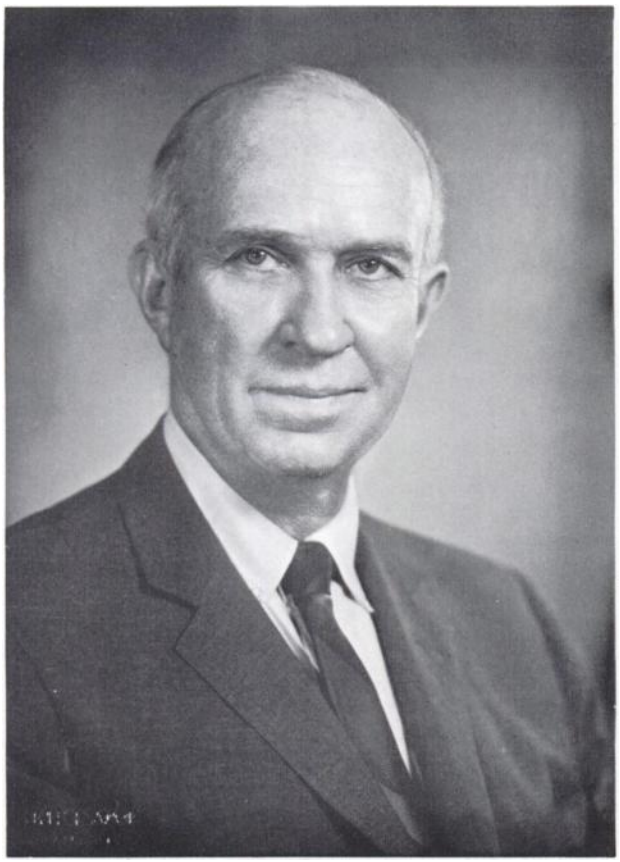

# DISTINGUISHED NUCLEAR PIONEER—1970

# JOHN HUNDALE LAWRENCE, M. D.

In 1935 a young instructor of medicine on vacation from Yale University collaborated in a study of the metabolism of animals using radioactive phosphorus produced by his brother in the recently invented cyclotron. The animals developed leucopenia. Recognizing that the leucopenia probably reflected a suppression of leucopoiesis by the radioactive phosphorus, and realizing that this agent might have value in neoplastic disease, he administered radioactive phosphorus to a group of leukemic mice and then went fishing on the Trinity River. Returning to Berkeley several weeks later, he found the leukemic mice alive, vigorous and in apparent good health, although all of the control group of leukemic animals were dead. Within a few months, he administered radioactive phosphorus to several patients with leukemia and induced remission in their disease. Thus began the use of man-made radioactive materials in the treatment of human disease. And thus began the career of one of the most innovative and creative medical scientists in the field of nuclear medicine!

The alert and "prepared" mind that observed the effect of radioactive phosphorus on the hematopoietic system of the animals, immediately translated this recognition into a definitive experiment in leukemic mice, and then boldly, imaginatively and promptly used this information in an effective therapy of a human disease has placed John Hundale Lawrence in the forefront of the band of creative men who during the past 35 years have brought an entirely new modality to medical research, diagnosis and therapy.

What manner of man is John Lawrence? What provided him with the mind and character that has made possible his great contributions to nuclear medicine? Born in Canton, South Dakota (population 800) in 1904, the son of Gunda Lawrence—a mathematics teacher—and Carl Gustavus Lawrence —a school teacher, school superintendent and later a college president—John grew up with his brother Ernest (Nobel Laureate in Physics in 1939) on the banks of the Big Sioux River. He attended the public schools of South Dakota and graduated *cum laude* from the University of South Dakota.

"Going East" to study medicine, he graduated from Harvard Medical School in 1930, interned in medicine at the Peter Bent Brigham Hospital and took residency training in Internal Medicine at the University of Rochester Strong Memorial Hospital and at Yale's New Haven Hospital. He served as Instructor in Internal Medicine at Yale from 1933

to 1937, when he joined the faculty of the University of California at Berkeley. He became Director of the University's Donner Laboratory (the Biology and Medicine Division of the Lawrence Radiation Laboratory) in 1948, Professor of Medical Physics in 1950 and Physician-in-Chief of the Donner Pavilion in 1954.

