SEABORG RELATES A CAUTIONARY TALE ABOUT GOVERNMENT

The Atomic Energy Commission Under Nixon: Adjusting to Troubled Times

Glenn T. Seaborg with Benjamin S. Loeb
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Reviewed by Richard L. Garwin

From its inception in 1947 to its replacement in 1975 by the Energy Research and Development Administration and the Nuclear Regulatory Commission, the Atomic Energy Commission had responsibility for nuclear weaponry, the development of nuclear reactors for civil use and research more or less related to energy, including high-energy physics. The AEC also had a regulatory role, balancing (or confounding) the protection of the public from radiation with the security and economic aspects of its programs.

In two previous books with Benjamin Loeb—*Kennedy, Khrushchev and the Test Ban* (U. of Calif. P., Berkeley, 1981) and *Stemming the Tide: Arms Control and the Johnson Years* (Lexington Books, Lexington, Mass., 1987)—Glenn Seaborg gave a personal view of his involvement in the AEC from the time he became chairman at the beginning of the Kennedy Administration in 1961 to the beginning of the Nixon Administration in 1969. Retained by President Nixon as AEC chairman, Seaborg resigned on 16 August 1971. In the current volume Seaborg presents a candid view of the changing role of the AEC. The five main parts of the book cover nuclear explosions (peaceful uses and testing the antiballistic missile warhead), arms control, radiation standards, the breeder reactor and "administrative matters".

As chairman, Seaborg was the designated "official spokesman" for the AEC, but had "equal responsibility and authority" with other members of the commission in all actions. During his ten years as chairman, only 13 other commissioners served on the AEC. Among them was James T. Ramey, from 1956 to 1962 the executive director of the Joint Committee on Atomic Energy. The JCAE was a powerhouse of influence, and until the societal upheavals of 1968 and the changed Congress of 1969, it probably had as much influence on the AEC and the nuclear programs of the United States as any president.

A 1951 Nobel laureate in chemistry for his work on transuranic elements, Seaborg evidently strove to lead the AEC as a person of substance and principle. As AEC chairman, Seaborg accepted the need to implement policies and programs with which he might disagree, despite his self-characterization as a lifelong Democrat and, after leaving the AEC, his vigorous public advocacy of a comprehensive ban on nuclear tests.

Although his ideal was to express fully to the decision makers his personal and considered views of fact and proposed policy, Seaborg was explicitly denied this opportunity during the Nixon Administration. Seaborg's direct access on demand to Presidents Kennedy and Johnson was replaced under Nixon by access through a chain of four intermediaries. Seaborg writes "The ultimate course of the Nixon Administration might have been different had Nixon chosen to hear the opinions of a wider circle of advisers."

Seaborg now recognizes what he could not bring himself to believe at the time—that the school civics course concept of "government of law and not of person" stopped outside the door of the Nixon White House, to an extent unprecedented in modern times. Seaborg quotes Henry Kissinger's own *White House Years* (Little, Brown and Co., Boston, 1979) in support of the recognition that Nixon Administration sessions on the Strategic Arms Limitation Talks "may have been to some extent a sham. . . . If the bureaucracy had become aware [that details bored Nixon and that he left the selection of options to Kissinger] all vestige of discipline would have disappeared. I therefore scheduled over Nixon's impatient protests a series of NSC [National Security Council] meetings where options were presented to a glassy-eyed and irritable President so that directives could be issued with some plausibility on his authority."

Seaborg recounts his own enthusiasm for Project Plowshare (underground nuclear explosions for civil engineering purposes) and the ill-conceived breeder reactor program—both, in my mind, examples of the lack of objective analysis in the AEC. While breeder reactors may well be important to our energy future, Seaborg now feels the urgent "demonstration" approach was the wrong way to proceed; "a slower and broader program" might have been better. Just so!

Adjusting to Troubled Times is a valuable record and a cautionary tale, with import beyond the nuclear energy field.

