trast transfer functions and he was among the first to develop a computer-controlled color video display for producing complex visual stimuli.

David S. Grey (David Grey Associates, Lexington, Massachusetts) received the Joseph Fraunhofer Award for his "contributions to the development of computer optimization techniques in lens design." Grey earned his BA in mathematics from Harvard College in 1940 and pursued graduate studies in engineering there. He worked at Polaroid, at the Lincoln Laboratories and at Aerospace. In 1967 he founded David Grey Associates, which develops computer programs for optical design. Grey was among the first to develop a large-scale lens optimization program for engineers and to use the orthonormalization of aberrations in lens design.

John L. Plummer (Plummer Precision Optics, Pennsburg, Pennsylvania) was presented the David Richardson Medal for his "contributions to the advancement of the state of the art of optical fabrication by invention, by imagination, by example and by generously sharing his talents with others in the field." Plummer received a BA in mechanical and electrical engineering from Louisiana State University, Baton Rouge, in 1942. He worked at the Frankford Arsenal (Philadelphia, Pennsylvania), the army's primary optics facility, during World War II. In 1944 he co-founded Plummer and Kershaw, and in 1968 he founded Plummer Precision. The latter was one of the first optical fabrication companies to develop high-speed generation equipment, and to use robotics and air spindles in manufacturing.

OSA, the Coblentz Society and the Society for Applied Spectroscopy presented the 1986 Ellis R. Lippincott Award to Wolfgang Kaiser (Technical University of Munich) "for his innovative and imaginative approach to the study of molecular vibrations." Kaiser received his undergraduate degree (1950) and his PhD (1952) from the University of Erlangen (FRG). He worked at Purdue University (1952–54), in the US Army Signal Corps (1954–57), and at the Bell Labs (Murray Hill, New Jersey, 1957–64). In 1964 he became a professor of physics at Munich. In 1966 Kaiser introduced nonlinear autocorrelation techniques for measuring the duration of picosecond light pulses and made the first observations of coherent Raman Stokes and anti-Stokes scattering of probe light from driven lattice vibrations. In 1971 he was the first to measure directly the dephasing time of molecular vibrations in liquids using coherent Raman scattering, and in 1972 he measured the population lifetime of a vibration mode in a liquid. He introduced both coherent molecular vibrational spectroscopic techniques for studying tunable parametric ultrashort pulse sources in the frequency range 2500–27000 cm^{-1} (1974) and two-photon picosecond fluorescence probing (1975).

The society's board of directors also elected André Maréchal, retired director of the Institut d'Optique in Paris, the eighth present honorary member of OSA.

in brief

William Parrish, manager of crystallography and microstructures at IBM (San Jose, California) will receive the J. D. Hanawalt award of the International Centre for Diffraction Data for "excellence in the field of powder diffraction." Parrish pioneered many of the techniques and instruments now widely used in powder diffraction—including the x-ray diffractometer—as chief of the x-ray and crystallographic section at Philips Laboratories (1943–68). Most recently he has extended powder diffractometry to studies of material in magnetic bubble memories, and he has developed a high-resolution powder diffractometer for use with synchrotron radiation.

Dan Baker, a space physicist at Los Alamos National Laboratory, has become head of the Laboratory for Extraterrestrial Physics at the NASA Goddard Space Flight Center.

obituaries

Curtis Judson Humphreys

Curtis Judson Humphreys died 22 November 1986, less than three months before his 89th birthday, at his home in Delaware, Ohio.

Humphreys was born in Columbiana County, Ohio, on 17 February 1898. He obtained an AB degree at Ohio Wesleyan in 1918, an MS at the University of Kentucky in 1921 and a PhD in physics at the University of Michigan in 1928. His dissertation concerned the observation and analysis of the highly ionized spectra of arsenic and selenium and was done under Ralph A. Sawyer. While at Michigan Humphreys worked intimately with Samuel A. Goudsmit, assisting him with the preparation of manuscripts, one of which they published as coauthors. This was a rare opportunity for a young graduate student to have a small part in the development of quantum dynamics. He then joined the National Bureau of Standards where he spent most of the years between 1928 and 1953. When the Corona Laboratories of NBS were transferred to the Department of Navy in 1953, Humphreys became head of the infrared division at Corona, and in 1957, head of the research department, the post he held until his retirement in 1967. Three months after his retirement he rejoined the laboratory at Corona as a research associate, continuing his basic research until the dissolution of the laboratories in May 1969. He went immediately to Purdue University as a research associate in the physics department where he continued active work in atomic spectroscopy

HUMPHREYS

for another three years with me.

