



LITERATURE REVIEW

Tom Ramos, *From Berkeley to Berlin: How the Rad Lab Helped Avert Nuclear War* (Annapolis, MD: U.S. Naval Institute Press, 2022), 240 pp.

The debate over nuclear weapons and deterrence policy often revolves around numbers, types, and capabilities of the weapons themselves and how they fit into U.S. national security strategy. Seldom is attention paid to those who created these awesome weapons and how their intellectual and scientific contributions more than half a century ago have helped keep the nuclear peace for nearly eight decades. In *From Berkeley to Berlin: How the Rad Lab Helped Avert Nuclear War*, Tom Ramos addresses the important role played by the scientists, engineers, and weapons developers laboring in secret at the national laboratories to develop the nuclear arsenal that served as an effective deterrent to Soviet aggression and helped prevent the Soviet leadership from unleashing a nuclear Armageddon.

Ramos' work chronicles the efforts of American giants in the field of nuclear physics and related disciplines who initially set out to ensure that Nazi Germany would not be the first to develop nuclear weapons. Some of these brilliant scientists were emigres from Europe who fled the tyranny that befell the continent in the 1930s and 1940s and who understood the ramifications of a German nuclear weapon in the hands of the Nazi regime. These included Italian physicist Enrico Fermi, Hungarian-born physicist Edward Teller, Polish-American mathematician Stanislaw Ulam, and German-born scientist Hans Bethe. Each played a seminal role in the development of the U.S. nuclear arsenal.

Much of their work was carried out at Los Alamos Laboratory and the Livermore National Laboratory in Berkeley, California, co-founded by Teller and Ernest Lawrence. Herbert York was the first director of the University of California's Radiation Laboratory, or "Rad Lab." The Rad Lab's most significant accomplishment at the time was development of a thermonuclear weapon that could be carried on a submarine-launched ballistic missile. To this day, sub-launched ballistic missiles comprise the bulk of the U.S. nuclear deterrent force and are considered the most survivable "leg" of the U.S. strategic nuclear "Triad."

From Berkeley to Berlin describes the relationships between Lawrence, Teller, and other prominent scientists responsible for the development of America's nuclear arsenal, including Robert Oppenheimer, Herman Kahn, Johnny Foster, Harold Brown, Mike May, and Glenn Seaborg. It is a fascinating account, and Ramos intersperses the historical narrative with personal details about the key individuals. For example, he describes how during World War II, Johnny Foster (who will celebrate his 100th birthday this year) "got his hands on a captured German radar unit, took it apart and studied it, and, once he knew how it worked, developed tactics for bomber crews to outwit German radar units that guided air defenses to shoot them down." He also recounts Foster's love of motorcycles, noting, "He owned a Vincent HRD motorcycle and used it to transport himself and his new bride, Barbara, from Montreal to Berkeley." Foster was also the impetus behind the design of the Permissive Action Link (PAL) feature to safeguard the security of nuclear weapons, winning support from President Kennedy. The safety and security of the nuclear stockpile has been a consistent priority for every subsequent administration and remains an issue of the utmost importance today.



Lawrence's contributions are also highlighted throughout. As Ramos explains:

Ernest Lawrence left a huge legacy. He was a natural leader: a Nobel laureate himself, five physicists who worked for him also won the Nobel Prize. He took an experimental apparatus he invented and made it a tool that opened our knowledge of the atom and its nucleus. The mix of his intellectual abilities and his managerial skills made him a formidable individual. Lawrence, often alone, most consistently kept the American atomic-bomb project alive during World War II. When the Soviet Union appeared to be developing the means to overcome the United States in military prowess during the early Cold War, he became a formidable advocate for developing the hydrogen bomb. His influence on events around him was remarkable. West Point recognized Lawrence's contributions to the nation several months before he died by making him the first recipient of the Sylvanus Thayer Award.

Interestingly, many of the debates among the principals in Ramos' book revolved around issues still being debated today. For example, Mike May authored a paper advocating for a counterforce strategy in place of the Eisenhower's Administration's emphasis on "Massive Retaliation." A series of RAND studies involving William Kaufmann, Andy Marshall, and others had earlier developed the predicate for such a strategy. The arguments pivoted on whether the threat of massive nuclear retaliation in response to a Soviet attack made sense or whether smaller and "cleaner" nuclear weapons that could provide more limited nuclear options would provide a more credible deterrent. The debate was so intense that Army General Matthew Ridgeway, who commanded the Eighth Army in Korea, resigned as Army Chief of Staff, arguing, as Ramos notes, that Eisenhower's policy "opened the door for the Soviet Union to engage in foreign adventures at a lower level than would prompt the United States to use its nuclear forces," which could actually encourage Soviet aggression.

