A Chinese Achievement

China Builds the Bomb. JOHN WILSON LEWIS and XUE LITAI. Stanford University Press, Stanford, CA, 1988. xx, 329 pp. $29.50. ISIS Studies in International Policy.

China Builds the Bomb chronicles the decade-long effort of Chinese scientists to design, construct, and test their nation's first nuclear device. There is also an abbreviated account of Beijing's first hydrogen bomb test. Based largely on official histories and the memoirs of several leading participants in the program, the study also draws upon interviews describing the tortuous history of Chinese scientific and military effort during two decades of internal upheaval. It makes clear the magnitude of China's achievement in advancing so rapidly to nuclear status.

Not unlike the program itself, Lewis and Xue's account proceeds logically and sequentially. Their history begins with the Chinese leadership's deliberations of the early 1950s on the security challenge posed by American nuclear weapons and proceeds *seriatim* through the period of Sino-Soviet collaboration, the mining and processing of uranium, the production of fissile material, the research and design of the first nuclear device, the preparation of the test site in northwestern China, and subsequent efforts to build upon the initial nuclear successes.

The authors are at their least successful in assessing the motivation for the program as it evolved in the early and mid-1950s. Lewis and Xue present a picture of a highly vulnerable, intimidated Chinese leadership confronting the prospect of American use of nuclear weapons against the mainland. They review the end of the Korean and Indochina conflicts and the offshore island dispute of 1954–55 and conclude that these events "constituted the proximate cause of the Chinese decision to build a national strategic force" (p. 35). They cite declassified American documents purporting to describe "Washington's increased dependence on nuclear weapons and its readiness to use them against China" (p. 17) and assert that in the offshore island conflict "the Chinese appear to have concluded that the Americans were preparing to fight a nuclear war against them" (p. 34), but no credible evidence is furnished to buttress these claims. Notwithstanding intermittently flamboyant rhetoric from both sides, Washington and Beijing imposed clear limitations on their respective military actions. That Mao was vexed and inhibited by the deterrent effect of U.S. nuclear weapons seems indisputable, but American use of nuclear weapons in combat would only have been *in extremis*, and avoidance of their use thus depended ironically on Chinese restraint.

Lewis and Xue offer a somewhat circumscribed portrayal of the role of Mao Zedong, though they note his intense and early interest in the implications of the nuclear revolution. As the authors observe, the paradoxical character of nuclear fission was especially intriguing to a dialectician such as Mao. In the high-level leadership meeting of mid-January 1955 that initiated the weapons program, Mao argued that though other preoccupations had prevented early attention to nuclear development "sooner or later, we would have had to pay attention to it" (p. 39). Mao did not seem noticeably alarmed or impelled by any putative American nuclear threats directed against China; he rather seemed to believe such weapons were the *sine qua non* of major power status.

A more likely immediate determinant of the Chinese nuclear decision was the Soviet Union's readiness to provide direct and extensive assistance. Although their treatment is overly equivocal, the authors shed important light on this fascinating but neglected history. Most scholars have emphasized the importance of the Sino-Soviet national defense agreement of October 1957, when Moscow pledged to provide a sample nuclear device as well as additional data and equipment to the Chinese. The Soviet cancellation of this agreement in mid-1959 (disclosed by the Chinese in 1963) led most observers to conclude that the Soviets played a fairly limited role in the ultimate successes of the nuclear program.

This interpretation ignores the extent of the Soviets' involvement in Beijing's nuclear development at its inception. As the authors note, the weapons decision of 15 January 1955 was followed immediately by important agreements with Moscow. Some were public (a 17 January accord providing China with its first cyclotron and nuclear reactor) and others secret (a 20 January protocol for joint uranium prospecting). Later Soviet commitments included extensive obligations for the training of personnel, the construction of major R&D facilities (including a gaseous diffusion plant), and provision of prototypes for Chinese weapons delivery systems. Simply put, the Soviet Union provided China much of the wherewithal that eventually enabled Beijing's impressive entry into the nuclear competition.

Lewis and Xue assert that the Chinese viewed Soviet aid as a near-term expedient and that Moscow repeatedly imposed severe limits on the provision of data crucial to actual weapons development. They further depict Khruschchev and Soviet advisers in China as grudging and inconsistent in the furnishing of assistance. Given the virtually total lack of disclosures from Soviet sources, their account relies heavily on Chinese descriptions of these events. But Chinese accounts of the late 1950s are necessarily self-serving in their depiction of Soviet behavior. Without question, Moscow's pullout of aid was highly disruptive, especially the reneging on promised deliveries of uranium hexafluoride for enrichment purposes. But the most important issue gets lost sight of: why had Soviet leaders been prepared to facilitate China's nuclear development in the first place? In scale and scope Soviet assistance to the Chinese weapons program is without parallel in the history of nuclear proliferation. Absent equivalent disclosures from Soviet sources, the full story of Sino-Soviet nuclear cooperation will never be known.