A tremendously formative and constructive influence in John's life was his lovely and beautiful wife, Amy, whom he married in 1942 and who aided, strengthened and gave him joy until her tragic death in 1967. Their four fine children are a credit to their parents.

Working with Hardin Jones, Cornelius Tobias, James Born and many others, Dr. Lawrence developed educational programs of high excellence in biophysics, in medical physics and in bioradiology, and an outstanding postdoctoral fellowship program which has provided education and training to young physicians and scientists from this country and abroad. Many of the more than 600 "graduates" of these programs now are directing their own programs in laboratories throughout the world.

Dr. Lawrence's remarkably productive research is reported in some 300 published articles and in two books. Additionally he has edited 16 books and serves on the Editorial Board of five scientific periodicals.

Among his most outstanding contributions are his pioneering use of radioactive tracers for investigation of metabolism in normal and diseased states which began in 1935 and which has continued to the present time; the first therapeutic use of radioactive phosphorus in 1936; the first biomedical studies with heavy particles conducted between 1935 and 1938, and the demonstration of the greater biological effect of the dense tissue ionization produced by these particles in normal and neoplastic tissues; the demonstration in 1935 to 1937 that estrogenic compounds provide some protection against radiation injury in mice; the first use of $^{11}C$ in breath-analysis studies in collaboration with Dr. Tobias and others in 1944; the discovery of the anesthetic properties of xenon in 1946; with Dr. H. L. Jones in 1949, the first use of labeled inert gases in humans; the description with Dr. N. I. Berlin in 1952 of "relative or stress polycythemia"; and in 1954 the use of glycine-2-$^{14}C$ for the measurement of red-cell life span and studies of the nature of the anemia occurring with leukemia. Since 1948, in collaboration with Doctors C. A. Tobias and J. L. Born, Dr. Lawrence has demonstrated the therapeutic advantages in several diseases of therapy with the higher energy, heavy charged particles, experiments which are continuing in an effort to determine the optimum particle for use in therapy. Many of these original contributions now have been adapted for general use and have improved the physician's ability to deal with human illness.

Another aspect of Dr. Lawrence's genius is his administrative ability as Director of the Donner Laboratory and Associate Director of the Lawrence Radiation Laboratory. These institutions have achieved world-wide renown for their accomplishments and excellence—in no small way because of John's patience, perseverance and persistence! He has made possible the fine research environment in which have been developed such major contributions as Dr. C. A. Tobias' and Mr. Hal Anger's first well-type scintillation counter for the *in vitro* measurement of radioactivity in samples of biological materials; the first multiple-port scintillation counter used to perform radioisotope kinetic studies *in vivo;* and Mr. Anger's development of the first whole-body photoscanner in 1952, the positron scanner in 1958 and, most recently, the "multiplane tomographic gamma-ray scanner."

In his work, Dr. Lawrence has had dozens of collaborators to all of whom he invariably expresses full recognition and appreciation.

The great scientific and medical contributions made by Dr. Lawrence have brought him world-wide recognition and distinctions too numerous to catalog here. Among these are honorary degrees from the Universities of South Dakota and Bordeaux and from the Catholic University of America; the Caldwell Medal of the American Roentgen Ray Society; the MacKenzie Davidson Medal of the British Institute of Radiology; a medal from His Holiness Pope Pius XII; the Silver Medal of the University of Bordeaux; the Silver Cross of the Greek Royal Order of the Phoenix; and the Pasteur Medal of the Pasteur Institute of Paris. He has delivered 15 distinguished lectureships; served as a visiting professor in many American and foreign universities; and he is a member and has held office in many distinguished scientific, scholarly and professional organizations including the Presidency in 1966 and 1967 of the Society of Nuclear Medicine. He has served on many national committees and has represented the United States Atomic Energy Commission and the State Department on several foreign missions.

With all his great accomplishments and fine distinctions, John Lawrence remains a humble, warm and friendly man—a strong supporter and proponent of his colleagues and students, a true friend and a fine physician and gentleman. The Society of Nuclear Medicine indeed is privileged to welcome him to its roster of Distinguished Nuclear Pioneers.