versity physics department over the past year. Last fall, **Jainendra Jain**, formerly at the State University of New York at Stony Brook, became the first holder of the Erwin Mueller Chair in Physics at Penn State. **Lee Samuel Finn** also moved to Penn State last fall from Northwestern University. **Peter Eklund** of the University of Kentucky will follow next month.

The American Society for Mass Spectrometry has presented its 1999 Award for a Distinguished Contribution in Mass Spectroscopy to **Melvin B. Comisarow**, a professor of chemistry at the University of British Columbia, and **Alan G. Marshall** a professor of chemistry at Florida State University. They were honored for the invention and development of Fourier transform ion cyclotron resonance mass spectrometry. The society also presented its 1999 Biemann Medal to **Matthias Mann** for "his ingenious applications of mass spectrometry to protein chemistry and molecular biology." Mann is a professor of molecular biology at the University of Southern Denmark. The awards were presented at the 47th ASMS Conference in June in Dallas, Texas.

Fred Stein has been selected to be the new director of education and outreach programs at the American Physical Society. He is currently the director of the Center for Science, Mathematics, and Technology Education and a professor of chemistry at Colorado State University. He replaces **Ramon Lopez**, who has accepted the position of Cook Professor and chair of the physics department at the University of Texas at El Paso.

In June, **Keith Thomassen** retired as head of the magnetic fusion energy program at Lawrence Livermore National Laboratory. He retained his professorship in the nuclear engineering department at the University of California, Berkeley.

Bob M. Duff has been named the executive director of the Southwest Research Institute's instrumentation and space research division. He was previously director of the institute's electronics and applied physics department.

OBITUARIES

Glenn Theodore Seaborg

Glenn Theodore Seaborg, discoverer of ten transuranic elements, winner of the 1951 Nobel Prize in Chemistry, and chairman (1961–71) of the Atomic Energy Commission, died on 25 February at his home in Lafayette, California, while recovering from a stroke he had suffered six months earlier.

Born on 19 April 1912 in Ishpeming, Michigan, Glenn earned an AB in chemistry from the University of California's Los Angeles campus in 1934 and a PhD in chemistry from its Berkeley campus in 1937. Gilbert Lewis supervised Glenn's thesis work, which was on the interaction of fast neutrons with lead. After completing his PhD, Glenn worked in Berkeley's chemistry department—as Lewis's personal assistant, as an instructor (1939–42), and then as an assistant professor (1941–42).

In 1940, Edwin McMillan and Peter Abelson synthesized element 93 (neptunium) at Berkeley for the first time. Because neptunium, with a halflife of two days, was found to emit beta particles, its decay product was presumed to be element 94. In December of that same year, Glenn and his Berkeley team successfully isolated the unstable neptunium and separated and identified its decay product as element 94.

GLENN THEODORE SEABORG

Continuing the nomenclature of its two predecessors in the periodic table, the new element was named plutonium.

In 1942, the US having entered World War II, Glenn took a leave of absence from Berkeley to join the Manhattan Project at the University of Chicago's Metallurgical Laboratory. It was in the summer of that year that I joined Glenn's group as its 12th member. I viewed my job as temporary—one that would disappear as soon as World War II was over. I must confess that, though Glenn took great pains to explain to me the science that was driving the project, I really did not understand the scale of what was being done. But he had decided that I would be the one who would watch over the instrumentation that was needed for him and his superb corps of chemists.

The chemists' job was to design a separation process for plutonium, an element that had hitherto been produced in such small quantities that no one had ever seen it. Furthermore, its separation was made even more difficult because the element was accompanied by frightening amounts of radioactivity when it was produced from the highly irradiated uranium in the huge neutron reactors at Hanford, Washington.

Of course, the separation project under Glenn was very successful, and I found out later that his knack of picking people to do particular jobs was really quite effective. In the rare cases when it did not work out, he would hire someone else and put him to work right alongside the errant worker.

Glenn was a very intense person who always kept his eye on the ball and seemed to have the knack of doing the right thing at the right time. He believed that one should not waste any time in making measurements any better than needed to accomplish a particular scientific objective. Occasionally, he was accused of skimming the peaks of research and never working in the valleys, but that was unfair because he was concerned with reconnoitering the vast new research areas that had been opened up by the advent of nuclear energy, knowing that the thorough investigations would come later when the training of PhD students resumed after the war.

Glenn always worked very hard because he felt that he had so much to do. He seemed to have a vision that demanded all of his capabilities (and those of his associates, too!). During the war, most of the scientists worked about 60 hours a week, and the necessary meetings were always held at night. To relieve stress, Glenn developed the habit of playing golf at the nearby Jackson Park Golf Course. Although his tortured swing was something to behold, somehow he managed to get on the green in three strokes on the average, and often beat his opponents (I was often among them) with his short game.

Glenn's first love was the expansion of the periodic table, and, as soon as he felt that the process of chemically separating plutonium was under control, he decided that the next step was to look for new elements beyond plutonium. He had two options. One was to use the newly built neutron reactors ("piles" they were called in those days) to add neutrons to the plutonium nucleus until it beta decayed to a new element with the atomic number 95. The other option was to use helium ions from the 60-inch Crocker Laboratory cyclotron in Berkeley to make a new element with the atomic number 96. He used both methods and eventually was successful in creating both new elements—americium and curium.

