tried to influence political leaders about their use serve as polestars for Rhodes's narrative. Rhodes uses Leo Szilard, whose epiphany on a London street corner in 1933 constituted the first realization of the possibility of a nuclear chain reaction, who played a key role in getting the Manhattan Project under way, and who became an increasingly determined critic of plans to use atomic bombs to end the war, as a running commentator throughout the book. This device works well, because Szilard had both the insider's experience and the perspective of a perpetual outsider, and evidence exists concerning his views from the beginning of the Manhattan Project to its end. Unfortunately, Rhodes drops the thread of Szilard's commentary in a place where it would have served him well, his discussion of area bombing. In a postwar symposium on the decision to drop atomic bombs Szilard said that for him the moral divide had been crossed earlier, when the American government rained incendiary bombs on Japanese cities. What better support could have been provided for Rhodes's insistence that we see technological war as a piece?

And yet nuclear bombs did usher in a "new age," and no one knew that better than Niels Bohr. Like Szilard Bohr struggled to alert policy-makers to the implications of nuclear energy for world peace and world order, and like Szilard Bohr is used prominently by Rhodes to put the making of the atomic bomb into a world political perspective. Because Rhodes has earlier explained Bohr's principle of "complementarity," by which he reconciled conflicts between classical and quantum physics, the reader is prepared to understand how Bohr viewed the peril and the hope posed by nuclear energy as being complementary and how he believed that the complementarity might be used as the basis of a charter for a postnuclear world. Both Szilard's and Bohr's efforts to gain a sympathetic hearing of their views from political figures (in Bohr's case from Prime Minister Winston Churchill and President Franklin Roosevelt, in Szilard's from Secretary of State designate James Byrnes) failed dismally. Szilard and Bohr succeeded in predicting a postwar arms race, which we have yet to find a way to bring to an end.

Inevitably, in a book of this scope by an author who is neither a scientist nor a professional scholar, there are some gaps in historiography, some instances of mistaken judgment, and some errors of fact. But these do not undermine the book's overall value. Rhodes has succeeded in treating a subject with vast moral implications without being moralistic. He does not fail to understand the origins and implications of the conflict, in World War II, and he neither ignores nor underplays German and Japanese atrocities. He has appropriate respect for the technological achievement of the Manhattan Project and, more important, for the scientists and political figures who had the unenviable task of simultaneously straining to develop a new device and deciding what to do with it, in a time of unprecedented stress and peril. He is not interested in asserting blame or casting stones. (Only once does he seem to pass judgment. His language suggests contempt for Curtis LeMay's justification of the fire-bombing of Japanese civilians on the grounds that drill presses sticking up in the ruins revealed that every paper house was a weapons factory.) He has a larger purpose: to expose the modern possibility of delivering "total death" as a product of "the nation-state parasitizing applied science and industrial technology to protect itself and to further its ambitions" (p. 781) and to warn that total death is certain unless the inherent lawlessness of the sovereign state can be curbed.

Rhodes proposes a version of Michael Polanyi's model of the "republic of science," open in its spirit, international in its scope, and transnational in its culture, as a model for world order. Science, he says, "fights the exclusivity of the nation-state . . . by sharing its discoveries freely" and by demonstrating "how an open world could function without chartered violence" (p. 784). This is a compelling idea; it has been experimented with on a small scale by the Pugwash movement. But it also is a problematic vision. As Niels Bohr, Leo Szilard, and their descendants are citizens of the republic of science, so too are Edward Teller and his young Star Warrior disciples. And modern science has not developed as separately from the modern state as Rhodes would have us think it has. Science is as much a product of the environment in which it grows as it is of individual genius, and modern science could not have reached its present state of development without the modern state's resources. It is idealistic to present the two as antithetical. These caveats aside, Rhodes's book is a remarkable achievement.

CAROL S. GRUBER
Department of History,
William Paterson College,
Wayne, NJ 07470

Arms Control: A View from Inside

Stemming the Tide. Arms Control in the Johnson Years. GLENN T. SEABORG with BENJAMIN L. LOEB. Lexington (Heath), Lexington, MA, 1987. xxii, 497 pp. + plates. $24.95.

This is the first attempt to lay out the story of arms control during Lyndon B. Johnson's presidency, and Glenn Seaborg has succeeded well. Drawing on his diary and on papers from his tenure as chairman of the Atomic Energy Commission (1961–1971) and supplementing them with declassified documents and interviews, Seaborg has marshaled a great deal of material not heretofore in the public domain and told the story lucidly and in detail.

