

Russell L. Steere, 1917-1992

A. Hadidi



Russell L. Steere, founder and retired research leader of the Plant Virology Laboratory, Agricultural Research Service, U. S. Department of Agriculture, Beltsville, MD, died from cancer on 28 February 1992, at the age of 74. A native of Michigan, he was born in 1917 in Pittsfield Township, Washtenaw County. He received his B.S. degree in 1941 from the University of Michigan, Ann Arbor. During World War II, he joined the Army Air Corps in the Pacific theater; he flew a Lightning

long-distance reconnaissance plane. After the war, he returned to the University of Michigan for graduate study, receiving his M.S. degree in 1947 and his Ph.D degree in Botany in 1950. After graduating, he spent a year at the Rockefeller Institute for Medical Research near Princeton, NJ, working with Dr. Louis O. Kunkel on plant viruses. From 1951 to 1959, he was an assistant research biologist at the world-renowned Virus Laboratory of the University of California, Berkeley, whose director was Nobel Laureate Dr. Wendell M. Stanley. Dr. Steere's scientific reputation in plant virology was established during his tenure at Berkeley. He collaborated with Dr. Robley C. Williams in pioneering the application of the electron microscope to virus research. Dr. Steere led research on purification and electron microscopy of plant viruses as well as on the development of freeze-etch and freeze-fracture electron microscopic techniques for revealing three-dimensional ultrastructure information on viruses and cells not readily obtained from thin sections. Because of his scientific reputation, many young scientists spent sabbatical appointments in his laboratory.

The U. S. Department of Agriculture, Beltsville, recruited Dr. Steere in 1959 to establish and lead the Plant Virology Pioneering Laboratory. He functioned as research leader of this laboratory for 25 years, until his retirement in 1984. Dr. Steere was bold and effective in his leadership; he recruited first-class scientists who made notable research contributions on fundamental problems, establishing the worldwide scientific reputation of his laboratory. Staff members of the laboratory during the last decade of Dr. Steere's leadership included Robert E. Davis, Theodor O. Diener, Ahmed F. Hadidi, Jacobus M. Kaper, Robert A. Owens, and Irving R. Schneider.

Much of Dr. Steere's research is considered innovative. Among his contributions to virus purification is chloroform-butanol clarification of plant-virus extracts and agar gel filtration for purification of viruses under mild conditions. Application of the

latter method to a preparation of tobacco mosaic virus (TMV) containing rods of different lengths separated the particles into fractions of essentially one length and showed that only the full-length TMV rods are infectious. He demonstrated the occasional disadvantage of phosphate buffers and the importance of specific ions, controlled ionic strengths, and pH during purification procedures. Dr. Steere demonstrated the value of simple ultrafiltrators for concentrating dilute preparations of purified virus, and he developed a zone electrophoresis apparatus that contains a novel, removable capsule for collecting separated viral components.

His freeze-fracture technology has many applications in biological and medical research, especially in the study of malarial parasites and the AIDS virus. Currently, annual training courses for scientists are presented at Colorado State University, Fort Collins, and at least five corporations have developed commercial instruments based on this technology. The freeze-etch and freeze-fracture techniques are apt to obscure his other contributions to electron microscopy, which include the silhouette technique, the first careful measurements of the length of TMV, the first demonstration of the polyhedral shape of what were previously thought to be spherical plant viruses, the pattern of particle arrangement in the striate inclusions of TMV, and the determination of the number of tobacco mosaic virions required to initiate an infection.

Dr. Steere was president of the Electron Microscopy Society of America from 1969 to 1970. He received many awards, including the Achievement Certificate from Walter Reed Army Medical Center, the Superior Award from the U. S. Department of Agriculture, and the Ruth Allen and Fellow Awards from the American Phytopathological Society. Acknowledging his distinguished career, Colorado State University named the Russell L. Steere Freeze-Fracture Laboratory in his honor in 1991.

Although Dr. Steere maintained an active profile as invited speaker at various national and international meetings and symposia, he also found time to arouse the interest of high-school students in biological research by advising high-school teachers and conducting science-club activities. After retiring, he devoted his energies to crafting unusual wooden bowls and baskets and to building a solar house in Aylor, VA.

Dr. Steere's survivors include his wife of 49 years, Rosamond of Hyattsville, MD; four daughters, Sue Ellen Delos of Williamsburg, VA, Janet Wilcox of Corvallis, OR, Paula Newquist of Madison, AL, and Martha Alexander of Silver Spring, MD; a brother, Robert, of Bloomfield Hills, MI; four sisters, Agnes Green of Trenton, MI, Edith Houck of Ann Arbor, MI, Nancy Strohl of Littleton, CO, Helen Mudgett of Eden Prairie, MN; and 10 grandchildren.