Wall of Remembrance - Luminaries Who Made it Possible

William H. Blahd, MD

William H. Blahd, MD, a pioneering nuclear medicine physician and author of one of the first widely used textbooks in the field, as well as an honored figure in nuclear medicine education and research, died on March 6, 2011 from complications of polycythemia. He was born in Cleveland, OH, the son of Moses Emmett Blahd, MD, a prominent surgeon who studied in Vienna, Austria. After attending Western Reserve University (Cleveland) and the University of Arizona (Tucson), Blahd received his medical degree from Tulane University (New Orleans, LA) in 1945. He completed his internship at King's County Hospital (Brooklyn, NY) in 1946. From 1946 to 1948, he served as a captain in the U.S. Army Medical Corps. He completed residencies in internal medicine and pathology from 1948 to 1951 at the Wadsworth Veterans Hospital (now the West Los Angeles [CA] Veterans Administration [VA] Center).

At the Wadsworth, where he would remain and serve as a leader in nuclear medicine for more than half a century, Blahd became acquainted with Benedict Cassen. In 1950 Cassen assembled the first automated scanning system (made up of a motor-driven scintillation detector coupled to a relay printer). The scanner and its later iterations leading to the rectilinear scanner were used with 131I for thyroid imaging. Cassen's work was championed by Blahd, who was among a small group of physicians who conducted initial studies with the scanner. The scanner and its subsequent adoption served as defining events in the evolution of clinical nuclear medicine, and Blahd's endorsement and reports on its initial use offered guidance for physicians who began to integrate its use into their practices throughout the world.

In 1972, Blahd received his board certification in nuclear medicine by studying his own textbook for what was then the first nuclear medicine board examination for the American Board of Nuclear Medicine (ABNM). He would go on to serve in numerous positions on the board, including chair (1982–1983) and executive director (1991–2004). He was a Life Member of the ABNM.

After serving on numerous committees and as president of the Southern California SNM Chapter, Blahd was elected president of SNM in 1977. Among many other initiatives he promoted in this period, he undertook, with the assistance of his wife, Mitzi, to reinvigorate the society's Education and Research Foundation (ERF), with a goal of supporting the development of nuclear medicine and nuclear medicine technology through grants and fellowships.

A major breakthrough occurred in 1990, when the Blahds won the support of Cassen's widow, Mary Wylie Cassen, who named the ERF as the recipient of her husband's estate. The Benedict Cassen Fund was then used to create the Cassen Award, given every 2 y and referred to as the "Nobel Prize" of nuclear medicine, as well as other pilot research grants and postdoctoral fellowships. In 2004, the Blahds were recognized with the establishment of the ERF Mitzi and William Blahd Pilot Research Grant.

He was a fellow of both the American College of Nuclear Physicians and the American College of Physicians. From 1991 to 1997 he chaired the Accreditation Council for Graduate Medical Education's Resident Review Committee for Nuclear Medicine, influencing the direction and content of training in the field. His belief in the future of nuclear medicine motivated him to work to establish new departments in Los Angeles–area hospitals, among them Cedars–Sinai, St. Joseph, and Valley Presbyterian.

In his foreword to Blahd's 1965 Nuclear Medicine text, Glenn Seaborg, PhD, then chair of the Atomic Energy Commission and a Nobel Prize winner in chemistry (1951), wrote of the task facing those attempting to chart a path in the new field of medical radioisotopes: "It is a staggering challenge to discern order in the material of life." For well more than half a century, Blahd rose to this challenge by championing inventive minds, training new generations of nuclear medicine specialists, serving as a founding member of institutions that today define the field, and working tirelessly to advance the causes of education and research so that these efforts would be sustained well into the future. His quest for "order in the material of life" provides an example of service that few can emulate but to which many can aspire.

John Alton Burdine, MD

John Alton Burdine, MD, a nuclear medicine physician, past president of SNM, and noted leader and organizer at St. Luke's Episcopal Hospital in Houston (TX), died on April 12, 2010.

Dr. Burdine was born in Austin (TX) in 1936. His father was John A. Burdine, Sr., MD, dean of the College of Arts and Sciences at the University of Texas at Austin. The young Burdine graduated from his father's institution in 1959. He received his medical degree from the University of Texas Medical Branch in Galveston in 1961. He completed an internship in internal medicine at the Indiana University Medical Center (Indianapolis) and returned to Galveston for residency in internal medicine. During his residency, he first became interested in nuclear medicine scanning techniques.

