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Lennart Carleson of the Mittag-Leffler Institute of Stockholm was presented the 1984 Steele Prize for a Fundamental Paper for a series of three papers: the first two deal with interpolation problems in complex analysis, and the third resolves a 40-year-old question in harmonic analysis on the convergence and growth of

partial sums of Fourier series. Carleson received his PhD in 1950 from Uppsala University. He has held visiting professorships at the Massachusetts Institute of Technology and Stanford University and currently holds an appointment at the Mittag-Leffler Institute. He served as president of the International Mathematical Union from 1979-82.

obituaries

Leon Pape

Leon Pape, a leader in the development of medical physics, died unexpectedly on 2 January 1984 at age 58.

Pape was born 8 February 1925, in New York. He received his MS in physics in 1953 and his PhD in biophysics in 1965, both from the University of Southern California.

Pape was certified in radiological physics by the American Board of Radiology. From 1955-62 he worked as a radiological physicist, first at Cedars of Lebanon Hospital in Los Angeles, then as chief radiological physicist at the City of Hope Medical Center in Duarte, California. In 1961 he became a professor of physics at California State University, Los Angeles; he served as chairman of that department from 1967-70. During this period Pape developed facilities and programs in biophysics and in radiological health physics; late in his tenure as chairman, his efforts were particularly significant in persuading a California legislation committee to approve adequate supplementary funds for the construction and operation of the University's 4-MeV Van de Graaff laboratory, a facility unique in the California State University system.

From 1971 until his death, Pape worked at the Zoophysiological Laboratory B, August Krogh Institute, University of Copenhagen in Denmark, serving as its director from 1975-77. Research areas represented in his publications include radiobiology, energy transport and cell physiology, and physical theories of the living state. His central research interest was membrane biophysics: After developing research methods and techniques in a series of experiments on *Amphiuma* red-cell membranes, he was able to use those techniques on human red cells and other human membranes, a study in which he was productively engaged until the end of his life.

Leon Pape was an exceptionally warm human being who could generate instant rapport with colleagues, collaborators and students. Even 13 years after leaving California State, the news



PAPE

of his death moved the campus community as though he were a universally loved current colleague. As a tribute to his memory, the Leon Pape Memorial Lecture Series has been established; Rosalyn S. Yalow, medical physicist and Nobel Laureate in medicine, delivered the inaugural lecture on 11 May 1984.

HAROLD L. COHEN
FERNANDO B. MORINIGO
FRIEDA A. STAHL

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Ernest Omar Wollan

Ernest O. Wollan died on 11 March 1984, at the age of 81. As one of the real pioneers in nuclear energy, he had made notable and varied contributions to physical knowledge and techniques; in particular, he was a founder of health physics and a leader in developing the science of neutron diffraction.

Wollan obtained an AB from Concordia College in 1923, and a PhD in 1929 from the University of Chicago while working with Arthur H. Compton on studies of x-ray scattering. Wollan's measurements in gaseous helium, neon and argon gave probably the best experimental data for comparison with the current theories of Llewellyn Thomas, Enrico Fermi, and Douglas

Hartree on the density distribution of atomic electron clouds. After spending 1932-33 in Zurich conducting cosmic ray research as a National Research Council Fellow, he served as an assistant professor (1934-38) at Washington University in St. Louis. He then served for about a year at the Chicago Tumor Institute where he was the physicist responsible for a 10-gram radium source. It was at this position that he became involved in the problems of radiation dosimetry.

When the Metallurgical Laboratory of the Manhattan District started to take shape at the University of Chicago, about 1941, Wollan's recent experience was of significant value to the group of radiologists and medical personnel that gathered there in anticipation of health and radiation problems stemming from the nuclear chain reaction. One of Wollan's lasting contributions was the development of photographic methods into a reliable quantitative measurement of gamma-ray dosage; he invented the now universally adopted radiation badge.

In 1944 Wollan moved to Oak Ridge, Tennessee. The Laboratory's graphite reactor was producing steady beams of slow neutrons; it had been widely recognized that, owing to their wave nature, such neutrons could be diffracted like x-rays. By adapting one of his old x-ray diffractometers to neutrons, Wollan made possible a great deal of early work in slow neutron spectrometry and in solid-state physics—work for which the neutron interactions were unique, such as the location of hydrogen atoms in crystals and the determination of magnetic ordering. An example of the latter was Wollan's discovery (with Clifford Shull) of antiferromagnetism.

Wollan made several other significant contributions during the post-war years. For example, he adapted the mechanism of a domestic washing machine to move a small carriage in and out of the high-flux region of Oak Ridge's graphite reactor, thereby giving a sinusoidal signal in the reactivity that served to measure the poisoning effect of any sample placed within the carriage. This "pile oscillator" was particularly sensitive because its signal was distinguishable from background effects. It was later used to discover the low neutron-capture cross-section of zirconium—an observation that had a profound effect in nuclear engineering.

Wollan was a member of the research staff at the Oak Ridge National Laboratory for 23 years, much of the time as Associate Director of the Physics Division. After retirement in 1967, he remained a consultant to the Laboratory until 1977. He was unusually modest about his scientific work, preferring not to present it at meetings

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and conferences. A clear example is his last publication: On 2 December 1942, he was present at the startup of the first nuclear chain reaction at the University of Chicago. He had installed his cosmic-ray ionization chamber on a balcony about 20 feet from the graphite pile where it recorded the gamma-ray ionization levels during that eventful afternoon. However, it was not until 1980, long after retirement, that he published the chart showing these data; it now stands as the clearest and most dramatic record of one of the great events in physics.

A. H. SNELL

M. K. WILKINSON

W. C. KOEHLER

Oak Ridge National Laboratory

Malvern K. Iles

Malvern K. Iles, associate physicist at the Department of Energy's Ames Laboratory at Iowa State University, died unexpectedly on 19 May 1983, at the age of 28. Although young, his energy and enthusiasm for physical science and technology had already led to contributions in a wide spectrum of areas.

Iles had been hired by the Analytical Spectrochemical Group at Ames in 1975 while still an undergraduate at Iowa State, because of his expertise in laser technology, and became a full-time member of this group in 1978, upon receiving a BS in physics.

Laser technology was a central enthusiasm of Iles, and he designed and built a number of laser systems that are in use in pollutant detection, energy generation, and other research applications. Iles was a frequent consultant throughout Ames and at other laboratories on laser and detection systems; he developed concepts for "charge gates" and charge-to-count converters, as well as designing a novel rotation and displacement transducer and a rugged underwater vacuum gauge. A large enterprise, to which Iles contributed greatly in recent years, was the design of a large-scale kinetic-energy storage system.

Iles's love of life carried him into many activities outside his professional work. He designed, built, tested and used wilderness clothing. He was particularly interested in ultralight gear that could be used under extreme ranges of conditions, and he was experimenting constantly with new designs. At the time of his death, Iles was about to leave for the Andes mountains in Chile as a member of a climbing expedition. Those of us who were lucky enough to know him as a colleague or friend remember him as a free, creative spirit of tremendous energy and enthusiasm. He was in motion constantly,

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