

at the Centro do Ecologia, Caracas, Venezuela
Kurt Wüthrich, a professor of biophysics at the ETH, Zurich.

The newly elected members of the National Academy of Engineering include:

John L. Anderson, head of the department of chemical engineering at Carnegie Mellon University
Stanley Backer, a professor emeritus of mechanical engineering at MIT
David T. Blackstock, a professor of mechanical engineering and a faculty research scientist at the University of Texas, Austin
William M. Brown, the president of the Environmental Research Institute, Ann Arbor, Michigan
Lance A. Davis, vice president for research and development at Allied Signal Inc, Morristown, New Jersey
Roger P. Kambour, a member of the research staff at the GE Research and Development Center, Schenectady, New York
Walter F. Kosonocky, holder of the Foundation Chair for Optoelectronics and Solid-State Circuits at the New Jersey Institute of Technology
John H. Nuckolls, the director of Lawrence Livermore National Laboratory
Stewart D. Personick, assistant vice president of the Information Networking Research Laboratory at Bellcore, Morristown, New Jersey
Johanna M. H. L. Sengers, a senior fellow of the National Institute of Standards and Technology, Gaithersburg, Maryland
Robert R. Shannon, director of the Optical Sciences Center at the University of Arizona, Tucson
Arnold H. Silver, chief scientist at the Superconductivity Research Center of the TRW Space and Technology Group, Redondo Beach, California.

Among the new NAE foreign associates is Keith A. Browning, director of research in the Meteorological Office of the Government of the UK, Bracknell, England.

OBITUARIES

Isadore Perlman

Isadore Perlman died quietly in his sleep on 3 August 1991 at the John Douglas French Center for Alzheimer's and Related Diseases in Los Alamitos, California. He was 76



Isadore Perlman

years old.

I first met Isadore Perlman at UCLA in the fall of 1933, when he was an undergraduate. The following fall, Iz came to the University of California, Berkeley, to finish his junior and senior years as a chemistry major, and my contacts with him continued there. After obtaining his bachelor's degree in chemistry (1936), and following a short time in industry, he went on to obtain a PhD in physiology (1940) under Israel L. Chaikoff at Berkeley. Between 1937 and 1943 he published several pioneering papers describing the use of radioactive isotopes of phosphorus, bromine and iodine in physiological investigations.

In January 1942, immediately after the US entered World War II, Iz joined my research group. We were then investigating, first at Berkeley and then at Chicago, the development of chemical methods for the separation of plutonium from uranium and its fission products. Iz played a key role in the successful accomplishment of this objective, and he moved to the Clinton Laboratories at Oak Ridge, Tennessee, and then to Hanford, Washington, when the plutonium project moved successively to those sites. Due in large part to his efforts, a successful process for the chemical separation and purification of plutonium was put into operation in an unbelievably short time with the result that a plutonium bomb was made available to bring an end to the war with Japan.

Immediately after the war Perlman returned to Berkeley, first as an associate professor and then as a full professor (1949) of chemistry, to help direct the newly established nuclear chemistry division in the Radiation Laboratory (now the Lawrence Berkeley Laboratory). There, research on

the transuranium elements continued with great success: Ten more such elements were synthesized and identified. Iz and his student Louis B. Werner were the first to isolate a compound of curium in macroscopic quantity.

In 1947 Iz began publishing articles on alpha decay; for about the next 20 years he was known as the world leader in this field. His student Frank Asaro continued as his coworker. The Bohr-Mottelson collective model of the nucleus owed much to Perlman's experimental research program.

Perlman concentrated on the alpha decay process, nuclear energy level studies and the identification of new isotopes. For example, he worked with Stanley G. Thompson on nuclear structure; Frank S. Stephens on odd-parity rotational states; Richard Diamond and Stephens on multiple Coulomb excitation; Albert Ghiorso and John Rasmussen on alpha decay systematics; David H. Templeton, Jerome J. Howland and Manfred Lindner on new radioactive isotopes; Robert H. Goeckermann on the fission process; and Jack M. Hollander, Donald Strominger, C. Michael Lederer and me on several compilations of widely used tables of isotopes. He published a two-volume book with Earl K. Hyde and me called *The Nuclear Properties of the Heavy Elements*.

In 1967 Perlman became interested in a completely new field, the determination of the origin of ancient pottery by elemental analysis of the pottery fabric. His group developed new measurement techniques for neutron activation analysis and new methodologies for interpreting the data. Their work led to fundamental changes in archaeological concepts, particularly in Eastern Mediterranean studies, and it also was important to geological studies. Perlman's work infused new vigor into the field of neutron activation analysis, and laboratories using similar procedures were started in France, Israel and Germany.

Perlman "retired" from the University of California and the Lawrence Berkeley Laboratory in 1973 and began his next career. He obtained a dual professorship in archaeology and chemistry at the Hebrew University of Jerusalem. There, with Joseph Yellin, he built a neutron activation analysis laboratory for studying ancient pottery; it soon became the top-rated facility in the world for this purpose. The facility, called the Department of Archaeometry, was intimately connected

with the Israeli Institute of Archaeology. Working closely with archaeologists, scientists at the lab provided new insight into many provenience problems.

