He is a director of United Nuclear Resources, Inc., of the United Illuminating Co., and of several other organizations; he is currently vice-president of the International Union of Pure and Applied Physics and president of the American Association for the Advancement of Science.

From X-Rays to Quarks—Modern Physicists and Their Discoveries

Author	Emilio Segre
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Reviewer	D. A. Bromley

This is a fascinating book that should be required reading for all nuclear scientists, but most particularly those who are still students, or beginning their careers as active scientists. It also represents a treasure trove for historians of nuclear science.

Emilio Segre, from his early days in Rome through his days at Chicago and, more recently, at the University of California at Berkeley, has been present at the creation of both nuclear and particle physics, and has left his mark on both.

This book is not intended as a textbook on nuclear or particle science; indeed, Segre's textbook, *Nuclei and Particles,* has already been used by a generation of students in these fields. Nor is it intended as a comprehensive history of either of these fields of science; rather, it comprises the personal reminiscences centering on Segre's own experience and exposure throughout the course of his long and exciting career as a working scientist. But, because Segre always seemed to be where the action was, his memories of events, people, and discoveries trace a central thread through much of the development of these two fields of modern science, from 1927 to the present.

The book has 14 chapters and some 10 appendixes. The first chapter discusses the physicist's world in 1895 and establishes the scientific milieu in which the new fields took root and developed. It takes the reader through the discovery of x rays. The second chapter takes us forward through the discovery of radioactivity and the work of the Curies, while the third brings us to Rutherford and transmutation of the elements. Chapter 4 focuses on Planck and his reluctant postulation of quantization, while Chapter 5 focuses on Einstein and the revolution that he personally created in the world of science. Chapters 6 and 7 take up the work of Rutherford and Bohr on the discovery and understanding of the nuclear atom, while Chapter 8 discusses the remarkable development of quantum mechanics. Chapter 9 discusses the "wonder year," 1932, with its discoveries so central to nuclear physics, the neutron, the positron, deuterium, and the like; this was a year not to be duplicated until 1974 with the discovery of the psi-particles, new quarks, and the postulation of a unified theory of the forces of nature. Chapters 10 and 11 are devoted to Enrico Fermi and nuclear energy, and to E. O. Lawrence and particle accelerators, respectively. Chapters 12 and 13 go beyond the nucleus to the world of the elementary particles, the fundamental symmetries of nature, quantum electrodynamics, and the modern frontiers of physics, while in Chapter 14, Segre speculates briefly about what it all means, and where it will lead. His concluding sentences bear quotation: "Not only the subject matter but the philosophy of physics, too, changes with time and there is every reason to think that it will continue to do so, even at a profound level. I do not believe Galileo, Newton and Einstein have been the last of their ilk."

One of the very attractive features of this book is the fact that, drawing from his own files and those of his friends, Segre has been able to include a number of photographs of the giants of nuclear science at work and at play, photographs that have not previously ever been published. He also provides a detailed bibliography which will be invaluable to those searching for their scientific roots.

D. A. Bromley is Henry Ford II Professor of Physics and director of the Wright Nuclear Structure Laboratory at Yale. He is a director of United Nuclear Resources, Inc., of the United Illuminating Co., and of several other organizations; he is currently vice-president of the International Union of Pure and Applied Physics and president of the American Association for the Advancement of Science.