Lewis and Xue's account comes into its own when it reaches the period following the cancellation of Soviet assistance. The book is especially vivid in its depiction of the personal, physical, and scientific obstacles the program faced. These included extreme hardships associated with the acute food shortages of 1960–62. In addition, the nuclear program became embroiled in a major jurisdictional dispute during 1961–62 over China's national defense priorities; periods of political and social upheaval (especially the Cultural Revolution) also took their toll.

As described by Lewis and Xue, the ultimate success of the program in the face of such difficulties is attributable to at least five factors. First, the development of a nuclear weapon was deemed to have singular importance as a national goal and took priority over all other objectives. (On p. 96, the authors cite a 1956 directive from Mao Zedong: "Provision for all leading scientists, technicians, and equipment necessary for the project should be guaranteed and take precedence over all other claims.") The conjunction of unambiguous high-level policy support with a commitment to grant the scientists free rein was a potent combination. Second, the pullout of Soviet aid added an urgency and nationalistic intensity to the program that constituted an enormous spur to scientific and technical development. (The first nuclear device was designated

"596" to mark the year and month of the formal cancellation of Soviet nuclear aid.) Indeed, especially as the program neared its successful conclusion, the project directors repeatedly pushed the pace of their efforts, on occasion having to overcome skepticism on the part of the political military leadership. As the authors conclude, "In most instances the nature and level of the programmatic demands emanated from the experts themselves" (p. 225).

Third, the Chinese undoubtedly benefited from the fact that other countries had gone before them. Systematic collection and scrutiny of Western literature enabled identification of promising paths and avoidance of costly mistakes. Premier Zhou Enlai, who assumed a crucial oversight role throughout the program's history, advocated an approach that he termed "one-time test, overall results." The authors describe this as "a method in which the stages of theoretical research, experimentation, engineering, and production were considered together and undertaken as a whole. . . . The Chinese . . . shunned full scale experiments except when absolutely necessary" (p. 107). Time and cost imperatives also contributed to a more risk-taking, improvisational approach that at times compromised safety and that placed a lower premium on exactitude and sophistication.

Fourth, the Chinese made extremely effective use of the equipment and design data the Russians left behind. The unavailability of uranium hexafluoride proved the major inhibiting factor in the production process, and the authors describe the completion of the partially finished gaseous diffusion plant at Lanzhou as "a national crusade" (p. 125). Indeed, the fact that the Chinese managed to install all the Soviet-supplied equipment at the plant by late 1962 undermines the blanket assertion about total disarray in the aftermath of Moscow's aid withdrawal: the plant was far from finished when Soviet assistance ceased. The Chinese were also able to use fragmentary Soviet data that proved vital to design of the implosion device employed in the first nuclear test.

The fifth and final factor deserves special note: the Chinese were able to devise a highly effective system for program management. As the commitment to develop nuclear weapons accelerated in the late 1950s, Chinese leaders "became convinced that the time had come to impose a central, military-type organization on the entire strategic program and thereby eliminate, or at least minimize, the overlapping leadership systems and populist interference" (p. 53). The soundness of this approach was repeatedly demonstrated in ensuing years.

The dominant figure in this process was Marshal Nie Rongzhen, who as head of the Defense Science and Technology Commission assumed principal responsibility for overseeing the program as a whole. The leadership's commitment to simultaneous pursuit of all key aspects of weapons development underscored the need for such a decision-making body. As a result, decisions could be made and implemented in a timely, effective fashion, even when they entailed major reallocation of resources. The April 1960 decision to emphasize enriched uranium rather than plutonium as the near-term source of fissionable material is one example: it is difficult to imagine a decision of this sort in the absence of an authoritative management system.

However, the authors also offer revealing glimpses of an intense intra-bureaucratic struggle during the early 1960s, when some of China's most powerful leaders allegedly sought to discontinue or delay the nuclear effort in the aftermath of China's "three lean years." Although Mao ultimately ruled in favor of nuclear development, other bureaucratic constituencies and leadership networks were able (through the creation of a 15-member Central Special Commission in late 1962) to impinge somewhat on Nie's prerogatives. The marshal's ability to carry the program to successful conclusion and within the agreed-upon timetable was a vivid testimonial to the management arrangements and procedures introduced at his behest. As the authors further note, a quarter-century later Nie and his key subordinates maintain predominant influence within the Chinese nuclear weapons and space bureaucracy.

Despite the limitations of the available evidence and some intermittent analytical problems, *China Builds the Bomb* is a landmark study. In detail and scope it vastly surpasses all previous research on this topic, and it seems certain to remain the definitive treatment for many years to come. Perhaps most important, Lewis and Xue have demonstrated the rich potential of sustained collaboration between American and Chinese scholars. All students of nuclear strategy and of Chinese politics will remain in their debt.

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