But in the late 1940s, there were two big problems that affected research into the transuranic elements. One was that the relatively primitive instruments were not very sensitive. The other was that, although the chemistry of plutonium was well-known by then, that of the new elements was completely unknown. These factors meant that little progress had been made after many months of effort. Finally, Glenn made a big breakthrough when he formulated his theory that the transuranic elements were part of an actinide series, and, because they were trivalent in aqueous solution, they could be chemically separated from the plutonium target material. His theory of a rare earth–like series required a major realignment of the periodic table, and for many years the Seaborg hypothesis was fought by other chemists. In the end, his actinide theory was vindicated, especially after his insight made possible the chemical identification of elements up through element 103, which was later dubbed lawrencium.

His work in the transuranium field led inexorably to the Nobel Prize in Chemistry in 1951 and thence to service outside the laboratory, where he soon proved himself equal to the challenge. From 1958 to 1961, he served as chancellor of the University of California, Berkeley, and then, in 1961, President Kennedy asked him to be the chairman of the US Atomic Energy Commission (AEC). That position launched his career into the arena of world politics. For ten years and while serving under three presidents—Kennedy, Johnson, and Nixon—Glenn worked diligently at the AEC. He participated in the negotiations that led successfully to a complete worldwide ban on the atmospheric testing of nuclear weapons. Of more far-reaching consequence, though, was his espousal, both while chairman and thereafter, of a comprehensive test ban treaty.

Though his AEC job was a very demanding one, Glenn always had time to talk about the science that was dearest to his heart, the transuranium elements. It was because of Glenn that AEC's National Transplutonium Program was launched in 1961 and carried through to the point where the heaviest elements would become available for various kinds of chemical and physical research. It was also thanks to Glenn that our current knowledge of these rare elements is very extensive. Furthermore, it was his sponsorship of the very expensive production of large quantities of pure plutonium-244 that led to the use of ^{244}Pu as the target material in the production of one putative atom of element 114 by a joint Russian–American team at the Joint Institute for Nuclear Research in Dubna, Russia, in January 1999. If confirmed, this achievement will mark the discovery of the first truly superheavy element.

When he returned to Berkeley in 1971 after the long stint in the Washington jungle, it would have been understandable if he had settled down into a less hectic existence—but that was not to be. He immediately plunged into the academic routine, and one of his greatest joys became teaching the freshman chemistry class. For that, he had to study hard to bring himself up to the very high standards that he had decided a teacher should have. Besides his teaching duties, he supervised the PhD research of more than 65 students. He founded and became the first director of the Lawrence Hall of Science in 1982. He wrote more than 500 scientific articles and numerous books. Because he had an acute sense of history, he somehow also found the time to edit his valuable, extensive, and marvelously detailed journals, which he had kept faithfully throughout his long career. He was truly overwhelmed when, in 1994, his colleagues proposed that element 106 be named Seaborgium, and he claimed that that was an even greater honor than the Nobel Prize!

The accompanying picture of Glenn was taken a few months before the stroke that would prove fatal by Pier Addone, the inventor of the PEP-II, the "asymmetric B factory" completed late in 1998 by the LBL/SLAC team.

ALBERT GHIORSO
Lawrence Berkeley National Laboratory
Berkeley, California

Gerhard Herzberg

Gerhard Herzberg, winner of the 1971 Nobel Prize in Chemistry for "his contributions to the knowledge of electronic structure and geometry of molecules, particularly free radicals," died on 3 March at his home in Ottawa, Canada.

Born in Hamburg, Germany, on 25 December 1904, Herzberg was ten when his father died, but scholarships made it possible for young Gerhard to attend the local *gymnasium*. Later, a Hamburg industrialist supported his further education at the Technical University of Darmstadt.

After earning his doctorate in engineering physics at Darmstadt in 1928, Herzberg was a postdoctoral fellow at the University of Göttingen, where, during one of the most exciting periods in the history of physics, the newly developed quantum mechanics was being applied to atomic and molecular physics. He joined Max Born's group for six months, working on theory with Walter Heitler, and then spent six months with James Franck's experimental group.

At Göttingen, Herzberg met Friedrich Hund, who kindled his interest in molecular-orbital theory. Herzberg made an important early contribution to the field with his theory of bonding and antibonding electrons. This innovation led to an invitation from John Lennard-Jones to spend the academic year of 1929 at the University of Bristol in England. He returned to Darmstadt in 1930, and, through his research over the next four years, he won recognition as one of the pioneers of molecular spectroscopy.

After the Nazis came to power in 1933, Herzberg, whose wife Luise (also a distinguished spectroscopist) was Jewish, began looking for positions abroad with the help of emergency committees in London and Zurich. Opportunities in North America not only were scarce because of the Great Depression, but were also much sought after by a large number of academic refugees from Europe. Eventually, in 1935, Herzberg was invited to join the University of Saskatchewan in Saskatoon, Canada, as a guest professor funded by the Carnegie Corp.

At Saskatchewan, proving himself to be an excellent and caring lecturer, he was soon given a permanent appointment. He spent ten happy years there, and carried out important research on molecules of astrophysical interest, while completing two of his molecular texts.

In 1945, he joined the faculty of the University of Chicago's Yerkes Observatory, where he formed a lifelong friendship with Subrahmanyan Chandrasekhar. Herzberg founded a spectroscopy laboratory that housed a long absorption–path system to duplicate the spectra of planetary atmospheres.

Three years later, he returned to Canada to establish a molecular spectroscopy laboratory at the National Research Council of Canada (NRCC) in Ottawa, which was expanding its activities after World War II. Having seized the opportunity with enthusiasm, he soon assembled a team of young spectroscopists, who all later