go from 40 kV to 60 kV and to use direct exposure on photographic plates instead of taking a picture of the fluorescent screen. Based on their freehand drawings of the design changes, Burton let them alter the existing microscope and start building what became the successful electron microscope.

By 1938 German claims of electron microscopes with 100-Å resolution—20 times better than the light microscope—were reported in major newspapers. The announcement gave Burton leverage for more funding and indicated existence of a market for such microscopes. It spurred Hillier and Prebus to renewed urgency and caused them to wonder how they might get a piece of the action. They reached 100-Å resolution by December 1939. That same year, electron microscope imports from overseas were blocked by war in Europe. Canada did not have the industrial power to quickly begin large-scale manufacture of such equipment. Hillier, after defending his doctoral thesis, "The Fundamental Principles of Practicing Electron Microscopy," in the early spring of 1940, telephoned GE and RCA for interviews.

He found his first opportunity at RCA. Vladimir Zworykin, associate director of RCA Research Laboratories, had gone through two designers without getting an electron microscope that would work in normal light, a criterion that he and RCA marketing considered essential. Hillier told him that if the specimen was thin enough, high beam current could be used and the fluorescent screen seen in a well-lighted room.

Zworykin asked Hillier how long it would take to produce a prototype based on the one Hillier and Prebus had made in Toronto. The answer: two weeks, because students had to make extra parts in the university shops after working hours. Thus, Hillier had a working scope in 12 days and nights with help from his Toronto associates, especially William Ladd. Zworykin and Hillier then got RCA to agree to have its laboratory begin manufacturing the microscopes until the company's factory could take over one to two years later.

Many industries purchased microscopes primarily for prestige; others had trouble finding good operators. Zworykin and Hillier realized they needed to educate clients and develop trained operators more than they needed to increase sales. They endorsed an idea to convene an open meeting to discuss the future of electron microscopy in the US. Organized by chemical physicist G. L. Clark, the meeting was held in Chicago. Hillier gave concise, straightforward answers to questions. He impressed the audience with his broad understanding of the microscope's problems and test results and his phenomenal memory of historical details of RCA's work.

Toward the end of the meeting, a resolution to establish a permanent organization—the Electron Microscope Society of America—was passed unanimously. Hillier was elected president for the 1945 term. He made many contributions to EMSA, including developing standards of measuring and reporting magnification and resolution. He showed that by slightly defocusing an image, he could measure a specimen regardless of its quality. He was active in the formation of the International Federation of Societies for Electron Microscopy. At IFSEM's 1954 meeting in Toronto, Canada honored Hillier, his University of Toronto partners, and their German counterparts as the first scientists to achieve 100-Å resolution.

When foreign microscope manufacturers tried to capture part of the US market in the 1960s, RCA was not affected. Hillier had assembled a strong research and development team during his first 15 years there. The RCA scopes were now reliable and user-friendly. One of Hillier's most important staff additions was John Reisner. Hillier had been overseeing the microscope work at RCA's laboratories in Princeton and Camden. Always a good judge of character, Hillier saw in Reisner a man he could trust and in 1951 placed him in charge of the Camden laboratory. Their teamwork between the two labs produced the golden years of RCA's microscope development.

In 1967, after 27 years of working directly on electron microscopes, Hillier became a business executive with RCA. His coworkers and friends appreciated his interest in a wide range of subjects, his directness of action, and his exceptional self-confidence. He retired in 1977.

Hillier and I were lifetime friends and sometimes competitors. We both had worked in successful programs to make a transmission electron microscope. The last time I saw him, we talked as usual about friends we had lost but mainly about the future of technology. When I asked if he regretted having to do graduate work in physics instead of art—he received a physics and math scholarship to Toronto—he said, "I enjoy drawing and painting to clear my thinking or bond with other people, but the day I was forced into electron microscopy was the luckiest day of my life."

Sterling Newberry
Rumford, Rhode Island

Recently posted death notices at http://www.physicstoday.org/obits:

Waldemar Gorzkowski
12 November 1939 – 15 July 2007

Tom Metcalf
5 October 1961 – 7 July 2007

Warren Witzig
26 March 1921 – 13 June 2007

Ole Kleppa
4 February 1920 – 27 May 2007

Dorrit Hoffleit
12 March 1907 – 9 April 2007

James Edward Bishop
16 January 1954 – 30 December 2006

Walter Ernst Meyerhof
22 April 1922 – 27 May 2006

Edward der Mateosian
6 August 1914 – 20 May 2006

Gilbert Jerome Perlow

Gilbert Jerome Perlow, one of the pioneers of the Mössbauer effect and an editor of the *Journal of Applied Physics* and *Applied Physics Letters*, died on 17 February 2007 of heart failure, a week after his 91st birthday.

