

we hear that

Rutgers University, has become president of the New York Academy of Sciences.

James L. Elliot has been appointed director of the George R. Wallace Astrophysical Observatory and associate professor in the department of earth and planetary sciences at MIT.

Stanley J. Shepherd and **Peter D. Georgopoulos**,

both physics professors at Pennsylvania State University, have received AMOCO Foundation Outstanding Teaching Awards. The awards of \$1000 each are given to recognize excellence in teaching performance by senior faculty in the undergraduate program.

James K. Tison has joined the staff of Balzers Corporation as high vacuum equipment product manager, leaving his previous position at CVC Products, Inc.

obituaries

Manne Siegbahn

Karl Manne George Siegbahn, one of the great pioneers of atomic physics, died on 25 September at the age of 91. He was born in Örebro in Sweden and received his academic education in the University of Lund, where he obtained his doctor's degree in 1911. He taught at Lund and eventually became the head of the physics department, succeeding Johannes R. Rydberg. He moved to the University of Uppsala in 1923 and from 1937 until his retirement in 1964 he was Director of the Nobel Institute of Physics of the Royal Swedish Academy of Sciences.

When Siegbahn started his scientific work the wave nature of x rays had just been recognized and Henry Moseley had done his famous work establishing the shift of the K and L series with atomic number. While this early work was done with an accuracy of only about 1%, Siegbahn, by a brilliant sequence of improvements in methods and design of x-ray spectrometers, had by 1924 increased the accuracy by a factor of almost 1000, that is, down to 0.001%.

Apart from studying the structures of the K and L radiations and finding many new components in them, Siegbahn discovered M radiation in 1916. Subsequently he and his students produced a great deal of new knowledge about x-ray spectra covering almost all the elements from sodium to uranium. They also studied absorption spectra of x rays and established for the first time that corresponding to the K, L and M series there are one, three and five absorption edges respectively. The shell structure of atoms with two electrons in the K shell, eight in the L shell and eighteen in the M shell, with which we are so familiar today, was largely based on Siegbahn's work.

Because of the high accuracy that Siegbahn developed in x-ray spectroscopy it soon became apparent that the Bragg equation had to be slightly corrected on account of the finer details of crystal diffraction that was developed by P. P. Ewald and C. G. Darwin.

In addition to his work with crystals Siegbahn was also a pioneer in the use of



SIEGBAHN

ruled gratings for the study of x-ray spectra, particularly at longer wavelengths. He built ruling engines that allowed him to produce gratings of the high quality required for x-ray studies and in this way, independently of the American workers, he established the small discrepancy between x-ray wavelengths measured by crystals and measured by ruled gratings, which was later resolved by recognizing an error in the determination of the viscosity of air on which Millikan's value for the electronic charge was based. In 1924 Siegbahn published his well-known book *Spectroscopy of X-rays*, which remained for many years the Bible of x-ray spectroscopists. Another outstanding result obtained by Siegbahn and his co-workers was the first clear demonstration of the reflection, refraction and interference of monochromatic x-rays.

After becoming (in 1937) the first director of the physics department of the Nobel Institute Siegbahn built there the first accelerator in Sweden and established a laboratory that made many important contributions to the study of nuclear energy levels. A large number of foreign students, postdoctoral fellows and other visiting scientists passed through this Institute, which attained an ex-

tremely high international reputation.

Siegbahn was not only a great physicist; he was also a great engineer. It was through his ability as an instrument builder that, as mentioned earlier, he was able to increase the wavelength accuracy of x-rays a thousandfold, and it was also through the same engineering ability that he was able to produce ruled gratings of the necessary precision and later to build accelerators, beta-ray spectrometers and other equipment for the work at the Nobel Institute. Anyone who has visited the Nobel Institute will have been impressed, as I was, by the high level of perfection of instruments designed at the Institute. I had the privilege of meeting Siegbahn on several occasions. Each time I came away with a strong impression of his warm and unpretentious personality, his genuine interest in his visitor and his obvious pleasure in showing the remarkable instruments he had built. He left with me the memory of a great scientist.

