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MORGAN SPARKS

1916–2008

Elected in 1973

“For pioneering work in the invention of the grown junction transistor.”

BY WILLIAM MURPHY
SUBMITTED BY THE NAE HOME SECRETARY

MORGAN SPARKS, the man who “invented” the Sandia National Laboratories we know today, died on May 3, 2008, at his daughter’s home in Fullerton, California, at the age of 91. Morgan had a distinguished 30-year career with Bell Laboratories, and is best remembered for his role in developing the first “grown-junction transistor,” the semiconductor device recognized as one of the first building blocks of the digital age.

Born in 1916 in Pagosa Springs, Colorado, and raised in Texas, Sparks received his bachelor’s and master’s degrees in chemistry at Rice University before earning his Ph.D. in physical chemistry from the University of Illinois in 1943. That same year, he began his long tenure at Bell Telephone Laboratories in Murray Hill, New Jersey, working on batteries for naval torpedoes in the Electrochemical Research Department. In 1948 he joined the new Bell Labs Semiconductor Physics Group, just as it was about to announce the invention of the first transistor. As a member of this group, Morgan made seminal contributions to the development of the junction transistor conceived that year by physicist William Shockley.
Working closely with chemist Gordon Teal, Sparks developed a more practical means of fabricating junction transistors by adding tiny amounts of specific impurities to germanium crystals during their growth process. Called the “grown-junction transistor,” this breakthrough was announced by Bell Labs on July 4, 1951. Shortly thereafter, Shockley, Sparks and Teal published these results in a now-famous paper in Physical Review.

In 1955, Sparks became a Director of Solid State Research at Bell Labs, and advanced through its management ranks, becoming Vice President of Electronics Technology by 1971. In these capacities, he led efforts to develop silicon integrated circuits for the Bell Telephone System.

Sparks was the last surviving member of the original Shockley group at Bell Labs. Ian Ross, president of the Labs from 1979 to 1991, put Sparks’ work on the transistor in perspective. “In a very real sense . . . Morgan’s work . . . completed the innovation that was the invention of the transistor.” Ross, who first met Sparks in 1952 and remained a lifelong friend, added: “In everything he did . . . Morgan was always a calm, constructive, and good-tempered person. But that suggests one more outstanding attribute, his ever-present sense of humor. Those who have known him have indeed been privileged.”

Morgan’s career at Bell Labs ensured his place in the history of American science and technology, but he also left his mark in Albuquerque on the hearts and minds of a generation of Sandia researchers. When Senator Pete Domenici (R-N.M.), who was elected to the Senate the same year (1972) Morgan became Sandia director, learned of his passing, he said, “Morgan Sparks set a high standard for the professional, efficient management of Sandia National Labs. He recognized the future need to channel lab science into technology transfer, and he laid the groundwork to link defense-based research to applications that now impact our lives every day. I credit Dr. Sparks for working to make Sandia one of the best-run labs in the nation. He was my friend.”

When President Harry S. Truman established Sandia in the late 1940s, he recruited American Telephone & Telegraph
Company (with the famous injunction to “render an exceptional service in the national interest”) to manage the institution. But the modern Sandia, the multiprogram national laboratory that develops technical solutions to the nation’s most pressing national security challenges, that Sandia is the invention of Morgan Sparks, who came to Sandia in 1972 and served as director until his retirement in 1981.

Throughout the 1950s and 1960s, Sandia was a sharply focused, single-mission laboratory—and the mission was nuclear weapons. Sandia enthusiastically embraced Truman’s charge and put forth often heroic efforts in the monumental task of building America’s strategic deterrent. By the 1970s, however, policy makers sensed that the pace of investment in the nuclear weapons program could be relaxed a bit. Thus just a few months after Morgan became director, Sandia experienced the largest cutback in its history. Fully 10 percent of its workforce was laid off within a six-month period, and the future of the laboratory was uncertain.

Morgan, however, had no intention of presiding over the slow demise of this unique institution. He understood that the capabilities developed at Sandia to fulfill its nuclear-weapons mission could be applied to a host of other challenges. After the wake-up call to international terrorism during the 1972 Munich Olympics and the energy crisis of 1973, Sparks concluded that, “The nation had urgent needs, and Sandia could help.”