Born in New York City on 10 February 1916, Gil attended Townsend Harris Hall (now Townsend Harris High School) in Queens. A science teacher realized he had a pupil who could make apparatus run and who had the intellectual curiosity to try to understand how the world works. That teacher gave Gil the freedom to study what he wanted and in return had a skilled helper to assist with his classes.

At age 16 Gil went to Cornell University as an undergraduate to study medicine, which his parents saw as a good career during the Depression. But so strong was his interest in physics—and, as he said, his talent for medicine was not so great—that he switched. He went on to do graduate work at Cornell; his master's thesis, on measurements of L_α satellite x rays, was supervised by Floyd Richtmyer. He then moved to the University of Chicago and did his PhD thesis research with Samuel Allison on nuclear reactions of lithium-6 using a

Gilbert Jerome Perlow

Van de Graaff accelerator. For assistance with making a lithium target, Gil consulted a chemist, Mina Rea Jones, who became his wife as well as his scientific partner until she died in 2003.

Gil completed his thesis in 1940. With US involvement in World War II imminent, he left Chicago for the US Naval Research Laboratory in Washington, DC, where he worked on submarine detection using ultrasound. The system he built was so successful he was flown to Pearl Harbor to supervise its installation in a submarine. He was offered a berth on a trial voyage to sail through the Tsugaru Strait between two Japanese islands, but he declined. After the war he turned to using captured German V2 rockets to make cosmic-ray measurements in the upper atmosphere. He designed and built several detector systems, including telescope arrays of Geiger counters and cloud chambers, that were launched from White Sands, New Mexico. The results showed the presence of gamma rays and charged particles above the atmosphere. Only a small fraction of the gamma rays were in the primary cosmic radiation, and he proposed that most of them arise from Compton backscattering from the atmosphere below.

In 1952 Gil joined the faculty of the University of Minnesota, and in 1954 he moved to Argonne National Laboratory in Illinois, where, apart from sabbaticals in Harwell, UK, and as a Humboldt fellow in Munich, Germany, he spent the rest of his career.

Following the discoveries of the Mössbauer effect in 1958 and the large effect in iron-57 in late 1959, Gil worked with Stanley Hanna and a quickly assembled group of collaborators to unravel the hyperfine spectrum of ^{57}Fe and the internal magnetic field of iron atoms. This major feat in early 1960 was achieved from Gil's realization that the gamma-ray polarization could be detected and used to simplify the spectrum. Measurements of the change in the spectrum when a magnetic field was applied showed that the hyperfine field was negative—that is, antiparallel to the atomic magnetic moment. There followed a long series of measurements on applications of the Mössbauer effect to lesser-used isotopes, and Gil was the first to employ it to explore the compounds of xenon, newly discovered by John Malm at Argonne. In preparing xenon and other compounds, Gil's wife was of indispensable assistance. Gil also used the Mössbauer effect to study phenomena such as quantum beats, and he explored the magnetic hyperfine anomaly in iridium-191.

Gil had always believed in the importance of looking for applications of research and in communicating and disseminating research results—indeed, he held a patent for using the Mössbauer effect to measure gamma-ray polarization. In 1970 he became editor of both the *Journal of Applied Physics* and *Applied Physics Letters*. He retired from Argonne's physics division in 1981 but remained an important influence in the American Institute of Physics's journals office at Argonne until he finally retired from the journals in 1990. He was an inventive editor, and he instituted a high-T_c panel when those materials were discovered, which ensured rapid publication and *APL*'s share in this exploding field. Following the example of *Reviews of Modern Physics*, he established *Applied Physics Reviews*. His successors highly appreciated his constant support.

A witty and cultured man, he enjoyed reading, sketching, listening to music, and sailing his yacht on Lake Michigan. He served as commodore of the Chicago Corinthian Yacht Club.

Gil will be remembered for his innate understanding of what experiments were important and his ingenuity in carrying them out. Many scientists from the US and abroad came to work with and learn from him. They and friends throughout the world will miss the friendship and hospitality extended by the Perlows over the years.

John Schiffer
Charles Johnson
Argonne National Laboratory
Argonne, Illinois ■