Siegbahn was awarded the Nobel Prize in Physics in 1924 "for his discoveries and research in the field of x-ray spectroscopy." In 1934 he received the Hughes Medal and in 1940 the Rumford Medal of the Royal Society of London and in 1948 the Duddell Medal of the Physical Society of London. Even after his retirement in 1964 he continued to work actively and diligently in the Institute that he had founded. His pioneering work forms an essential experimental basis of modern atomic theory and will be remembered by generations of physicists to come.

GERHARD HERZBERG
National Research Council
Ottawa, Canada

Joseph H. Weis

Joseph H. Weis was killed at age 35 in a sudden storm that swept the French Alps on 30 August while he was climbing the Shroud on the Grand Jurasse near Chamonix. His climbing partner, Frank Sacherer of CERN also perished (see following obituary).

Born in Coulee Dam, Washington, in 1942, Weis received a BS degree in physics at Caltech and obtained his PhD in physics at the University of California at Berkeley in 1970 under the direction of Stanley Mandelstam. After postdoctoral work at the Massachusetts Institute of Technology, he joined the faculty at the University of Washington in 1972 where he remained until his death. He was also a visitor at the Theory Division of CERN in Geneva on several occasions.

A theoretical high-energy physicist, Weis was well known for his tenacious pursuit of difficult and challenging problems—in particular, for his demonstration of the necessity of multi-Regge cuts to avoid conflicts with decoupling theorems, for his formulation of a consistent set of Feynman rules for Reggeon

exchange diagrams for multiparticle processes, and for his work on high-energy hadron-nucleus collisions. Most recently he had investigated the implications of confinement on the parton model and carried out an exhaustive study of two-dimensional QCD that made possible a consistent parton interpretation of this theory with confined quarks.

His intensity and enthusiasm in tackling a physics problem and his friendly and incisive questioning were stimulating to all who were fortunate to know him. High-energy physics, as a discipline, has lost a theorist of great talent and accomplishment, and, as a community, has lost a magnanimous and inspiring colleague.

MARSHALL BAKER
University of Washington

RICHARD BROWER
University of California at Santa Cruz
CARLETON DETAR
University of Utah

Frank J. Sacherer

Frank J. Sacherer, a theoretical physicist who specialized in accelerator science at the CERN laboratory in Geneva, died 30 August. Sacherer met his death in the same mountaineering accident that killed Joseph Weis (see preceding obituary). He was 38.

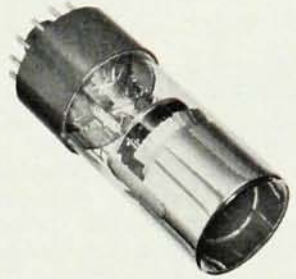
Frank was born in San Francisco, attended the University of San Francisco as an undergraduate and then came to the University of California at Berkeley, where he received his PhD in physics under my supervision at the end of 1968. He became a member of the CERN staff in 1970, and in the brief time since then developed into one of the world's foremost accelerator theorists. Success in that discipline includes close participation in machine development, so that CERN, in particular, has suffered a grievous loss through his unexpected death.

His major interest had been in collective effects, phenomena arising from the interaction of intense beams with themselves and their surroundings and which, in large part, limit achievable intensities in high-energy accelerators. He established a general framework for dealing with these effects, which is in wide use. In the last few years he had also become a leading authority on stochastic cooling, a scheme that increases the density of particles in phase space and opens the way to a practical proton-antiproton colliding-beam facility. One such facility is now under construction at CERN and another is planned for FermiLab; the confidence to go ahead with such plans is due in considerable part to Sacherer's contributions in understanding and controlling the process.

He was always extremely diffident about his accomplishments, bemoaning the fact that he couldn't accomplish more. The world accelerator community has lost

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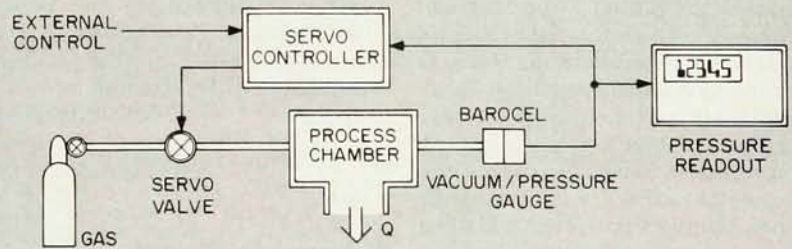
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