

## DOCUMENTS OF THE GENERAL FACULTY

**REPORT OF THE MEMORIAL RESOLUTION COMMITTEE FOR  
WILLIAM SHIVE**

The special committee of the General Faculty to prepare a memorial resolution for William Shive, professor emeritus, chemistry and biochemistry, has filed with the Secretary of the General Faculty the following report.

John R. Durbin, Secretary  
The General Faculty

**IN MEMORIAM  
WILLIAM SHIVE**

William Shive, prominent scientist and educator, died October 2, 2001, in Austin. He is survived by his wife, Gwyndolyn White Shive, whom he married in 1941, two daughters, Kathleen S. Matthews of Houston and Karen S. Browning of Austin, and two grandchildren, Thomas W. Browning and Kathryn L. Browning, both of Austin.

Bill was born December 20, 1916, in Commerce, Texas. He was the oldest of three children born to William C. and Myrtle B. Shive. His youth and early manhood were spent in this small-town Depression setting. He worked hard from an early age, and he put himself through East Texas State Teacher's College, graduating with a BA degree in 1937. He entered The University of Texas in 1937 and received an MA degree in chemistry in 1939 and a PhD in 1941, with a major in organic chemistry under the supervision of Professor H. L. Lochte. His first post was as a research associate and instructor in organic chemistry at the University of Illinois at Urbana, 1941-1942. He joined the faculty at Tulane University in 1942 and served as instructor and then assistant professor of chemistry. Bill returned to The University of Texas in 1944 as a research scientist in the Biochemical Institute (later named the Clayton Foundation Biochemical Institute). In 1945, he was also appointed assistant professor of chemistry. He served as associate professor, 1947-1949; professor, 1950-1987; and chairman of the Department of Chemistry, 1961-1970. In 1985, he was named the first recipient of the Roger J. Williams Centennial Professorship in Biochemistry.

As a scientist, Bill enjoyed a national and international reputation for major contributions to our understanding of intermediary metabolism and nutrition. In the late 1940s and early 1950s, Bill and his associates developed, with metabolic antagonists, a new method for elucidation of biochemical processes in living organisms. He used these inhibition analyses for major advances in biochemistry and nutrition, particularly pinpointing the then unknown roles of vitamins. For this research, he received in 1950 the Eli Lilly and Company Award in Biological Chemistry sponsored by the American Chemical Society. Among his major contributions were: (1) discovery of the role of folic acid in transfer of single carbon units, the role of biotin in carboxylation, and the role of vitamin B<sub>12</sub> in methylation and deoxyribonucleotide synthesis; (2) discovery and synthesis of the three formate-carrying cofactors of folic acid; (3) identification of the first intermediate (5-amino-4-imidazole carboxamide) in purine biosynthesis; and (4) development of an assay (reversal of sulfanilamide inhibition) for the anti-pernicious anemia principle, vitamin B<sub>12</sub>. In addition, he developed a procedure for the isolation of vitamin B<sub>12</sub> from natural sources (for which he was awarded a U.S. patent) and elucidated the biological role(s) of this vitamin in the anemia problem.

His extensive studies on structural specificity of metabolic antagonists for binding sites were the earliest to utilize not only restricted rotation in analogs to determine substrate conformation essential for binding sites, but also biological activities to determine the conformation of specific groups on the analogs, such as the planar nature of the 1,4-cyclohexadienyl group.

One of the first proponents of end-product control of biosynthetic processes, Shive was one of the first to provide evidence for separate sites or separate enzymes for a common biosynthetic step under the control of multiple end products and for the modulation of such processes by the availability of subsequent substrates.

Bill recognized that effective utilization of nutrition in medical practice is dependent upon the development of methods for assessing the nutritional status of each individual and identifying factors that limit the nutritional responses of each individual. In the late 1970s, Bill and his associates initiated an approach to this problem using human lymphocytes. Over a period of several years, they developed a serum-free, chemically-defined culture medium that supports lymphocyte proliferation, and used it to develop assays to assess the metabolic and nutritional status of an individual's cells. These assays provide direction for effective biochemical intervention and for studying receptor-mediated cell responses. For this research, Bill received in 1983 the first Roger J. Williams Award in Preventive Nutrition.

Bill was highly regarded as a teacher and research mentor. He directed the work of 33 master's students and 57 doctoral students. Typical were these comments by former graduate students: "Dr. Shive was an excellent research mentor, a man who is patient, yet demanding of personal excellence." And, "Dr. Shive brought very high standards both to the classroom and to the research laboratory. He was always supportive of students, and guided many to successful professional careers. He conveyed to students the importance of combining creativity with a sound command of information and experimental observation." In a lighter vein, to students in lecture sections he was "the fastest man in the west with a piece of chalk."

In recognition of his many contributions to the University, he was inducted into the Hall of Honor of the College of Natural Sciences in 1997. Although Bill relinquished his teaching duties in 1987, he maintained a significant research program until the day before he died.

William Shive served with distinction on many local and national committees. He was a member of the Nutrition Study Section, National Institutes of Health, 1969-1973, and chairman in 1972-1973; a member of President Ford's Biomedical Research Panel and chairman of its Interdisciplinary Cluster on Nutrition, 1975-1976; and liaison officer for The University of Texas System to the Robert A. Welch Foundation, 1970-1986. He was a member of the American Society of Biological Chemists, American Chemical Society, and American Institute of Nutrition.

William Shive was a truly unique individual. He was a person of superior intelligence, very high standards, and high integrity. He was unpretentious and steadily optimistic. His private life was marked by numerous contributions and remarkable generosity of spirit, often unnoted and private by his personal choice. We have all gained from our association with him.

This memorial resolution was prepared by a special committee consisting of Professors Emeritus Lester J. Reed (chair), Joanne M. Ravel, and Daniel M. Ziegler.

Distributed to the Dean of the College of Natural Sciences, the Executive Vice President and Provost, and the President on November 19, 2001. Copies are available on request from the Office of the General Faculty, FAC 22, F9500. This resolution is posted under "Memorials" at: <http://www.utexas.edu/faculty/council/>.