The book contains the first written account of an important presidential study commission on nuclear nonproliferation in late 1964 and early 1965, the Gilpatric Committee (named for its chairman, former deputy secretary of defense Roswell L. Gilpatric). Seaborg reviews the work of the committee (which included such luminaries as Dean Acheson, Robert Lovett, John Jay McCloy, Allen Dulles, George Kistiakowsky, Alfred Gruenther, and Herbert York) and the reasons for the limited impact of the study and the cool reception it received. As one involved both in the work of the committee and in Secretary Dean Rusk's negative reaction to it, I disagree to some extent with Seaborg's assumption that the State Department's main objection to the committee's recommendations was the priority assigned to nonproliferation over the North Atlantic Treaty Organization's multilateral nuclear force (MLF). Although the report gave a much-needed impetus to nonproliferation, it was in Rusk's (and my) opinion too hard in the punitive political measures it proposed not only against governments that undertook further nuclear proliferation but even against our then nuclear allies, Britain and especially France, in an effort to roll proliferation back.

Seaborg also discloses for the first time in public reference the fact that in 1964 the United States government considered unilateral action or joint action with the Soviet Union against China if it did not give up its nuclear weapons ambitions, including "even a possible agreement to cooperate in preventive military action" (pp. 111–112). Incidentally, in noting President Johnson's calming announcement after the Chinese made public their first test in October 1964, he does not recall that Secretary Rusk had previously made an anticipatory statement, based on our advance intelligence on the impending Chinese test, which was also intended to deflate the impact of the event.

The main content and value of the book are not in such occasional revelations, however, but in the thorough and well-reviewed account of the major arms control efforts of the Johnson administration, above all with respect to nuclear nonproliferation, nuclear

"The high point of the Glassboro (New Jersey) summit meeting—June 23 and 25, 1967—occurred at luncheon on June 23, when, at President Johnson's invitation, Secretary McNamara made an impassioned plea, here being conveyed to Premier Kosygin by the interpreter, that the two powers abstain from large-scale deployment of defensive systems lest this set off another round in the nuclear arms race. Soviet spokesmen have since confirmed that this presentation by McNamara had a strong effect on Kosygin and others in his party, leading in a very important way to SALT I and the ABM Treaty." [Photograph by Y. R. Okamoto; from *Stemming the Tide*]

testing, and curtailment of production of fissionable materials. Nonproliferation, in both its technical and political ramifications, was indeed central in those years and rightly occupies about half of the book.

With regard to fissionable materials production, Seaborg provides the most complete available review of American decisions and decision processes, as well as discussing the rather unsatisfactory limited tacit agreements with the Soviet Union. He shows how the United States had drifted into building up unneeded production capacity in the 1950s through bureaucratic momentum fueled by reluctance to do less than our utmost to ensure continuing superiority over the growing—but at that time greatly overestimated—Soviet nuclear weapons program.

The discussion of the nuclear testing issue covers the continuing efforts, unsuccessful in those years, to expand the 1963 Limited Test Ban Treaty (LTBT, which Seaborg has discussed in similar careful detail in his 1981 book *Kennedy, Khrushchev, and the Test Ban*). Seaborg also discusses the problems of interpretation and violation of the LTBT, noting divergent views over interpretation within the United States government (the Arms Control and Disarmament Agency pressing for tight interpretation, and the Atomic Energy Commission [AEC] for looser interpretation in order to have more flexibility for its own test program). As he notes, both the Soviet Union *and* the United States were guilty of at least technical violations of the LTBT. (The present Administration continues to charge the Soviet Union with such violations but is silent about the facts that there has been a gray area of interpretation from the outset and that the United States has also been responsible for violations.) Seaborg reviews the course of internal debates over the American position with respect to a comprehensive test ban (CTB), noting that in effect during the entire period from 1964 on (to 1982) during which the United States continued to advocate a CTB, it did not really want one. (In July 1982 President Reagan, for the first time since the Eisenhower administration, repudiated American advocacy of a CTB.) Seaborg admits his reservations in the 1960s but affirms his wholehearted support today for a CTB.