In 1965, Dr. Burdine moved to Houston, where he became a professor of radiology and professor of medicine at Baylor College of Medicine, while also serving as chief of the nuclear medicine sections at Baylor and for the Harris County Hospital District. At Baylor he published seminal works pancreatic, hepatic, renal, and lung radioisotope scanning in nationally recognized journals. He became chief of the nuclear medicine service at St. Luke's Episcopal Hospital/Texas Children's Hospital in 1969, a position he held along with other responsibilities for the next 15 y. Among his team's accomplishments during these years was the introduction of 99mTc-human albumin microspheres for lung perfusion studies and other scanning applications.

Dr. Burdine initiated development and quality programs that sustained St. Luke's through periods of expansion. He led the effort to construct the St. Luke's Medical Tower, later renamed the O'Quinn Medical Tower at St. Luke's, and the Skybridge, the 29-story, Ce´sar Pelli–designed medical and professional building, with twin towers that remain a Houston landmark. Colleagues remembered Burdine as not only a forward-thinking leader but as a compassionate physician. David Pate, MD, who was president of St. Luke's until 2009, told the Houston chronicle: ''John had a passion for helping those who were less fortunate and often called me to ask me to care for people who had complicated medical problems and no way to pay.

In 1997, Dr. Burdine's accomplishments were recognized with the Hall of Honor Award from the College of Natural Sciences at The University of Texas at Austin. He served as chair of the Committee on Nuclear Medicine for the Texas Medical Association and became an active member in SNM, serving on numerous committees, as a member of the board of trustees, and as president in 1982 and 1983.

Howard J. Dworkin, MD

Howard J. Dworkin, MD, a leader in nuclear medicine education and a past president of SNM, died on January 27, 2012 in Royal Oak, MI. He was an internationally recognized authority on quality and planning issues associated with the continuing medical education (CME) process.

Dworkin was born in Brooklyn, NY. He received an undergraduate degree in chemical engineering from Worcester Polytechnic Institute (MA) in 1955 and his medical degree from Albany Medical College (NY) in 1959. During his internship at Albany Hospital (1959– 1960) and residency at Rochester General Hospital (NY; 1960–1962), he trained in internal medicine. It was during his time at Rochester that he saw a notice on a bulletin board about a research fellowship at the University of Michigan (UM). At Michigan, William Beierwaltes, MD, was heading up an active group of nuclear medicine physicians and had coauthored the first textbook of nuclear medicine practice. Dworkin went to UM in 1962 and, although his teaching associate and third-year residency positions were nominally in internal medicine, he pursued his interests in nuclear medicine. From 1963 to 1965 he held a fellowship in cancer research at the UM Medical Center, earning a master's degree in radiation biology during the same period.

After a year in Toronto, Canada, as head of nuclear medicine and associate professor at the Princess Margaret Hospital, Dworkin was drafted in 1967 during the Vietnam War. As a naval commander, he served as head of nuclear medicine in the Department of Radiology at the National Naval Medical Center in Bethesda, MD, from 1967 to 1969. He participated in a new program designed to train technologists in working with isotopes in diagnosis and therapy. The program would evolve into the Nuclear Medicine Technologist Training Program at Portsmouth, VA, and would spur the establishment of a number of other military educational efforts in nuclear medicine.

After leaving the military, Dworkin went to the William Beaumont Hospital, where he chaired the Department of Nuclear Medicine at the Royal Oak, MI, facility from 1969 to 2002 and at the Troy, MI, location from 1981 to 2001.

In addition to his presidency of SNM (1986–1987), Dworkin served as president of the American College of Nuclear Physicians (1978 and 1979), as chair of the American Board of Nuclear Medicine (ABNM) Committee on Certifying Examinations (1983). He was active in the Education and Research Foundation of SNM and served as the society's representative to the American Medical Association Section Council on Nuclear Medicine. He was also appointed to the Council of Medical Specialty Societies and the Accreditation Council for Continuing Medical Education (ACCME) during years in which plans for today's enhanced continuing medical education requirements were being made. He was the 1998 chair of ACCME.

