# WARREN E. WINSCHE

*1917–1983*

BY HERBERT J. C. KOUTS

WARREN E. WINSCHE died on June 19, 1983, at his home in Bellport, New York. At the time of his death, Dr. Winsche was Deputy Director of Brookhaven National Laboratory, a position that he had occupied for four years.

Dr. Winsche had a constantly inquiring mind that found new challenges and discovered fresh solutions in technical problems ranging over a wide variety of fields. He was a chemist by training, and he made important contributions to chemistry and chemical engineering. He also developed new approaches that influenced many other fields of science and engineering—he was led into these fields by his curiosity and his evolving technical and managerial responsibilities.

At the same time he had a penetrating insight into the human side of the people with whom he worked, and he was sensitive to the needs of individuals as human beings. He found special pleasure in solutions to complex blends of technical and personal problems, solving at once both kinds of difficulty. He was especially interested in assisting women and members of minority groups into careers in science from which they might otherwise have been barred by cultural influences.

Warren Winsche was born in Brooklyn, New York, on January 26, 1917. He grew up in Brooklyn and received his B.S. in chemical engineering in 1939 from the Polytechnic Institute of Brooklyn. He then continued at the University of Rochester where he was awarded

an M.S. in 1940 and at the University of Illinois where he was awarded a Ph.D. in chemical engineering in 1943.

From 1943 to 1945 he was a member of the National Defense Research Council. He worked at the University of Illinois and at the Edgewood Arsenal on problems in chemical warfare. In 1945 he went to the Clinton Laboratories of the Manhattan Project, now the Oak Ridge complex of laboratories of the U.S. Department of Energy. There he was Group Leader for Chemical Processes, a position that permitted him to apply deep insight into the value of modern countercurrent chemical processes to the development of new, efficient methods of reprocessing spent fuel from nuclear reactors.

In 1946, seeing new challenges in the design of the world's first peacetime nuclear research reactor at Brookhaven National Laboratory, he joined the staff of that infant institution. He profoundly influenced the design of this new graphite-moderated reactor through his unique ability to see novel solutions to technical problems. His principal innovations were a fuel element design and a split-flow cooling circuit that were important in raising the power and the available neutron flux by an order of magnitude over those previously achieved in research reactors.

During this period he also conceived of a method of generating short-lived radionuclides by separation from their long-lived parents. This principle is the basis for an array of generators of active isotopes, particularly the Te-I generators of I-132, which today are the backbone of nuclear medicine. About 80 percent of radioisotope patient administrations (about 10 million per year) are made with pharmaceuticals using radioiodine from these generators.

In 1951 he joined the Atomic Energy Division of E. I. duPont de Nemours. He became a Senior Research Supervisor and, later, Research Manager of the Chemical Separations Division for the Savannah River production facilities. There he originated an ion exchange process using stirred bed ion exchange equipment that became the basis for large-scale production of Pu-238 by remote control methods, requiring only limited shielded space. Later this made possible the wide use of Pu-238 in electrical power generators used for space missions. He also developed centrifugal extractors that reduced the in-process time required for chemical treatment of spent nuclear fuel from the Savannah River operations. This sub-

stantially reduced irradiation of the solvent, the key feature of successful Savannah River use of the Purex process.

Dr. Winsche returned to Brookhaven National Laboratory in 1962 and became Chairman of the Department of Nuclear Engineering. In this broader capacity his inventive mind found scope in many directions at once. He conceived of several possible new versions of plutonium-fueled breeder reactors based on the potential for high breeding gain that might be offered by carbide or metallic fuels. These concepts opened the possibility of reducing or eliminating the need for intermediate fuel reprocessing. He was a pioneer in focusing attention on hydrogen as a fuel of the future, and he developed a simple means of storing large amounts of hydrogen in small spaces at low pressures, based on use of metal hydrides. He developed an early interest in surface chemistry with applications to new catalysts and to biological processes.

In 1975 he became Associate Director of Brookhaven for Energy Programs, and in 1979 he became Deputy Director of the laboratory, a position he held at his death.

Dr. Winsche wrote numerous unclassified and classified publications based on his innovative ideas, including a description in *Nucleonics* (March 1951) of his I-132 generator and an article in *Science* (June 29, 1973) laying out his views on use of hydrogen as a future fuel in the Nation's energy economy. He held ten unclassified patents and a number of classified ones.

He was a Fellow of the American Nuclear Society, a member of the American Association for the Advancement of Science, Director of the Long Island Forum for Technology, a member of the editorial board of *Annals of Nuclear Energy* (Pergamon Press), and a member of the Energy Committee of the Long Island Association. He was elected to the National Academy of Engineering in 1982.

One of Warren Winsche's most distinctive characteristics was his constant questioning of problems and solutions to find out if questions had better answers or if conditions affecting old answers had changed enough to merit reconsideration.

He was a pioneer in the development of nuclear energy and left his mark on many aspects of the technology in this field. Because he was constantly looking to the future and addressing problems that he anticipated, his influence will continue to be felt in future years.