The strong AEC interest in its "Plowshare" program for peaceful nuclear explosions played a restraining and detrimental role in American policy on seeking negotiated constraints on nuclear testing, as Seaborg acknowledges in his even-handed account of that issue.

In recounting the nuclear nonproliferation efforts, above all the long road to the nonproliferation treaty (NPT) before its conclusion in 1968 and ratification in 1969, Seaborg rightly sees the State Department as being responsible for long delays owing to protectiveness over the sensibilities of its allies (although in State we preferred to see, and describe, these delays as "diplomatic realities"). He recounts in detail the course of negotiations—within the United States government, with our European allies, with the Soviet Union, and within the community of nations. The ingenuity of some of the efforts is captured in an example he cites: in the summer of 1967 U.S. negotiator William Foster sent a possible compromise to Washington described as a "Roshchin draft," attributed to his Soviet negotiating partner, while Alexei Roshchin sent an identical "Foster draft" to Moscow. (This almost caused a real problem when Ambassador Llewellyn Thompson in Moscow expressed interest to Gromyko in the "Roshchin draft," and a puzzled Gromyko asked whether he meant the "Foster draft.")

Seaborg's discussion of the efforts in the mid-1960s to negotiate limits on strategic nuclear delivery systems is a little thin, because his involvement in the negotiations was less. Nonetheless, he recounts the main developments. I would take issue only with his comparison of the proposed freeze in 1964 with its "revival" in recent times (p. 12). Although the two proposals were superficially similar, there would have been a significant difference between permanently freezing an overwhelming United States strategic superiority in the mid-1960s and freezing a rough parity in the mid-1980s, a difference that explains the change in the Soviet position.

Similarly, Seaborg's account of the origins of the strategic arms limitation (SALT) talks and efforts in 1967 and 1968 to launch those negotiations is incomplete. Nonetheless, he has the main developments, a lively account of the Glassboro summit meeting of 1967, and interesting disclosures of aspects of our position for the talks in 1968 that were aborted by the Soviet occupation of Czechoslovakia. He is quite correct in giving particular credit to Robert McNamara, as well as to President Johnson, for launching SALT.

Finally, on the subject of arms control for outer space the account is also thin, both with respect to little-known negotiations in 1963 that laid the groundwork and with respect to the 1967 Outer Space Treaty. He does not indicate that the Soviet Union was prepared to agree to a treaty in 1963; it was President Kennedy who decided that such a treaty would follow too closely on the heels of the domestic political debate over the limited nuclear test ban treaty. Also, I take issue with Seaborg's criticism of our failure to seek constraints on nonweapons military

uses of space. He even speaks of "outer space becoming cluttered with reconnaissance satellites" without acknowledging the important, even crucial, role that such "national technical means of verification" have played in making the SALT agreements possible. On the other hand, I believe he understates the potential danger of President Reagan's Strategic Defense Initiative in bringing weapons to space, although to be sure he makes but passing reference since this subject goes beyond the time-span of the book. (On a minor point, one of the few factual errors is a footnote reference [p. 404] to a "large number" of Soviet launchers once constructed for a fractional orbital bombardment system; the number was only 18.)

Arms control policy-making and negotiation are at least as much a matter of internal deliberation, maneuver, and decision as of international negotiation. Seaborg's detailed account is particularly rich in bringing this internal dimension into focus. He has strong if not unique qualifications for examining the interface of scientific-technical and political considerations. He also had a very useful vantage point as one of the players in the political arena during the Johnson years. He draws on both of these strengths to advantage in this study. He gives examples (Pentagon devotion to MIRV as well as the previously noted AEC interest in Plowshare and State Department interest in the MLF and allied sensitivities) of instances in which legitimate but parochial interests may have stymied progress in arms control more than, in retrospect, they should have. Above all, as he rightly stresses, while all considerations should be brought to bear, there is an essential need for a personal and positive interest by the president in order to crystallize decisions and realize arms control potentialities. Demonstrating that lesson, so relevant to the situation today, is itself a major contribution of this excellent book.

RAYMOND L. GARTHOFF
Brookings Institution, Washington, DC 20036

A New Specter

Preventing Nuclear Terrorism. The Report and Papers of the International Task Force on Prevention of Nuclear Terrorism. PAUL LEVENTHAL and YONAH ALEXANDER, Eds. Lexington (Heath), Lexington, MA, 1987. xviii, 472 pp. $56; paper, $22.95. A Nuclear Control Institute Book.