R. Edward "Ed" Coleman, MD

R. Edward "Ed" Coleman, MD, a pioneer in the development of PET and a visionary leader in its translation to routine clinical use, died on June 25, 2012 in Durham, NC. He was born in Otwell, IN. He received his bachelor's degree from the University of Evansville (IN) and his medical degree from Washington University (St. Louis, MO), where he also completed an internship in internal medicine. After residency at the Royal Victoria Hospital (Montreal, Canada), he returned to St. Louis in 1972 for a fellowship in nuclear medicine at the Mallinckrodt Institute of Radiology.

While at Mallinckrodt, he collaborated with Michel Ter-Pogossian, PhD, and a team of physicians, physicists, chemists, and computer scientists in the development of PET technologies. Coleman was a full participant in the broad range of activities surrounding early PET work at Mallinckrodt, including cyclotron technologies, scanner design and testing, investigation of novel radiopharmaceuticals, and acquisition of early images in animals and humans. Throughout the years, Coleman maintained a focus on PET, promoting hybrid integration with x-ray CT and advocating appropriate clinical applications for PET/CT. This effort involved a tireless collaboration with academia, industry, and government.

He was instrumental in establishing the National Oncologic PET Registry that facilitated greatly expanded Medicare coverage of PET. More than 20 years ago Coleman identified in Newsline the key challenges to be overcome before PET could become widely used (and reimbursed) in clinical imaging: (1) improved tomographic hard- and software; (2) automation of cyclotrons and reliable access to PET radiopharmaceuticals; (3) generation of clinical data validating the benefits of PET; and (4) clarification of the role of U.S. Food and Drug Administration jurisdiction over PET radiopharmaceuticals.

It is a testament to his vision, dedication, and hard work that he personally led efforts on each of these fronts. His words in 1991 remain true today: "Clinical PET is the epitome of the application of the tracer method to medical diagnosis. . . .If nuclear medicine does not demonstrate its interest in the development and application of PET, other specialties will make PET their own."

Throughout his career Coleman maintained a vigorous interest in academic work and research that encompassed an amazing breadth of topics. Examples of his diverse research contributions include pioneering studies of 111Inlabeled leukocytes and platelets and radioimmunotherapy of gliomas. He also contributed extensively to the literature on diagnosis of pulmonary embolism and cardiovascular nuclear medicine.

For those of us who had the privilege of working with him on a daily basis, Ed was a friend, a mentor, a colleague, and a leader: but most of all he was a genial spirit and an inspiration. No matter how busy things were, Ed always had time to listen. He treated everyone he knew with respect and, in turn, was highly respected by all. Ed's many interests—his athletic ability (he was a member of the University of Evansville's national championship basketball team), his ongoing passion for sports (notably Duke basketball), his devotion to his children, his zest for travel (he successfully summited Mt. Kilimanjaro with his daughter, son, and son-in- law)—all characterized his enthusiasm for action. This enthusiasm carried over to the care of his patients and in his academic pursuit to revolutionize imaging and revitalize nuclear medicine practice.

Alexander Gottschalk, MD

Alexander Gottschalk, MD, died peacefully on October 5, 2010 at the age of 78, after a 5-y battle with prostate cancer. Alex was born in Chicago, IL, in 1932 to illustrious parent educators. Alex received his magna cum laude baccalaureate degree from Harvard in 1954 and his medical degree in 1958 from Washington University of St. Louis, where he was elected to Alpha Omega Alpha. He returned to Chicago for an internship at the University of Illinois and a radiology residency at the University of Chicago, which he completed in 1962.

Alex accepted a 2-y research associate position at the Donner Research Laboratory in Berkeley, CA, where he worked closely with Hal Anger, the developer of the scintillation camera that bears his name and remains the primary imaging instrument in today's clinical nuclear medicine practice. Lending his clinical expertise and ingenuity to Anger, the pair produced seminal images of the heart, kidneys, and brain.

In 1967, he became director of the Argonne Cancer Research Hospital (later known as the Franklin McLean Institute), where he collaborated with such luminaries as Paul Harper, MD, Katherine Lathrop, and Robert Beck. Among other groundbreaking efforts, the group worked on the development of clinical applications for technetium compounds.