Perlman "retired" from the Hebrew University in 1985 and returned to the Lawrence Berkeley Laboratory. There he helped Asaro organize a program to measure the abundance of the element iridium in thousands of rock samples, with the goal of determining the validity of the relationship, proposed by Luis Alvarez, between massive extinctions of life on Earth and the impact of large asteroids or comets.

At the Hebrew University, as at Berkeley, Perlman was always a teacher, and there were strong bonds of affection between him and his students. His versatility, brilliance, quick wit and unselfishness impressed us all.

GLENN T. SEABORG
Lawrence Berkeley Laboratory
Berkeley, California

Harlan J. Smith

Harlan J. Smith, the director of McDonald Observatory of the University of Texas at Austin for 26 years, died on 17 October 1991 at the age of 67. He was responsible for building the astronomy department at Austin, for overseeing major additions to the facilities at McDonald Observatory and for pioneering public outreach programs.

Smith received his BA (1949), MA (1951) and PhD in astronomy (1955) from Harvard University. He joined the astronomy faculty at Yale University in 1953 and came to the University of Texas in 1963 to become chair of the department of astronomy and director of McDonald Observatory. That move coincided with the university's decision to assume responsibility for the operation of McDonald, after initially sharing that responsibility with the University of Chicago.

Smith had a strong belief in and zeal for bringing the message of astronomy to the public. He was legendary for his enthusiastic lectures to any group. He also developed the "StarDate" radio program, which is now heard worldwide. He strongly believed in humanity's destiny to explore space and supported that goal in any way he could.

As a researcher Smith discovered (with Dorrit Hoffleit) the optical variability of quasars. He studied the influence of solar wind on radio emissions from Jupiter and discovered the existence of a class of variable stars he



Harlan J. Smith

named dwarf Cepheids.

Smith's later research interests included planetary radio emission analysis, quasars, variable stars, photometry and instrumentation. In addition to his research he served on many national scientific committees of NASA, the National Science Foundation and the National Research Council, and was chairman of the board of the Association of Universities for Research in Astronomy.

Smith was among the first astronomers to realize the importance of ground-based observations in the planning and support of space missions. In the 1960s he convinced NASA to fund the McDonald Observatory's 107-inch telescope for that purpose, and NASA still supports planetary research on that telescope. His effort also opened the door for other NASA-funded telescopes, such as some of those at the Mauna Kea Observatory in Hawaii.

Smith was a member of the National Academy of Sciences *ad hoc* Committee on the Large Space Telescope (1966-70), a project that eventually resulted in the Hubble Space Telescope. As chair of the NASA Space Science Board committee on space astronomy and astrophysics (1977-80), he played a key role in proposing the Great Observatories series of orbital telescopes, which includes the Advanced X-Ray Astronomy Facility, the Gamma Ray Observatory and the Space Infrared Telescope Facility as well as the Hubble Space Telescope. And Smith was chair of a national committee that recommended that NASA support the Search for Extra-Terrestrial Intelligence program.

Smith also developed the award-winning educational film series *The Story of the Universe*.

Smith's interests in international

scientific cooperation and world peace were reflected in his hosting many scholars from around the world at the University of Texas, McDonald Observatory and his home.

Increasingly, international cooperation in space and on Earth became the focus of Smith's research. He had a particular interest in and love of China, which he visited several times, and he was responsible for a very vigorous scientific exchange with that country. At the time of his death, he was working on the return of humans to the Moon and the establishment of lunar astronomical observatories. Smith's dream was that the coming decades would see increasing numbers of telescopes on the surface of the Moon, probing the universe under the ideal conditions the lunar environment affords.

THOMAS G. BARNES III
FRANK N. BASH
JAMES N. DOUGLAS
WILLIAM H. JEFFERYS
J. CRAIG WHEELER
University of Texas, Austin

Amulya L. Laskar

Amulya Lal Laskar, a professor of physics at Clemson University, died of lung cancer on 19 July 1991. Born in Dacca (now the capital of Bangladesh) in 1931, he received his BSc (with honors) and his MSc at Calcutta University and his PhD at the University of Illinois in 1960.

Laskar's research was dominated by the study of diffusion in solids. After almost any colloquium he was able to show that what was really important in the research that had just been described was diffusion. He made one of the first demonstrations that diffusion along dislocations could shortcut other mechanisms.

Laskar built a laboratory for the study of diffusion at Clemson. His lab demonstrated that the thermodynamic parameters of defects, especially near the melting point, must be considered to be functions of the temperature. His group also made the first observation of self-polarization at the λ transition in ammonium halides, among other achievements.

Laskar was on the advisory board of *Defects and Diffusion Forum*, directed a NATO Advanced Study Institute on diffusion in materials and an Indo-US workshop on diffusion in solids, and edited the books *Diffusion in Solids*, *Superionic Solids* and *Solid Electrolytes and Diffusion in Solids*.

Laskar's colleagues appreciated him for his support and pleasant