obituaries

from electrochemistry to new areas of chemistry and physics. He was a member of a team of four who built the first mass spectrometer in Czechoslovakia in the early 1950's. After some early work on analytical aspects of mass spectrometry, Čermák's research interests turned to collision processes investigated by means of mass spectrometry. In the ensuing years his research group made several essential contributions to the then rapidly developing field of ion–molecule collision processes. Studies of ionization in collisions of electronically excited metastable neutrals with molecules (Penning ionization) led him to the electron spectroscopy known as Penning ionization electron spectroscopy (PIES)—the area of chemical physics he is credited with founding. The years from 1965 to 1977 were characterized by vigorous activity and leadership in this field. In the last two years of his life his work was at times restricted by the advancing disease which he fought bravely, but which led eventually to his death.

Čermák's major scientific contributions came in the fields of mass spectrometry (collision processes) and of electron spectroscopy. His early work on ion–molecule chemical reactions showed the role of electronic excitation energy in these processes. A simple change in the operating conditions of the Nier-type ion source for an ordinary mass spectrometer allowed his and other research groups to study charge-transfer processes before special beam machines were generally available. The idea of studying the so-called break-down pattern of an excited polyatomic molecular ion by imparting a specific amount of excitation energy through charge transfer came from these early investigations. His paper on electron-impact production of highly excited Rydberg states in noble-gas atoms was one of the pioneering works in this area. Studies of associative and Penning ionization in collisions of metastable noble gas atoms and molecules in Čermák's laboratory led to the understanding that, by accurate measurement of energy of the released electron, detailed information could be obtained on electronnic and internal states of the ion formed. This was the beginning of the PIES method, which has since yielded not only data analogous to those from photoelectron spectroscopy of molecules, but also information on the colliding-particle interaction. He then exploited the method beyond the PIES limits; electron spectroscopy of autoionizing excited atoms formed in dissociative collisions of fast atoms and molecules may serve as an example of it.

Čermák served for many years as the head of the department of mass spectrometry of the Institute in Prague, and in the last years of his life he helped to organize and was temporarily in charge of the ESCA center of the institute. He was a visiting fellow at the Joint Institute for Laboratory Astrophysics, University of Colorado, Boulder in 1964–65 and in the summer of 1969, and a visiting professor at the Université de Paris-Sud, Orsay (1969–70). Čermák served for many years on the General Committee of the International Conference of Electronic and Atomic Collisions and he was a member of the Editorial Board of the *Journal of Electron Spectroscopy*. In 1968 he was awarded the title Doctor of Sciences, a high scientific honor in Czechoslovakia . In 1954 he was the recipient of the Czechoslovak State Prize for this scientific work and in 1977 he was awarded the Marcus Marci Medal for his contributions to the advancement of spectroscopy in Czechoslovakia.

Čermák's contributions to the field of atomic and molecular physics have achieved a worldwide recognition. He was a warm person; an enthusiast who was always younger than age showed, and an affectionate admirer of nature and wildlife. His friends and colleagues will remember not only personal charm (enhanced by his ability to converse freely in five languages), but also his firm and uncompromising stands when important issues were at stake. Čermák's younger colleagues will miss the advice, support and stimulation that he provided to so many.

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Cecilia Payne-Gaposchkin

Cecilia Payne-Gaposchkin, Phillips Professor of Astronomy Emerita at Harvard University and recipient of the American Astronomical Society's prestigious Henry Norris Russell Lectureship for 1977, died on December 7, 1979.

Born in Wendover, UK, in 1900, Payne-Gaposchkin grew up in England and entered Newnham College of Cambridge University in 1919 to study natural sciences. Her fascination for astronomy was initially inspired by one of Sir Arthur Eddington's lectures on relativity. After completing the tripos examinations, she crossed the Atlantic to study with the newly appointed director of Harvard Observatory, Harlow Shapley.

In 1925, Payne-Gaposchkin received the first PhD in astronomy awarded by Harvard or Radcliffe—as a woman her

degree was from Radcliffe. Her dissertation, entitled "Stellar Astrophysics" and published as a monograph, was a pioneering work in which she applied Meghnad Saha's ionization theory to determine stellar temperatures and chemical abundances. Appointed to the Harvard Observatory staff, she turned her attention to the spectroscopy of supergiants, Wolf–Rayet stars and variables. These studies resulted in another classic monograph: *The Stars of High Luminosity*, published in 1930.

At Shapley's suggestion, Payne-Gaposchkin then undertook a study of photographic stellar photometry. The time-consuming attention to detail required by the establishment of standard stellar magnitudes and colors caused Payne-Gaposchkin to chafe under this assignment. Although recognizing the value of photometry, she felt it consumed too much of her time. Nevertheless, this work led her to the study of variable stars, the field for which she is best known and to which she devoted so many years. Some of the variable-star studies were in collaboration with her husband, Sergei I. Gaposchkin.