Today, this debate is evident between those who advocate for greater flexibility in targeting options to tailor deterrence to specific adversaries and to bolster the credibility of U.S. deterrent threats and those who argue that such capabilities are unnecessary and make nuclear war more "thinkable." Controversy over the Trump Administration's 2018 *Nuclear Posture Review* and its call to supplement existing U.S. nuclear capabilities with low-yield ballistic missile warheads and a nuclear sea-launched cruise missile is emblematic of this ongoing debate.

The debate over whether to develop a hydrogen thermonuclear bomb after the successful use of atomic weapons against Hiroshima and Nagasaki also reflected contrasting views over the wisdom of developing new weapons capabilities. Oppenheimer was opposed while Teller was in favor of proceeding. Even today, arguments over the deterrent value of developing new nuclear capabilities continue.

There is no question that *From Berkeley to Berlin* is a valuable contribution to the literature on nuclear weapons and strategy. It is well written, and documents the rivalry between the various nuclear weapons laboratories—the "Rad Lab" at Berkeley (now Lawrence Livermore National Laboratory), Los Alamos, and Sandia—and how they

ultimately complemented each other in their efforts to provide for American security. To his credit, Ramos explains complex physics problems in English that is eminently understandable to the non-scientific reader. The story he tells is remarkable for its historical detail and for giving the reader insights into the personalities at the center of one of the most significant scientific endeavors in American history. It is well worth reading.

Today, concerns are rising over the possible use of nuclear weapons by Russia in its unjustifiable war with Ukraine and the bellicose nuclear threats emanating from both Moscow and Beijing against those who seek to preserve a stable and peaceful international order. In this environment, it is worth recalling the valiant efforts of those brilliant scientists whose work helped enable the United States to avert a third World War over the course of several generations.

*Reviewed by David J. Trachtenberg
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Hal Brands, *The Twilight Struggle: What the Cold War Teaches Us about Great-Power Rivalry Today* (New Haven, CT: Yale University Press, 2022), 328 pp.

The U.S. 2017 *National Security Strategy* speaks about the return of the great power competition, particularly with Russia and China.¹ This is not the first time in recent memory that the United States has had to compete with a great power adversary, and fortunately for the Free World, in that existential clash with the Soviet Union, the United States prevailed. In his book, *The Twilight Struggle: What the Cold War Teaches Us about Great-Power Rivalry Today*, Hal Brands examines why the United States prevailed and what lessons can be learned from the Cold War struggle that are applicable to today's great power competition.

Brands' examination could not be timelier, or more important. As he notes, the upcoming "competitions will determine whether the twenty-first century extends the relatively peaceful, prosperous world to which Americans have become accustomed or thrust us back to a darker past. They will influence the fate of freedom in countries around the globe." Brands divides the book into several chronological chapters, each of which highlights a different aspect of the Cold War rivalry between the United States and the Soviet Union: the origins of the strategy to compete with the Soviet Union, capitalizing on U.S. strength, the nuclear aspects of the competition, the importance and perils of competing on the periphery, taking the fight to the enemy, finding the balance between a comprehensive competition and resource exhaustion, highlighting the importance of understanding the adversary, reforming the government to sustain the competition in the long-run, the benefits of highlighting the ideological aspects of the competition, and giving an adversary a graceful

¹ The White House, National Security Strategy of the United States of America, December 2017, p. 27, available at <https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf>.

way to lose. The organization is clever and enables a reader to follow both the substantive lessons learned in different areas of the competition and its Cold War unfolding.

The book concludes by offering lessons for future U.S. competition with Russia and China. Chief among them is being able to navigate between unacceptable extremes, being willing to wage war but not seeking out the conflict, an alternative between a “disastrous escalation” and a “disastrous retreat.” The book makes the case for the multiplying the strength of U.S. alliances and underscores the importance of military capabilities. In order to compete effectively in the long-run, the United States must be able to set and maintain a steady pace of competition without needlessly exhausting its resources. Yet, as Brands points out, “sustainability involves morale as well as matériel,” and values are an essential weapon in the great power struggle. As a related matter, so are political warfare (efforts to increase short and long-term strain on an adversary’s system) and negotiations, “as a way of creating enough stability to permit the determined pursuit of advantage.” In order to compete well, the United States must appreciate the importance of appropriate timing, not only being perceptive to windows of opportunity but also to windows of its own vulnerability. The U.S. government must organize its bureaucracy to compete while resisting broader forces “of democratic self-destruction while exploiting the pressure for democratic self-improvement.” According to Brands, a successful competition requires blocking the opponent’s way forward, but not his way out. And lastly, the United States must see the competition as a way of life. America should plan on being exposed to high costs and real dangers. The key to prevailing in a rivalry in the long-run is to create space for the persistent accumulation of advantage.

