vertical and horizontal characterization of gravity-wave fields over the mid-Pacific Ocean. Using an airborne sodium–Rayleigh lidar system, Hostetler collected data that, among other things, enabled the characterization of random gravity-wave fields in the upper stratosphere and mesosphere.

Since receiving a PhD in electrical engineering from the University of Illinois, Urbana–Champaign, in 1992, Hostetler has been a research assistant there.

Johnson was chosen for the Engineering Excellence Award for his contributions in optical technology, particularly his innovations in packaging and product development. Johnson's inventions include trimline dial illumination using line-powered LEDs, and LED indicators and numeric displays used in switchboard and consumer products.

Johnson did undergraduate work in mechanical engineering at Rutgers University before joining AT&T Bell Laboratories in Murray Hill, New Jersey, where he is now a Distinguished Member of the technical staff.

Koszi was cited for the development and demonstration of semiconductor laser processing methods and their use in lightwave communication. He was instrumental in the establishment of the TAT-9 undersea system, which began operating in 1991, as well as other lightwave communication systems.

After earning a BS in physics from Moravian College in 1970, Koszi joined Bell Labs in Murray Hill. Like Johnson, he is a Distinguished Member of the technical staff there.

Phillips received the Engineering Excellence Award for the design of lenses used in microlithography. Among his most recent achievements was the design of a lithographic lens that Sematech, the semiconductor research consortium, will use to make prototype 256-megabit memory chips. He has also designed lenses for laser scanning and micrographic data storage.

After earning a BS in mathematics from the Carnegie Institute of Technology (now part of Carnegie Mellon) in 1966, Phillips worked for Owens–Illinois as a lens designer. In 1973 he joined GCA Tropel, located in Fairport, New York, where he is now chief lens designer.

IN BRIEF

In October 1992 **Malvin C. Teich** was given the Memorial Gold Medal of Palacký University in the Czech Republic for his contributions to the understanding of the fundamental nature of light. Teich is a professor in the departments of electrical engineering and applied physics at Columbia University.

Leo Mandelkern, the R. O. Lawton Distinguished Professor of Chemistry at Florida State University, has been awarded the American Chemical Society's 1993 Charles Goodyear Medal. The award honors his research on the structure and properties of the bulk state of polymers, in particular crystallization.

OBITUARIES

Robert Morris Page

Radar in the US originated at the Naval Research Laboratory in Washington, DC, in the late 1930s. Many engineers and scientists contributed to its invention and development, but one of the most productive and inventive was Robert M. Page, who passed away in Minnesota at the age of 88 on 15 May 1992.

Born in St. Paul, Minnesota, in 1903, Page came to NRL in 1927 after obtaining a degree in physics from Hamline University in St. Paul, Minnesota. The bulk of the early research and development that was to lead to the first successful pulse radar fell to Page. His work with high-power pulse transmitters and his invention of the duplexer in 1936 allowed a single antenna to be used for both transmitting and receiving. These were two of the significant advances that led to the practical application of this new technology. Page was a prolific inventor, and after several bitter disputes over credit for the inventions, his patents were judged in court to have provided the basic description of pulse radar.

Robert M. Page

The development of radar at NRL in the 1930s by Page and his associates was not easy. In spite of the growing threat of war and the military need to detect the newly emerging bomber aircraft at long range, the development of radar failed to garner official enthusiasm in its early years and so had low priority. It was the Depression, and government spending was diminishing. In 1935 Page's radar project was to be canceled. However, as he later wrote, "Laboratory engineers were hot on the trail of radar and refused to give up." One story told at NRL is that Page took the precaution of adding a phone jack to his radar receiver so that he could use it for communication as well. Having a phone jack, he wouldn't have to explain to visitors that he was continuing to work on radar along with other assigned projects. With perseverance he was able to demonstrate the successful use of radar before work on it was to cease altogether.

Page further advanced radar with his invention of amplitude-comparison monopulse tracking radar in 1942. This is still the preferred radar technique for the precision tracking of targets, especially for military applications, because of its high accuracy and relative immunity to most forms of electronic countermeasure.

Page continued to initiate new directions in radar after World War II. He was influential in the development of over-the-horizon radar operating in the high-frequency band (typically in the range from 5 to 30 MHz). This type of radar takes advantage of the refraction of radar waves from the ionosphere to reach out to distances of 3500 km or greater. Under Page's inspiration, NRL also pioneered high-range-resolution radar, which made possible the detection of submarine periscopes and other applications.

In 1957 Page became director of research at NRL. He returned to Minnesota on his retirement in 1966.

It was my privilege and pleasure to serve as head of the radar division under Page during his last two years as NRL's director of research. Although he had invented radar at the time I was still in grade school, the age difference didn't bother him. In many subtle ways he encouraged me and showed me what was necessary for continued development of new and innovative radar technology.

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