

1965 from the University of Iowa, where he is now a professor of physics.

The 1989 Simon Ramo Award, also presented by the APS division of plasma physics, went to Jon M. McChesney, a senior scientist with General Atomics of San Diego, California, a company involved in basic fusion research and conventional nuclear power. The award, which is given for work performed as part of the recipient's doctoral studies, was presented to McChesney for his "sophisticated measurements showing anomalous ion heating in a tokamak and... subsequent explanation in terms of chaos theory, thus demonstrating the relevance of basic research to the fusion effort." McChesney received his PhD in applied physics from Caltech in 1989.

The 1989 Shock Compression Science Award, given every other year by the APS topical group on shock compression of condensed matter physics, was presented to George E. Duvall, a professor of physics at Washington State University. Duvall was recognized for his "outstanding contributions to shock wave physics and his educational and organizational leadership in the shock physics community." Duvall received his physics PhD from MIT in 1948. After holding research positions with General Electric Corporation and Stanford Research Institute, Duvall joined the Washington State faculty in 1964.

IN BRIEF

Michael Stavola has become an associate professor in the physics department of Lehigh University in Bethlehem, Pennsylvania, and **Alan Streater** and **Michelle S. Malcuit** have been appointed assistant professors in the same department. Stavola, who was formerly on the technical staff at AT&T Bell Laboratories, studies the physics of defects in semiconductors. Streater, an atomic and molecular physicist, was previously an assistant professor at Southern Oregon State College. Malcuit, a specialist in nonlinear optics, was most recently a research associate at the Institute of Optics of the University of Rochester.

OBITUARIES

Ernst Ruska

In the 1980s the science community witnessed the semicentennial of the

electron microscope, the 80th birthday of its designer, Ernst Ruska, the awarding of his Nobel Prize and, sadly, the reason for these lines, his death on 27 May 1988.

Ruska was born on Christmas Day into a scholarly family—his father was a historian of science and an uncle was an astronomer. His interest in technical subjects led him to study engineering at technical colleges in Munich and Berlin instead of attending a university, even though the latter was in those days regarded as far more prestigious. At the Berlin Technische Hochschule, as part of Max Knoll's project for improving the design of cathode-ray oscillographs, Ruska examined the lens-like behavior of a short coil. Building on the electron-lens work of Hans Busch, Ruska realized that he could focus the electrons with a smaller current if he enclosed the coil in an iron casing in which a narrow gap had been cut. The gap, he reasoned, would allow the field to "leak" into the path of the particles. This idea, which was a crucial step on the road to the electron microscope, led Ruska to construct the first magnetic electron lens to be recognized as such. His lens was much more than a prototype, for although modern versions are made of more homogeneous metal, are machined more accurately and include complex mechanisms for correcting astigmatism and for introducing a specimen or an aperture, the basic design has remained unchanged. Together with his friend and fellow PhD student Bodo von Borries (who later became Ruska's brother-in-law), Ruska patented the *Polschuhlinse* (polepiece lens) in 1932. In 1931 Ruska placed two lenses one above the other and showed that their magnifications ($3.6\times$ and $4.8\times$) multiplied to give an overall value of about 17.3. The first primitive electron microscope had been built.

Support for further development of the microscope was difficult to obtain in the 1930s, not only because of the economic conditions of the time but also because many scientists believed that no specimen could survive inspection by such a device: Placed in a vacuum, bombarded and rapidly heated by electrons, the sample would be burnt to a cinder before any useful information could be gained. In a letter of 8 January 1935, the editor of *Die Naturwissenschaften* unequivocally rejected a paper containing the first electron micrographs of untreated biological specimens. "Reproduction of electron-microscope magnifications," he wrote, "would serve no useful purpose.... I am thus unable

to make any use of your MS." It was some time before researchers realized that scattering within the specimen is sufficient for image formation (by phase contrast) and that absorption is not necessary. In 1937, however, Ruska and von Borries succeeded in obtaining support from the Siemens Company in Berlin. Two prototypes were ready the following year and a year after that Siemens delivered the first of about 30 commercial versions of the electron microscope.

Ruska and his colleagues spent the immediate postwar years preparing for a new generation of microscopes. In 1954, the Elmiskop-I appeared. (I have no doubt that some readers of this account are still using theirs, though spare parts have become a problem.) This robust instrument was considerably superior to the 1939 microscope: a higher accelerating voltage, a double condenser for illumination control, a device to correct astigmatism, and good stability made it a desirable tool in physics and biology. From 1949 onward, Ruska spent at least part of his time in the Fritz Haber Institute of the Max Planck Society in West Berlin. In 1955 he left Siemens, and from 1957 until 1974 he directed the Electron Microscope Institute of the FHI.

Ruska was a man of method, who kept detailed records of his research activities going back to his student days, and he devoted much of his time in the last years of his life to tracing the early history of the electron microscope. He was naturally sensitive about the fact that the first patent for an electron microscope was taken out not by Knoll, von Borries or himself, but by Reinhold Rüdenberg of Siemens-Schuckert-Werke AG, whose

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