

**Nuclear Medicine
Pioneer Citation, 1976:
David E. Kuhl, M.D.**

By Frederick J. Bonte, M.D.



David Edmund Kuhl, one of three children of Robert and Caroline Kuhl, was born October 27, 1929, in St. Louis, Missouri. He was early drawn to the laboratory, for when he was in the sixth grade he persuaded several friends to amalgamate their chemistry sets with his own and join him in meetings at which shared experiments were planned and carried out.

In high school David Kuhl first read of the use of radioactive substances in the diagnosis and treatment of human disease and became intrigued by this concept. He furthered his research skills when, on finding long-forgotten bottles of several uranium compounds in a high-school laboratory, he investigated certain of their fundamental properties by injecting uranyl salts into several rats and evaluating the distribution of uranium radioactivity by postmortem autoradiography. His experiments with radioactivity led to the award of a Westinghouse Talent Search scholarship, with which he entered Temple University, in 1947, for the study of nuclear physics.

When Eugene Pendergrass, then Chairman of the Department of Radiology at the University of Pennsylvania, learned of David Kuhl's interest in the medical uses of radioactive isotopes, he encouraged Kuhl to come to the University of Pennsylvania to

study medicine. Promptly upon his entry into medical school, he was enrolled as a student assistant in the Department of Radiology, where he met the physicists John Hale and Robert Gorson and the radiologist Richard Chamberlain. Working under their general supervision, Kuhl built his own scintillation counter and used it to attempt to quantitate ^{131}I deposited in the thyroid tumors of patients who had been treated with this radionuclide. Upon learning of the work of Cassen, Kuhl and his associates built a rectilinear scanner, but, dissatisfied with the then standard solenoid-tapper display, Kuhl constructed the first radionuclide photorecording system, using a glow tube. This new device displayed gradations in quantity of radioactivity and made scan images readily and meaningfully interpretable for the first time. For this work he was given a Borden Undergraduate Research Award in 1955.

Following his internship at the Hospital of the University of Pennsylvania, David Kuhl entered the United States Navy, and from 1956 to 1958 he was assigned to direct the Nuclear Medicine Service at the U.S. Naval Hospital at Portsmouth, Virginia. While there he built another scanner-photorecorder system and became interested in using it to improve the efficiency of liver scanning. An encounter with

a textbook on the cross-sectional anatomy of the abdomen convinced Kuhl that valuable additional information could be obtained by adding tomographic views to the traditional frontal, oblique, and lateral ones then employed in radionuclide imaging.

On his return to the University of Pennsylvania from military service, Kuhl began his research association with Roy Edwards, an engineer in the Department of Radiology, and together they developed principles and mechanisms for longitudinal and transverse section scanning. Their aim was to accomplish total three-dimensional reconstruction from series of stacked images. After several interesting preliminary efforts, Kuhl and Edwards designed and made a detector which scanned in a series of tangential traverses, rotating about the patient on a circular path between scan passes. This device and its predecessors represented the first true axial tomographic imaging systems. Kuhl also studied transverse-sectional transmission imaging, initially using ^{131}I and later ^{241}Am . He reported on transverse axial scanning of the chest at meetings in 1965.

Kuhl and Edwards then assembled a family of increasingly sophisticated cross-sectional imaging devices, first reconstructing images by back-projection into a simple matrix, using a dedicated small-computer system. Later they developed a method of iterative reconstruction and ultimately perfected a system of orthogonal tangent correction (1965 to the present).

Kuhl has retained his interest in the application of data quantitation techniques to the study of physiological processes and presently utilizes his tomographic scanning unit in the investigation of such problems as the demonstration of local brain glucose metabolism in tomographic images, employing labeled deoxyglucose.

Although David Kuhl's principal recognition has

been gained through his research contributions in imaging, he has achieved distinction as organizer and director of one of the foremost nuclear medicine training programs in the world. A number of young people, nuclear physicians and allied scientists, have begun or advanced their careers under Kuhl's direction, and he has joined them in making numerous contributions to the literature of the clinical practice of nuclear medicine.

Not only has David Kuhl pursued an outstanding career as a research scientist and educator, but he has also served his field well by helping to bring it recognition as a true medical discipline. He was chosen to be one of the founders of the American Board of Nuclear Medicine, and later he organized and served as Chairman of the Residency Review Committee for Nuclear Medicine, defining and enforcing the standards for training programs in this newly born medical specialty. Further, Kuhl has long been a member of special study groups such as the subcommittee of the International Committee on Radiological Units and Measurements which formulated such basic concepts within the field as the appraisal of imaging systems in terms of the parameters of resolution and sensitivity.

Those who have worked with David Kuhl over the years have come to admire him greatly as a man of insight, patience, and keen wit. Though a dedicated and hard-working scientist, Kuhl leads a close and active family life with his wife Mike (Eleanor) and son David, with skiing and sailing among their favorite pursuits.

There are rare individuals who by their very presence in a certain endeavor not only impart to it a significant intellectual momentum, but confer upon it dignity and stature as well. Such a man is David E. Kuhl, justly and deservedly honored as the Nuclear Pioneer of 1976.