After a brief tenure as radiology department chair at the University of Chicago, Alex moved in 1974 to Yale University (New Haven, CT) as director of the nuclear medicine section. There, working with Barry Zaret, MD, he set up a pioneering cardiovascular nuclear medicine clinical and research service. He moved to Michigan State University (East Lansing) in 1990. Alex maintained a career-long interest in nuclear medicine techniques to assess pulmonary embolism and was closely involved in the Prospective Investigation of Pulmonary Embolism Diagnosis (PIOPED) studies, serving as chair of the nuclear medicine working group for PIOPED I, II, and III.

The awards Alex received for his brilliant and innovative work were numerous. One of the first (of which he was always quite proud) was being named in 1967 as one of America's "Ten Outstanding Young Men" by the U.S. Jaycees. He received the gold medals of both the Association of University Radiologists and the Radiological Society of North America. He held board certifications from the American Board of Radiology (in both general radiology and special competence in nuclear radiology) and the American Board of Nuclear Medicine. He served as president of the Association of University Radiologists (1969–1971), the Society of Nuclear Medicine (1974–1975), and the Fleischner Society (1989–1990).

Alex Gottschalk was one of our great nuclear medicine pioneers. Many of his contributions have evolved into elements of routine everyday practice in nuclear medicine. He will be missed by many.

Henry N. Wagner, Jr., MD

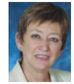
Henry N. Wagner, Jr., MD, a pioneer in nuclear medicine and international leader in the field for more than half a century, died on September 25 at his Baltimore home. Wagner retired from his career-spanning professorship at Johns Hopkins Hospital (Baltimore, MD) in 1995 but remained active in his emeritus status as a vigorous contributor to the nuclear medicine community. His achievements, which were recognized by numerous awards and honors, included not only basic and clinical science "firsts" but a distinguished record of publication, presentation, education, and outreach.

Wagner initially worked with John G. McAfee, MD, at Hopkins in the 1950s on studies with a range of early radiolabeled agents and scanning devices. In 1962 and 1963 they published pioneering studies on the use of 203Hg-chlormerodrin for renal imaging. In 1963 they also first used radiolabeled albumin aggregates for imaging lung perfusion in healthy individuals and patients with pulmonary embolism. Five years later Wagner and colleagues built on previous work to publish groundbreaking studies on the use of 133Xe ventilation scans to diagnose pulmonary embolism. Wagner is perhaps most widely known for his early contributions to PET imaging, having served in 1983 as the first human test subject for PET imaging of dopamine and opiate receptors in the brain. The images acquired in these experiments are widely acknowledged to have influenced a new generation of research into the brain's physiology and pathophysiology.

His work also advanced diagnosis and understanding in cardiology. In addition to the wide focus of his investigations, he served as a durable and reliable advocate for nuclear medicine on the larger scientific stage, writing numerous state-of-the-art reviews for publications such as The Journal of the American Medical Association and the New England Journal of Medicine.

He was president of the American Federation for Clinical Research (1953), SNMMI (1970–1971), the World Federation of Nuclear Medicine and Biology (1975–1978), and the Johns Hopkins and Baltimore City Medical Societies (1978–1980). His lifetime achievement was recognized by (among many awards) the Hevesy awards of both the European Association of Nuclear Medicine (1976) and SNM (1985), the first Vikram Surhabel gold medal awarded by the Society of Nuclear Medicine of India (1972), the American Medical Association's Scientific Achievement Award (1991), and the first annual SNM President's Award for Outstanding Contributions to Nuclear Medicine (1993). He also founded what is today the SNMMI Wagner–Torizuka Fellowship, which provides dedicated training to Japanese physicians in early stages of their careers.

In his many roles as leader, investigator, counselor, and mentor, Wagner embraced innovation and encouraged independent thinking. In his memoirs, he advised young readers with an interest in science: "Do not think as you are told, and do not do as others do according to the rules." His own creative and independent adherence to these maxims helped to define the development of nuclear medicine from its earliest years through its 21st-century transition to molecular medicine.



Susan C. Weiss, BS, CNMT

Susan C. Weiss, BS, CNMT, whose productive career in nuclear medicine spanned 44 y and included multiple groundbreaking achievements, died on July 19, 2009 from pancreatic cancer. She was a pioneer and innovator in the development of numerous nuclear medicine techniques for children and a noted mentor, teacher, and organizer to several generations of nuclear medicine technologists (NMTs).