As a veteran of Bell Labs, Sparks had long since learned that solutions could be found to even the most formidable challenges. When pressed by the media to speculate on Sandia’s prospects, he confidently told reporters that it would continue to thrive even as spending on weapons declined. Sandia, he said, would seek new programs “to add stability to our future workload and to provide diversity in our technical programs.”

By the end of the 1970s, Congress had validated Sparks’ vision, conferring national laboratory status on Sandia. With 7,700 employees, it was not only the largest of the three nuclear weapons labs, but also the one with the most diverse mission portfolio. Sparks continued to look ahead with his
usual optimism. “The nation is entering the ’80s with much apprehension. Beyond the state of the economy, the two biggest problems we face are the adequacy of our national defense and our energy supply. We at Sandia have a marvelous opportunity to contribute to both of these challenges. What more could we ask for?”

Upon learning of Sparks’ death, Sandia’s current president and director, Tom Hunter, said, “Morgan was president when I was a young staff member at Sandia. . . [He] was a great American and a respected leader in our community . . . I spent some time with him at the Nevada Test Site in the early ’70s and will always remember how this renowned researcher from Bell Labs so quickly and thoroughly immersed himself in every aspect of our weapons work. He was a credit to the lab, and, true to our mission, [he] provided exceptional service to the nation.”

In an interview after his retirement for Recollections for Tomorrow, a special 40th-anniversary Sandia publication, Sparks reflected on what it meant to be a Sandian. “For some time here [at Sandia] the vice president for research was brought out from Bell Labs . . . to keep those bonds [between Bell Labs and Sandia] . . . a kind of corporate culture evolves [that] encourages researchers to thoroughly understand their subject, write papers, publish, become known, get to know other fundamental workers in the field . . . The feeling was that if you’re going to do research in a field, you have to do it in a thorough, fundamental way. Those things were enormously influenced by Bell Labs.

“Sandia has its own culture . . . one of the things Sandia did was emphasize integrity . . . [it never] promised something it couldn’t deliver . . . Every organization has some history and background, and Bell Labs in particular and the Bell System in general played an important role in the evolution of Sandia. But Sandia is a first-rate, world-class laboratory in its own right.”

Jack Howard, who served as Morgan’s executive vice president from 1973 to 1981, recalled the many dimensions of the man. He wrote in an e-mail to the Sandia Lab News,
“The transistor won Nobel prizes for three physicists at Bell Labs, but it wouldn’t have worked without the epitaxial layer Morgan cooked up for them. . . . At Sandia, Morgan quickly learned the weapons business. Sandians know the great job he did while he was here.”

Orval Jones, Sandia’s executive vice president in the 1980s, recalled that “working for him was a pleasure.” Sparks, he said, “was modest, soft-spoken, and analytical, but he was also a decisive, supportive, action-oriented leader. An attentive listener, he was friendly and approachable—always courteous and considerate.”

Al Romig, now Sandia’s deputy laboratories director, was a young staff researcher in the 1970s. “You can’t imagine what an inspiration it was for us to have a scientist of Morgan’s stature at the head of this laboratory. His very presence lent huge credibility to our own work . . . But for all . . . his accomplishments as a researcher and as a technical manager at Bell Labs, Morgan was eminently approachable . . . in recent years as an Emeritus member at Sandia, I was deeply . . . moved that his interest and passion for the lab remained intense throughout his retirement.”

In 1981, Sparks accepted an appointment to the Robert O. Anderson School of Management at the University of New Mexico, where he was dean until 1984. He was also active in Albuquerque civic life, serving as chair of the United Way and the Police Commission Task Force. He led the effort to continue activities at Kirtland Air Force Base and served on the boards of Presbyterian and Lovelace hospitals, the New Mexico Symphony Orchestra, and the Albuquerque Academy. Until 2007 he was president of High Desert Investment Corporation, the developers of the High Desert and Mariposa communities.

At Bell Labs, Morgan got to know Bill Shockley’s secretary, Elizabeth “Bette” MacEvoy. As a guest at their wedding in 1949, Shockley arranged to have the rear axle of the newlyweds’ getaway car raised just enough to preclude traction. They were

1. Al Romig is now Skunk Works Vice President of Advanced Development Programs at Lockheed Martin.
married for 57 years until Bette’s death in 2006. The couple is survived by four children, Margaret Potter and Gordon Sparks, both of Waitsfield, Vermont; Patricia Fusting of Fullerton, California; and Morgan Sparks, Jr., of Burlington, Vermont.