Beginning about 1930 Humphreys started making wavelength determinations with the Fabry–Perot interferometer. Results of the first measurements appeared in the *Transactions of the International Astronomical Union* containing the draft and meeting reports of Commission 14 of that body following the meeting in 1932. For approximately 40 years some contribution to the International System of wavelength standards, originating in Humphreys's program, appeared in the report of the commission following every triennial meeting. Of his earlier work with the NBS group particular mention should be made of the analyses of the spectra of Krypton and xenon and their various ions.

During the World War Humphreys

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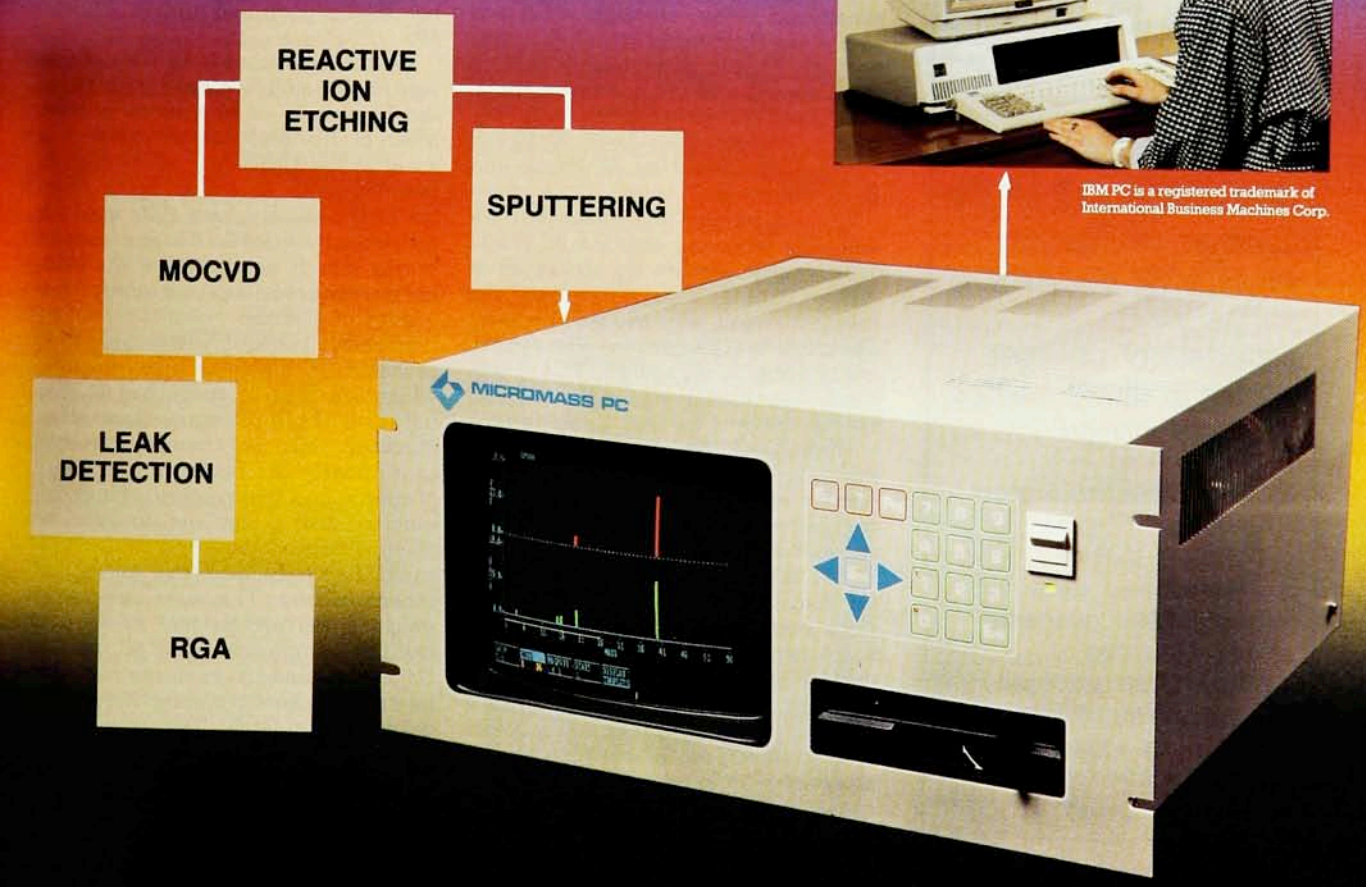