Sue began her career in the field by training with Merle Loken, MD, at the University of Minnesota (St. Paul) in 1965 and 1966, followed by work as a staff technologist at Manchester Memorial Hospital (CT) from 1967 to 1969 and at the Albert Einstein Medical Center (Philadelphia, PA) from 1969 to 1971. In 1971 she went to the Children's Memorial Hospital (CMH; Chicago, IL). Within 3 y she had become chief NMT, a post she held with distinction for almost a quarter of a century, also serving as the hospital's radiation safety officer (RSO) for most of these years. She was the first practicing NMT to be certified by the Nuclear Regulatory Commission as an RSO.

In 1967, CMH had acquired the first Anger gamma camera to be installed in a pediatric hospital. Sue readily adapted the adult equipment and techniques to those needed for children. One of her first publications was a booklet on pediatric techniques. Her methods of sedation and handling of children for nuclear medicine procedures won a scientific exhibit award and were published. She helped to perfect the technique of direct radionuclide cystography that has been adopted throughout the world and participated in the first prospective pediatric dosimetry determinations for 99mTc-MAG3. Numerous other investigations and pediatric adaptions in which she participated included pinhole dacrocystography, thallium SPECT imaging of the heart in Kawasaki disease, early use and promotion of 99mTc-glucoheptonate for diagnosis of pyelonephritis in infants, elucidation of the mechanism of Legg– Perthes–Calves disease and creation of an early staging protocol that accurately predicts outcomes in this
disease, documentation of asymmetric pulmonary perfusion in D-transposition of the great vessels in newborn infants, portable brain scintigraphic angiography for brain death, and microtechniques in radioimmunoassay using minute blood specimens from newborn infants.

Sue was most noted on the national and international nuclear medicine scene for her extraordinary energy and accomplishments in mentoring NMTs. She was first an outstanding educator. Sue was a founding member of the Nuclear Medicine Technology Certification Board and worked with other NMT pioneers in creating a valid certification process for nuclear medicine technology. As coordinator of the Associated Sciences Consortium for the RSNA, she planned their yearly educational themes and developed the day-long educational programs for the RSNA annual meeting for several years.

She initiated the reorganization of the Education and Research Foundation (ERF) of SNM into a cooperative alliance made up of the ERF as a separate entity and the SNM and SNMTS. Sue presented a concept aimed at creating a cooperative alliance with shared governance and representation. After many summit meetings, a strategic alliance was outlined and implemented. Sue would go on to be the executive director of the ERF, where all areas of nuclear medicine would benefit from her unique combination of farsighted strategy and attention to detail.

Sue also broke traditional barriers for women and technologists. She was the first woman elected president of the SNMTS, the first woman and first technologist elected president of the ERF, and the first woman and first technologist elected president of the Central Chapter (the largest chapter) of SNM. She served on the Central Chapter's board of directors for 24 y. She was elected as speaker of the National Commission for Health Certifying Agencies general assembly in 1981 and served on the executive council from 1981 to 1984.

Her primary professional goal was to ensure that the relationships among the various groups in the field—NMTs, physicians, physicists, and others—continued to prosper and grow.

There are so many things to remember about Sue in her short stay with us. We will each remember Sue in our own way. Sue was a caring, challenging, fun loving, considerate, strong, and intelligent woman who impacted our lives immensely as a loyal friend and colleague. We will miss her terribly.

Michael J. Welch, PhD

Michael J.Welch, PhD, a pioneer in radiochemistry and a noted educator, innovator, and leader in the nuclear medicine community for almost half a century, died on May 6 at Barnes– Jewish Hospital (St. Louis, Mo), surrounded by friends, family, and longtime colleagues. He was a professor of radiology, of chemistry, of developmental biology, and of biomedical engineering, and program head and founder of the Oncologic Imaging Program at Siteman Cancer Center, all at Washington University (St. Louis). At his death, Washington University, where he spent 45 years developing radiolabeled compounds and exploring their effectiveness in diagnosis and therapy, lowered flags across the campus to half-staff for a 3-day period of community reflection and celebration of his extraordinary accomplishments.

