

Benjamin M. Siegel

March 26, 1916 — March 22, 1990

Dr. Benjamin Siegel, professor emeritus of applied and engineering physics, died on Thursday, March 22, 1990, four days before what would have been his 74th birthday. While Ben was one of the earliest (1949) appointments to the faculty of the then-new and experimental Engineering Physics Department at Cornell and had a distinguished career in electron microscopy as a scientist, he will also be remembered for the personal example he set and the life he led.

Ben taught—by example, not precept—that it was possible to be deeply moral, deeply virtuous and deeply serious without being self-righteous, priggish or solemn; that it was possible to make judgments without being judgmental, and to have opinions without being opinionated. He never said an uncomplimentary thing and could always be counted on for good advice on the right way to proceed in a moral dilemma. No matter how competitive the environment, he demonstrated that it was possible to be good, kind and gentle. At least one former department chairman remembers this aspect of his life with deep gratitude.

His scientific career was devoted to the art and practice of electron microscopy and particle optics. At the beginning of his career at Cornell in 1949, use of this technique was very much in its infancy. Through special summer courses, he introduced it to a large number of researchers (including at least one future Nobel laureate and two future presidents of the Electron Microscopy Society of America) in both the physical and biological sciences. His influence on modern electron microscopy continues to be felt through the successes of his many former students and research associates. Indeed, his most significant contribution to teaching came through the one-on-one situations involved in his research programs.

Ben became interested in achieving the highest possible spatial resolution with the microscope. In a timely paper with Claire Eisenhandler, he explored theoretically the phase contrast mechanisms of imaging single atoms. Following this, he established a program identifying various elements of the theoretical and experimental steps necessary to make this a reality. This required work with field emission electron guns, superconducting electron lenses, digital image acquisition, and image processing and ultrahigh vacuum techniques. Many of the ideas Ben was working with in the seventies appear likely to be widely exploited in the nineties. Transmission electron microscopes with field emission guns are now available commercially, and the proposals to exploit the coherence of this electron source will build on the image analysis procedures developed by Earl Kirkland while working with

Ben. Vastly improved vacua are now available, reducing the propensity of the instrument to cover the specimen with some unknown contamination layer.

The program he established had a grand design which probably did not come to fruition in the way he hoped. It nevertheless was a success in that many of the features he saw as necessary to achieve high-resolution have indeed been seen as solutions to problems and have become available to the community. His students and associates went into programs in which they were unique and badly needed. In recognition of his contributions to attaining high resolution, the Electron Microscopy Society of America awarded him the EMSA Distinguished Scientist Award in 1982. He had served as president of the Society in 1973, and an issue of the international journal, *Ultramicroscopy*, was dedicated to him in 1984.

Ben was a key member of the Cornell faculty team that prepared the proposal that brought about what is now the National Nanofabrication Facility. Following this, he carefully reviewed the prospects for particle-based lithographies and initiated work on high brightness gaseous field ion sources for ion beam lithography. This work started a flurry of research activity in this area in Japan that continues to the present day, and he was actively engaged in attempting demonstration of such a tool up to the time of his death.

The personal example Ben set in his life stemmed from a deep faith. He was active in the affairs of the Temple Beth-El of Ithaca, its Rabbi Felix Aber Hebrew School, and in the activities of the Ithaca Jewish Welfare Fund. He served on the Cornell Hillel Foundation Board and for some years on the Cornell United Religious Work Board. In addition, he identified himself with the Zionist movement through his membership in the American Jewish League for Israel.

Ben Siegel was truly a gentleman and truly a scientist. We are the lesser for his passing, but his family, students, friends, and colleagues are much the better for his life.

Milton Konvitz, David Saxon, John Silcox