



Arin Radkowsky

ALVIN RADKOWSKY

1915–2002

Elected in 1991

*“For seminal contributions and innovations in the
engineering development of nuclear power.”*

BY MILTON LEVENSON

ALVIN RADKOWSKY, professor of nuclear engineering at Tel Aviv University and Ben-Gurion University of the Negev, both in Israel, died of pneumonia on February 17, 2002. Before retiring to Israel, Dr. Radkowsky had been chief scientist of the U.S. Navy Nuclear Propulsion Program for more than 20 years.

Alvin was born on June 30, 1915, in Elizabeth, New Jersey, the same town where his mother was born; his father was an immigrant from Lithuania. Alvin attended City College of New York (CCNY) and, at age 20, received a B.S.E. in electrical engineering. His first job was as a troubleshooter for the Singer Sewing Machine Company. In 1938, he went to work as an electrical engineer at the U.S. Navy Bureau of Ships in the interior communications and fire-control section. While employed there, he continued his education and received an M.A. in physics from George Washington University in Washington, D.C., where his thesis advisor was Edward Teller, perhaps an indication of things to come.

In 1947, still working for the Bureau of Ships, Alvin earned a Ph.D. in physics from the Catholic University of America. His dissertation, “Temperature Dependence of Electron Energy Levels,” written under the guidance of Karl P. Herzfeld, described a phenomenon now called “the Radkowsky effect.”

Admiral, then Captain, Rickover started organizing his working group for the possibility of creating a navy based on nuclear propulsion sometime in 1947. He recruited Alvin to be his physicist and arranged for him to go to the Argonne National Laboratory in 1948 to attain proficiency in reactor physics. The appointment at the laboratory was for three years, but Rickover decided to have Alvin come back after two years since his group had already started to function in Washington and he was anxious for quick action. Alvin became then the chief scientist of the program. When Adm. Rickover's section became Naval Reactors in 1954, both as part of the Navy Department and the Atomic Energy Commission (AEC), Alvin became a joint civilian employee of both the Navy and AEC.

Alvin was responsible for originating and assisting in the development of two reactor concepts for which he was awarded the Navy's Distinguished Civilian Award (the highest non-military award) in 1954 and the AEC Citation (1963). One concept was "burnable poison," for which he also received a cash award of \$25,000. This concept is important to all nuclear power plants, but it is especially important for navy vessels, because it enables them to operate for years without refueling, even in time of war. The other concept was the "seed blanket" reactor structure, which consists of a highly enriched fuel seed surrounded by a blanket of natural uranium. The blanket generates more than half of the reactor power and has a very long life necessitating only a relatively more frequent change of the seed providing thus for a large reduction in fuel cost.

In addition to his primary field of interest, Alvin had a long-standing interest in the use of thorium in nuclear reactors. He published a number of papers on this subject and owned several patents in the field, which he assigned to the company he helped found, Thorium Power, which is now publicly traded. The thorium fuel technology is designed to stop the reactors from producing weapons-suitable plutonium and reduce the toxicity and volume of spent fuel. The thorium fuel can also be used to dispose of existing stockpiles of plutonium while generating electricity. Alvin worked with Thorium Power to establish a program at the Kurchatov Institute in Moscow, Russia. That program con-

tinues and is testing the thorium fuel for use in commercial reactors.

Alvin was elected to the National Academy of Engineering in 1991. He also received many awards, including the Alvin M. Weinberg Medal of the American Nuclear Society for “seminal contributions and innovations in the engineering development of nuclear science and technology”; the Meritorious Civilian Service Award from the U.S. Department of the Navy for “outstanding service to the Navy during World War II”; the Alumni Outstanding Achievement Award in Science from Catholic University and the university’s first Karl F. Herzfeld Medal for outstanding accomplishments in physics; and the Townsend Harris Medal from CCNY. He was also a fellow of the American Physical Society and American Nuclear Society.

One aspect of Alvin’s life set him apart from most of his colleagues—he was both an outstanding physicist and a religious Jew. He saw no conflict between Orthodox Judaism and his vocation as a scientist. On the contrary, he felt strongly that there was a synergistic relationship between the two. He found that the rigors of logical Talmudic study and the meticulous observance of commandments regulating his religious life prepared him well for the mental discipline needed in inducing scientific theories from experimental data. He was convinced that a fundamental relationship exists between the concepts of Bohr’s Complementarity and Heisenberg’s Uncertainty Principle and the spiritual as well as the physical side of the existence of man. Moreover, he found the ever-increasing revelations of the wonders in the life sciences to be awe-inspiring. Professor Eugene P. Wigner had provided in a formal demonstration and discussed with Alvin that, according to quantum mechanics, the probability of the existence of a self-replicating unit is zero, thus questioning the emergence of even the simplest life form from the primeval “soup.”

Alvin is survived by his wife, Annette Eisenberg Radkowsky, a daughter, Gilah Chukat, both currently living in Israel, and a brother, Lawrence, living in Silver Spring, Maryland.

Alvin took to fatherhood with gusto, although he reached that status rather late in life. He poured into his daughter, a

most receptive imbibers, much of his knowledge and wonder of our world. He had the joy of being surrounded by six grandchildren but missed the birth of the last grandson by a little more than two years.

After Alvin's retirement from the U.S. government in 1972, the Radkowsky family moved to Israel, where Alvin became associated with Tel Aviv and Ben-Gurion Universities where he found, especially in the latter, an excellent nucleus of reactor physicists. His first Ph.D. student became a most proficient associate in the theoretical research that led to the development of the thorium-based reactor. During his years of research in Israel, Alvin continued his long-term relationship with Professors Teller, Bethe, and Wigner. Living in Israel also gave him the opportunity to seek out the luminaries of Orthodox Judaism who were appreciative of his mental powers and deep insights in Talmudic learning.

Although he devoted his time to physics, mathematics, and Talmud, he was dubbed by many of his acquaintances as the quintessential Renaissance man because of his deep knowledge of literature and his love of poetry, though not of avant-garde poetry. He always felt that the opportunities that life offered him were too exquisitely timed to have been fortuitous, giving him the sense that the strong Hand of Providential Guidance was directing him toward his accomplishments. He had a zest for living and one can almost say that Alvin never regarded himself as old. While the advancing years were awesome to him, his *raison d'être* was to complete old projects and start work on new ones. His wry sense of humor never left him, and his smile said it all.

