not consider that I was a good enough musician to make a reasonable living at it. I also felt that for me it was easier and less stressful and probably more enjoyable to have music as an avocation rather than as a vocation. Looking back on my career over the years, I have no doubt that I made the right career choice.

Phoenix: You have been a member of ACS for many years. Through the years, which are the services provided by the ACS that you have valued most?

Kates: During the more than 50 years that I have been an ACS member I very much enjoyed reading the ACS publications, the *Journal of the American Chemical Society*, *Biochemistry*, the *Journal of Organic Chemistry*, and *Chemical and Engineering News*. I was devoted to C&EN and would read it avidly to keep up with the developments in chemistry and biochemistry; I also very much enjoyed reading the letters to the editor there. I have attended a number of the annual scientific meetings and learned much from them in my own field of biochemistry (lipids) and chemistry in general.

For additional information on Dr. Kates, see the following biographical sources on the Web:

www.musiccentre.ca/CMC/dac_rea/eng/k_/Kates_Morris.html,
www.viola.ca/fournew.html, and
www.cobmeb.ca/Bulletin_2000/UofOBulletin.pdf.