If there is one missed opportunity and a downside to the narrative Brands presents in his otherwise insightful and well-researched book, it is that situations in which the United States did not get its policies quite right (for example McCarthyism or the U.S. conflict in Vietnam) are explained as necessary offshoots of selected strategies always leading to the betterment of U.S. approaches and competitive positions in the long run. Were U.S. failures really inevitable for the betterment of U.S. policies? Was there a way to avoid them? The book appears to answer the first question with a rather mechanistic “yes” and the second is left unanswered.

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David A. Cooper, *Arms Control for the Third Nuclear Age: Between Disarmament and Armageddon* (Washington, D.C.: Georgetown University Press, 2021), 248 pages.

In this highly polarized political climate, rare is the book that “crosses the aisle” to study a subject considered to be the other side’s purview. Self-styled “realists” have largely

abandoned scholarly book-length studies of the post-Cold War arms control environment, with the regrettable side effect of allowing an echo chamber to form among those who already favor arms control—only debating amongst themselves the scope and pace of disarmament, not its prudence. David Cooper, now Professor Emeritus for the U.S. Naval War College, attempts, and largely succeeds, in penetrating this echo chamber via heavy doses of history and realism.

His book, *Arms Control for the Third Nuclear Age*, is meant to help educate others about the U.S. history of negotiating arms control agreements on nuclear weapons, both during and after the Cold War, and how the lessons U.S. officials learned the hard way might have enduring value as Russia and China continue to grow their nuclear arsenals.

What sets this book apart from the broader literature on nuclear arms control is its foundation in the classic commentaries on the subject—and not simply those of Thomas Schelling, Morton Halperin, and Hedley Bull, but Herman Kahn, Albert Wohlstetter, and Colin Gray as well. It is a sad commentary on the state of the nuclear arms control literature that another reviewer of Cooper's work chides him for (gasp) seeming to approve of some of Gray's insights.² Such commentary only further reinforces Cooper's point that he makes repeatedly throughout the book, that there seems to be little room for "owls" between "hawks" and "doves" in the debate over nuclear arms control.

While this reviewer would quibble with Cooper's over-simplifying commitment to the avian categorization, his broader point is well taken—analysts can support using arms control to enhance U.S. security while being (necessarily) realistic about its limitations and prospects for success. Cooper contends that this "owlish" approach to nuclear arms control featured heavily in U.S. negotiating strategy during the Cold War, in which U.S. officials sought to preserve or expand technical areas where the United States had an advantage over the Soviets.

In the chapter that recounts U.S. arms control efforts during and after the Cold War, Cooper does cite instances where U.S. officials supported hard-ball tactics to retain strategic U.S. advantages, but gives short shrift to the expected outcome of those tactics versus the actual outcome. For example, U.S. officials used their advantage in ballistic missile defense technology to secure limits on the Soviet's ballistic missile defenses, with the confident prediction that once the missile defense issue was resolved, the Soviets would have no reason to increase their nuclear arsenal anymore once they reached parity with the United States. The Soviet Union, of course, did not stop building once they reached parity. Overall though, while trying to portray U.S. ambitions and outcomes in nuclear arms control during and after the Cold War is an undoubtedly ambitious task for one chapter, Cooper mostly succeeds in presenting the good, the bad, and the ugly in a way that reasonable "hawks" and "doves" would agree is largely accurate.

² Nancy Gallagher, as quoted in, "H-Diplo/ISSF Roundtable 13-9 on Arms Control for the Third Nuclear Age: Between Disarmament and Armageddon," *H-Diplo*, March 22, 2022, available at <https://networks.h-net.org/node/28443/discussions/9953940/h-diploissf-roundtable-13-9-arms-control-third-nuclear-age>.