The Gaposchkins were married in March 1934 and embarked on many years of collegial work. Her last book is dedicated to her husband, "that bright particular star." Their first major joint venture, *Variable Stars*, published in 1938, surveyed and organized the subject so effectively that much of it is still valid today. Payne-Gaposchkin wrote the detailed discussion of the intrinsic variables, while Sergei Gaposchkin concentrated on the eclipsing stars. The ability to synthesize heterogeneous material into a coherent whole is well illustrated in this monograph. The book served as a stepping stone, or as Payne-Gaposchkin preferred to think of it, a prolegomena, to the analysis of all known variable stars down to tenth magnitude as recorded in the Harvard Observatory plate collection. The Gaposchkins accomplished this monumental task in the space of about five years. The uniformity of the data allowed for systematic determination of the light curves and related photometric characteristics of some 2000 variable stars.

PAYNE-GAPOSCHKIN (1948)

Payne-Gaposchkin used the understanding of variable stars so obtained to place them in perspective in a larger sense: their distribution in the galaxy as indicators of the structure of the Galaxy, and their relationships to each other, including their role in stellar evolution. She shared this perspective with the astronomical community in two books, *Variable Stars and Galactic Structure* (1954) and *The Galactic Novae* (1957). The explosive variables, the novae, particularly excited her, for they gave her full play to exploit her initial interests in spectroscopy.

Most astronomers will agree with her self-assessment, namely that she was not one to fashion new theories, but contributed by collecting, turning over in her own hands, comparing and classifying the data of astronomy. She did this superbly and energetically for more than fifty years. The fruits of her work are the books already referred to as well as over 150 papers. She wrote two semi-popular books using the theme of stellar evolution, *Stars in the Making* (1952) and *Stars and Clusters*, published the year she died. Her textbook *Introduction to Astronomy* went through two editions, the second in collaboration with her daughter, K. Harumundanis.

Cecilia Payne-Gaposchkin's career at Harvard was marred by the reluctance of the institution to advance her and give her recognition that was her due. Her original ambiguous appointment in 1925 to the Harvard Observatory staff was not clarified until 1938, when she received the title "astronomer." At her own request, this was later changed to Phillips Astronomer. As such she participated fully as a member of the Harvard Observatory Council, including teaching, directing theses, and conducting graduate student examinations. Not until 1956, however, when the directorship of the Observatory has passed into the hands of Donald Menzel, was Payne-Gaposchkin "promoted" to professor and given a salary commensurate with her stature. Not only did she then become professor, she also became chairman of the Department of Astronomy at Harvard University. One can decry the years of injustice or one can rejoice that she was the first woman at Harvard to be appointed to a full professorship not specifically designated for a woman.

Students and colleagues will remember her for her prodigious memory and her way of referring to individual stars, even spectral lines, as familiar and distinctive friends. Many of her books are enriched by apt quotations from the ancient classics and later literature, an outgrowth of her early classical schooling. Her knowledge was encyclopedic, her enthusiasm unbounded. Shy and diffident herself, she tended to hold other renowned astronomers in great esteem, even veneration. This characteristic occasionally led her early in her career to yield to authority even when her own research pointed another way. Mostly, however, she was her own drummer, she stepped "to the music which [she] hear[d], however measured or far away." She may have felt that she had walked with giants; now we recognize that she, herself, was one.

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Norman Hurd Ricker

Norman Hurd Ricker, professor emeritus of physics at Oklahoma University, Norman died on 4 January 1980. He was 83 years old.

Ricker distinguished himself during his sixty-year career with two significant inventions. In the early 1920's, he invented the paper-cone speaker system still used for sound reproduction in radios, telephones and television. Ricker also pioneered a deep well drilling process used in oil-field development.

Rice University granted Ricker a BA (1916), an MA (1917) and a PhD (1920). From 1921 to 1923 he worked in the research laboratory of Western Electric Co (now Bell Laboratories). It struck him one day that the music piped into the laboratory from a nearby concert suffered from poor reproduction. "Music was almost a total loss," Ricker once remarked, "because the existing speakers could not pick up any high or low notes," He cut out several cone-shaped pieces of heavy drafting paper, glued them together and set them up to vibrate as a speaker. The result was a major advance in audio quality.

Ricker headed the geophysical research department of Humble Oil and Refining Co during the years 1923 to 1925. He spent the next 13 years as a consulting physicist for oil concerns and then worked the next 20 years as senior research physicist for the Carter Oil Co. After a year in a similar post at Jersey Production Research Co, he joined the University of Oklahoma. Ricker remained there for six years before he was awarded an emeritus professorship in 1965. □