Preventing Nuclear Terrorism is the product of a massive undertaking by the Washington-based Nuclear Control Institute and the Institute for Studies in International Terrorism at the State University of New York. The effort began with a major international conference in 1985, which led to a "task force" on nuclear terrorism made up of 26 experts from nine countries. The book contains the task force's final report and 26 background papers on terrorism involving stolen nuclear weapons or nuclear-weapon materials or attacks on nuclear facilities.

The study's conclusions can hardly be characterized as alarmist: "The good news is that the probability of terrorists turning to nuclear forms of violence is low. The bad news is that it is increasing" (p. xi). Indeed, the report notes that "as yet there are no public signs that any terrorists have the essential combination of capability and will to engage in an act of nuclear violence" (p. xii).

Why then the fuss? Is nuclear terrorism indeed, in the report's words (p. 14), "a real threat to civilization"? Vice President Bush (not a contributor) provides part of the answer: "Although we have so far been spared the terrible specter of nuclear terrorism, that doesn't mean that we don't need to begin addressing this problem" (p. 383).

Since nuclear terrorism is a relatively new concern in both academic and policy circles, the editors prudently went about "addressing this problem" by selecting authors from diverse professional backgrounds, including industry, government, research groups, and academia. The papers cover all levels of governmental activity—state and local, national, and international.

Despite the diversity of approaches, the group was united in endorsing the deferral of commercial uses of weapons-grade nuclear materials until national and international defenses against nuclear sabotage, terrorism, and theft are considerably improved.

Their findings make it clear that there is no "quick fix" to the problem of nuclear terrorism: nuclear facilities are vulnerable to truck bombs and insider sabotage; greater security is needed for nuclear weapons based on U.S. naval vessels and in countries where terrorism is prevalent; and transportation is the "weak link" in controls over international nuclear commerce. The study urges greater U.S.–Soviet cooperation and information sharing through such forums as "nuclear risk reduction centers," as suggested in the paper by Senators Sam Nunn and John Warner.

The timing could not be better for such a book. First, the Reagan Administration will soon be implementing its policy of "programmatic prior consent," under which certain U.S. nuclear trading partners will be exempted from case-by-case reviews for the physical security of weapon-grade nuclear material produced from exported American technology or nuclear fuels. The effect of this policy will be to facilitate, rather than delay, international commerce in such materials. In Japan alone, this would mean transcontinental shipments of ton quantities of spent nuclear fuel to Europe and, eventually, ton quantities of plutonium from Europe back to Japan without case-by-case physical-security reviews by the United States.

Second, the superpowers are finally approaching agreement on the reduction and possible elimination of intermediate-range nuclear forces in Europe and perhaps Asia. The United States, under encouragement by friendly NATO governments, is seeking to keep over 4000 tactical battlefield nuclear weapons in Europe as a means of compensating for Soviet advantages in conventional forces and as a way to achieve a closer "coupling" of the United States to the defense of Europe. The safety and security of these tactical weapons are an important concern of this book.

The book is not without some rough edges. A great deal of empirical evidence on this delicate subject matter is classified, a problem that will continue to hamper the development of comprehensive databases. Moreover, analytical rules to guide the collection and interpretation of the evidence remain very inadequately defined. One contributor (Konrad Kellen) is brutally candid about the analytic shortcomings of research on the motivations of potential nuclear terrorists; he warns analysts of nuclear terrorism (a concept he terms "bottomless") to be conscious that they are "wading into a morass of confusion and fuzziness" (p. 106).

Given the lack of stable methodology, some contributors rely upon frameworks of analysis whose usefulness and relevance may in some cases be open to question. One contributor (Luis René Beres) asserts that "the principal grievance that potential terrorists have against the United States concerns misguided elements of U.S. foreign policy" (p. 146). Working from this premise, he offers the following dubious requirements for reducing nuclear terrorism: U.S.–Soviet nuclear disarmament, the demise of "anti-Sovietism" in U.S. foreign policy, and an end to U.S. support to "authoritarian regimes."

Others rely upon their past work on nonnuclear terrorism to provide considerable data on terrorist groups in regions ranging from El Salvador to Armenia, without firmly establishing the relevance of these data to nuclear terrorism. Yet the country with the highest incidence of attacks on nuclear facilities—Spain—receives very little attention. Although a methodological *sauve qui peut*