After reviewing the history of nuclear arms control, Cooper seeks to distill some lessons that can help guide U.S. policymakers in the “third nuclear age” that features the entrance of a third nuclear superpower, China. He proposes the United States pursue “strategic stability” through a “dual-track approach” and “controlling what can be verified.” According to Cooper, “strategic stability” can be categorized as “first-strike stability,” “crisis stability,” “escalation stability,” and “arms racing stability.” He argues that the “first-strike stability” and “crisis stability” are the highest priorities in a tripolar nuclear deterrence environment.

How then should the United States pursue these kinds of stability via arms control negotiations? Here, Cooper clearly breaks ranks with the majority of arms control analysts by advocating U.S. nuclear arms buildups as the most realistic approach to bringing Moscow and Beijing to the negotiating table. The historic evidence for this position is clear, and Cooper convincingly cites both the primary documents and a range of interviews of former U.S. government officials from across the political spectrum. The “dual-track” approach, in his preferred strategy, would then be supported by U.S. arms control proposals that keep things simple, focusing specifically on the systems that can most easily be verified through national technical means, i.e., large strategic weapons, as a way to get around Russian and Chinese reluctance to agree to intrusive on-site verification.

Nobody can fairly accuse Cooper of being overly-optimistic about his preferred strategy, he is clear throughout the book that prospects for nuclear arms control among the United States, Russia, and China, are “iffy” at best. Cooper repeatedly emphasizes that the larger security environment, and political relations between the superpowers, determines arms control outcomes. Indeed, just after this book was published, non-government researchers revealed the newly discovered expansion of three different ICBM fields in China and, even more recently, Russia renewed its invasion of Ukraine. These developments only reinforce Cooper’s pessimism concerning the prospects for nuclear arms control in the following decades.

Nevertheless, Cooper contends that even if there is a small chance that arms control could help head off some of the more dangerous aspects of an arms race, then work should begin now on crafting some arms control principles that conform and support U.S. national interests and will receive bipartisan support. Cooper then proposes some specific potential U.S. arms control efforts, ones the reader suspects are more in the spirit of getting the conversation started than having his deeply-rooted support. They range from the eminently sensible (proposing to expand the U.S. and Russian nuclear risk-reduction centers to include Chinese participation) to the less-sensible (Cooper claims that a U.S. declaration of “mutual vulnerability” with China would be a “cost free” gesture, a suggestion that Japanese defense officials would very likely beg to differ on). His proposals to consider limitations on missile defenses or a renewed bilateral U.S.-Russian INF Treaty are particularly disconcerting and only somewhat offset by his listing of the domestic and international concerns these proposals might raise.

Cooper’s commitment to realist principles for arms control, while generally visible throughout his analysis, occasionally slips. He, for example, discusses the “vanishing nuclear guardrails” of arms control agreements—as if the agreements themselves were what kept

the nuclear competition in check. Yet, Russia's violation of the INF Treaty, which Cooper amply documents, demonstrates that arms control treaties have only as much power as the signatories allow them to have; they are not independent "guardrails." Cooper also relies too heavily on the "action-reaction" dynamic to explain the dangers of an unrestrained nuclear future without the New START Treaty. As William Van Cleave, considered by some to be the dean of realist thought on nuclear arms control, stated, "We should remind ourselves that in the democratic states of the West there is *always* arms control, even without negotiated agreements. Arms are controlled and limited by the West's traditional values, by its political and budgeting process, and by the influence of the media and of public opinion."³

In summary then, *Arms Control for the Third Nuclear Age* is a refreshing break from the current nuclear arms control literature that is dominated by "the triumph of hope over experience." Cooper provides a necessary, if incomplete, corrective to those who believe that if the United States just tries a little harder and perhaps makes a few more concessions, Moscow and Beijing will see the light. Cooper, on the other hand, demonstrates that the U.S. history of nuclear arms control negotiation is full of lessons for those with eyes to see them—that politics drive arms control and not vice versa, that negotiating from a position of strength is critical, and that concessions are a reward for negotiating seriously, not bait to begin negotiations.

Neither arms control "hawks" nor "doves" will be fully satisfied with all of Cooper's conclusions, but those seeking a middle way will find this book a useful guide. Given that one of Cooper's goals for the book is to provoke a more historically-informed debate about the desirability and limits of arms control, this reviewer believes it will succeed, but only through an unrelenting commitment by realists to re-enter the debate and demand arms control proposals be judged by the hard-learned lessons of history.

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³ Emphasis in original. William R. Van Cleave, "The Arms Control Record: Successes and Failures," chapter in, Richard F. Staar, ed., *Arms Control: Myth Versus Reality* (Stanford, CA: Stanford University Press, 1984), p. 3.