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was one of a team of spectroscopists working on the Zeeman-effect experiment and analysis that established that uranium was a member of a second rare earth series and not a homologue of tungsten. An important consequence of this work was the rearrangement of the periodic chart of atoms, which correctly placed Th, Pa, and U along with the transuranic elements on a separate line below elements Ce to Lu rather than as homologues of Hf, Ta, and W.

Humphreys was among the first to recognize that the improved radiometric techniques that had evolved during the war permitted a new assault on the infrared spectrum of hydrogen. Thus it was by a radiometric technique that he was the first to observe and report the sixth series of the emission spectrum of atomic hydrogen of a wavelength of 12.37 micrometers. This series is now called the "Humphreys Series" in physics textbooks. His work in infrared atomic spectroscopy piror to 1954 was recognized in an invitation to give a talk at the Rydberg Centennial Conference on Atomic Spectroscopy held at the University of Lund, Sweden, 1954. He shared this signal honor with William F. Meggers, Niels Bohr, Wolfgang Pauli, A. G. Shenstone, G. Racah and H. Kopfermann.

The availability of photoconductive detectors following the end of World War II made possible the extension of high-resolution observations into the infrared region well beyond the limit accessible to photography. His recording of a line in Xe I at 55 772.4 Å was the farthest observation in the infrared by this method at that time.

Humphreys achieved a significant breakthrough by 1955 with the development of a Fabry–Perot interferometer system for use in the infrared, capable of operating at order numbers in the range of 10^5. Negative results for similar attempts at other institutions were being reported during this same period. His success lay in the development of a mechanism for scanning the interference pattern across a slit by a uniform rotation of the interferometer. Up until this time optical standard wavelengths of eight significant figures were essentially limited to the 0.3–0.9-micron region. However, progress in molecular spectroscopy made for an acute need for wavelength standards in the 2–7-micron region. In 1958, Humphreys and his coworkers were able to report values in this region to eight significant figures—and indeed, some of his values of argon and neon lines were accepted as provisional wavelength standards by Commission 14. These were the first wavelengths of lines beyond the photographic limit ever to be considered in the half century of the Union's existence. Three years later independent, concordant determinations made by entirely different techniques were submitted by E. R. Peck and T. A. Littlefield to satisfy the provisions of the IAU for standard wavelengths, so that they no longer needed to be considered as provisional.

In addition to his many scientific achievements, Humphreys was known for his warm and friendly personality, for the many droll stories, always appropriate to the occasion, that he would recall and deliver in his inimitable manner, for his silent step, his ready smile and his inexhaustible vocabulary.

KENNETH L. ANDREW
Purdue University
West Lafayette, Indiana

James William Broxon

James William Broxon died 8 September 1986 after a long illness. He was 89.

Broxon graduated from Wabash College in 1919 and received his PhD from the University of Minnesota in 1926. Most of his professional career was spent at the University of Colorado in Boulder where he was an active member of the faculty from 1922 until his retirement in 1963. During part of World War II he worked in the Manhattan Project Laboratories at the University of Chciago.

His early research was on ionization processes in gases at high pressure, which led him to study cosmic rays using a high-pressure ionization chamber. His ion chamber recorded continuously the fluctuating intensity of cosmic rays that penetrated approximately 0.3 m of lead and steel, and he then correlated these intensities with sunspot activity, magnetic storms and other variables. This research spanned much of his professional career and resulted in approximately 40 publications. Assisted by graduate students, he worked without funding through the years of the Great Depresion when financial support for research was almost nonexistent.

For many generations of students Broxon was at the center of the undergraduate and graduate curricula. His favorite courses were mechanics and electricity and magnetism and in 1960 he published an undergraduate text, *Mechanics* (Appleton–Century–Crofts).

He is remembered by his students as a teacher who demanded much and who gave much in return.

ALBERT A. BARTLETT
University of Colorado
Boulder, Colorado □