Richard Garwin, since 1952 at IBM Research, contributed to nuclear weapons development and testing at Los Alamos from 1950, and was a member of the President's Science Advisory Committee under Kennedy, Johnson and Nixon.

John von Neumann: The Scientific Genius Who Pioneered the Modern Computer, Game Theory, Nuclear Deterrence, and Much More

Norman Macrae
Pantheon, New York, 1992. 405 pp. $25.00 hc
ISBN 0-679-41308-1

John von Neumann was born in 1903 in Budapest into an affluent assimi-

lating Jewish family. He was raised and educated there in the same somewhat restricted yet obviously very special milieu that also produced Leo Szilard, Edward Teller and Eugene Wigner. All four eventually migrated to America and remained close friends for the rest of their lives. After attending universities in Hungary and Switzerland and working for a while in Europe, von Neumann moved to Princeton, New Jersey in 1930. There he remained, first at the university and later at the Institute for Advanced Study. He died in 1957 at the age of 53, bitterly aware that he had been cut down while he still had much to do.

Von Neumann's earliest work was in pure mathematics, where like most authentic geniuses he showed considerable precocity, producing his first significant work while still a teenager. As he matured he gradually expanded his interests, first to theoretical physics, then to computation and computers, economics and game theory and finally, to national security affairs, including strategic theory and practice.

His prowess as a mathematician was legendary, and his contributions to basic mathematics and theoretical physics were too fundamental and too diverse to be adequately summarized here. Suffice it to say that smart people who knew Johnny commonly said he was the smartest person they had known.

His work in computers included the invention and practical development of the "von Neumann architecture," still the basis of all modern designs. He also supervised the construction, at the Institute for Advanced Study, of one of the first modern digital computers. He worked closely with other pioneer computer developers, including Nicholas Metropolis and James Richardson at Los Alamos and J. Presper Eckert and John W. Mauchly, the producers of the first large commercially available digital computer, the Univac. In the realm of applications, he focused on using computers to understand and predict the weather.

With Oscar Morgenstern he created the new science of game theory which he then applied to such things as economics and the kind of formal strategic analysis pioneered at the Rand Corporation, where he served as a frequent consultant.

In 1943 von Neumann joined the Manhattan Project (Teller, Szilard and Wigner had all joined earlier). He made crucial direct contributions to bomb design, and in an advisory capacity he assisted many others in making their particular contributions. After the war ended, he continued to participate in the work at Los Alamos, particularly that related to the hydrogen bomb.

As the cold war intensified, Johnny expanded his advisory activities to include nuclear delivery systems and strategic policy. As an adviser to several elements of the Defense Department, he played an especially critical part during the 1950s in determining both the requirements for and the nature of America's strategic weapons. In 1955 he departed for the first time from his customary role of adviser and joined the Atomic Energy Commission as one of its five full-time commissioners. In both these roles he was for a time by far the most influential scientist of all those engaged in such matters, and the programs and policies that he helped to initiate and guide continued to form the backbone of America's strategic posture throughout the cold war.

Macrae's book covers, fairly and fully, all this ground from Johnny's origins through his multifaceted career to his untimely death. It is the best yet on this very special man, and it will likely remain so for some time.

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The Physics of Waves

Howard Georgi
Prentice-Hall, Englewood Cliffs, N. J., 1993. 422 pp. $43.00 hc ISBN 0-13-665621-8

In reading this book I was reminded of a saying of Goethe: "Mathematicians are a kind of Frenchmen: When you talk to them, they translate it into their own language, and right away it is something different." I cannot help feeling that the same may be true of theoretical physicists! Howard Georgi, a distinguished member of this community, takes the traditional undergraduate subject of vibrations and waves and brings to it a decidedly nontraditional approach. In the preface to *The Physics of Waves*, he identifies three underlying principles that characterize many different kinds of wave phenomena: linearity, translation invariance and local interactions. He then proceeds to build up the subject in these terms.

When one looks beyond the unfamiliar terminology, one finds that Georgi's book has much in common with existing books on the subject. Georgi states that he was chiefly influenced by two well-known texts—