Throughout his career, Welch specialized in the synthesis of new radiolabeled compounds for medical imaging, with a special emphasis on the growing numbers of applications in PET. He was both a prime mover and an integral part in the development of PET as it transitioned from a compelling investigative idea through early studies to idespread clinical acceptance and integration with other modalities. For example, Welch performed the first human study of a receptor ligand, 77Brbromoestradiol, presaging one of the most common biomedical applications of PET. He was a highly creative scientist. He pioneered the use of biologic systems (as distinct from organic synthesis) to make imaging agents. A prime example was the photosynthetic production of 11C-glucose by Swiss chard leaves (with a final "drug" product that was green from the chlorophyll extracted along with the glucose). His success in these efforts lay in his ability to see beyond the immediate physical and chemical aspects of basic work to potential future applications and then to reach out and galvanize cooperative interest and participation from across the widest spectrum of specialists. His unique approach to scientific creativity embraced the need to involve others in looking for practical applications of novel radiolabeled agents.

Welch's enthusiasm for his research and his ability to make vital connections with other disciplines made him a notable and beloved educator. The list of individuals who trained with him as graduate students and postgraduate fellows includes the names of some of the most noted individuals in molecular imaging today and likely the names of others who will one day become leaders in the field.

He was recognized with honors and awards too numerous to mention in this limited space. He was elected to the Institute of Medicine in 1999 and received many of his field's highest honors. SNM alone awarded him its highest honors—the Paul C. Aebersold Award (1980), the Berson–Yalow Award (twice, in 1988 and 1990), the Georg Charles de Hevesy Nuclear Medicine Pioneer Award (1992), and the Benedict Cassen Prize in 2004.In 2008, SNM named a new award for outstanding contributions to radiopharmaceutical research in his honor.

Rosalyn S. Yalow, PhD

On May 30, 2011, after a decade and a half of physical and cognitive decline, Rosalyn S. Yalow died, just before her ninetieth birthday.

A brilliant scientist who was dedicated to finding truth regardless of the personal sacrifice it demanded and at the same time a warm human being who was intensely dedicated to her teenage son and daughter—as well as the occasional young physician who was invited to work in the lab or, as it came to be known, the "Radioisotope Service."

Rosalyn Sussman was the child of an immigrant from Germany and a first-generation American. She was a good student who developed an early interest in mathematics and science. She graduated from Hunter College with a major in physics, an unusual area of interest for a woman at that time. After overcoming several obstacles, she was accepted as a graduate student in physics at the University of Illinois, where she met and married another physics student, Aaron Yalow. After receiving their PhDs in 1945, they returned to New York, where Aaron became a medical physicist at the Montefiore Hospital while Roz volunteered to work with Edith Quimby at the Columbia College of Physicians and Surgeons. Quimby introduced Roz to Gioacchino Failla, DSc, who has been characterized as the dean of American medical physicists. Failla recommended that Bernard Roswit, MD, chief of radiation oncology at the Bronx VA Hospital, hire Roz as a part-time medical physicist to start a radioisotope service. This job would soon evolve into a full-time position. She was joined early on by Solomon Berson, MD, who had completed his residency in internal medicine. Their initial investigations were in the application of radionuclides in blood volume determination and the kinetics of iodine metabolism.

Yalow and Berson were soon recognized as outstanding investigators, and their early manuscripts are classics in clinical investigation. They turned their attention to understanding insulin physiology by labeling insulin and studying plasma kinetics in a variety of subjects. They observed that radiolabeled insulin was cleared from the blood more slowly in individuals who had received insulin injections previously. They deduced that the slower clearance was related to insulin antibodies, an idea that was considered to be heresy at the time. Moreover, they quantified the binding phenomenon. Yalow and Berson recognized that the quantitative competition of a radiolabeled antigen and an unlabeled antigen molecule for a limited number of binding sites on an antibody provided a basis for quantitation of an unknown amount of a similar molecule in a sample of plasma or other biological fluid. This brilliant insight, the basis of competitive binding assays, was subsequently investigated and validated. In 1960, they published "Immunoassay of Endogenous Plasma Insulin in Man" in the Journal of Clinical Investigation. Using the same principle but identifying unique characteristics of other peptide hormones, the duo went on to develop assays for human growth hormone and other materials of biologic interest. Most remarkably, they could detect with great sensitivity and precision the amount of such substances in less than a drop of plasma. Working together, with only an occasional junior associate, they characterized the role of heretofore un-measurable substances in health and disease.

In recognition of these contributions, the Nobel Prize in Medicine and Physiology was awarded to Yalow in 1977. It is not possible in the limited space available to review the impact that the development of radioimmunoassay has had on virtually every field of medical science.