

INTRODUCTION

ALBERT AND ROBERTA WOHLSTETTER ON NUCLEAR-AGE STRATEGY

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Given the quality of what has been recently written about Albert James Wohlstetter (1913-1997) and Roberta Mary Morgan Wohlstetter (1912-2007), it would appear that these late strategists have exerted immeasurably more influence on the history of the nuclear age than on historians. Nonetheless, Albert and Roberta—for the sake of brevity, this essay shall sometimes refer to the Wohlstetters by their first names—emerged as two of America’s most consequential, innovative, and controversial thinkers of strategy during the latter half of the last century.

They were controversial, in no small part, because their subjects of inquiry—questions of strategy, foreign and defense policy, and morality in the nuclear age—often lent themselves to deep disagreement. However, by engaging these questions, their research aimed above all at rejecting fatalism, at refuting “the belief that the holocaust will be on us unless by some desperate act we achieve some improbable immediate drastic change in the world order.”¹ In their view, such fatalism underpinned not only Utopian responses to the nuclear age’s dangers (e.g., “One World or None” calls for total disarmament, dissolution of national sovereignty, and world government), but also Dystopian responses (e.g., preventive nuclear war). As Albert explained in 1963:

We are in the dark about the future of science and technology, still more about the long-term future of military and political developments in the world arena. We should be extremely skeptical, therefore, if sweeping predictions on any subject come tied to a prescription, an exhortation for urgent and sweeping action. We have all heard the apocalyptic pairs of alternatives: “Destroy the Russians or they’ll destroy us”; or “Disarm or face world annihilation.” These are counsels of desperation, fear of the dark. They abandon not only patience, but intelligence.²

As a remedy to nuclear-age fatalism and apocalyptic thinking, the Wohlstetters sought to identify and, when needed, to invent and design prudent, pragmatic alternatives to limit and manage nuclear risks—for example, to decrease nuclear war’s likelihood by finding ways of improving the U.S. nuclear deterrent’s survivability, controllability, and therefore credibility in the face of changing dangers. Nevertheless, some viewed their research agenda very differently. “He believes in learning how to fight with nuclear weapons,” Paul Warnke, President Carter’s Arms Control and Disarmament Agency director, said bluntly (if not also reductively) of Albert’s work on nuclear deterrence in 1987. He continued, “I’ve never met a general or an admiral who really agrees with that.”³

Albert was also controversial because, in contrast to Roberta’s decidedly more subdued yet nonetheless formidable approach to debate, he engaged in policy disputes, not in a partisan or ideological manner, but rather with an analytical tenacity and intellectual ferocity that gained many admirers as well as detractors. As the venerable military historian, Sir Michael Howard, would later recall of Albert’s work on exposing arms race myths, “Wohlstetter tore to pieces the thesis of the arms control lobby, that the weapons policy of the Soviet Union was dictated simply by the perception of U.S. threat, rather than by their own very different agenda.” But Sir Michael would hasten to add: “His exposure of muddled, if not wishful thinking, on this issue did a great deal of good, but in his pursuit of [intellectual] adversaries, Wohlstetter showed himself at his most Calvinistic: there was at times a distinct whiff of burning in the air.”⁴

Yet that which made the Wohlstetters controversial also helped to make them innovative. They belonged to a small circle of policy-oriented researchers—a group that included Andrew W. Marshall, Herman Kahn, William W. Kaufmann and others—that established the intellectual foundations on which the field of strategic policy analysis now stands. In particular, Albert, Roberta, and their immediate colleagues forever transformed how those who would later work on national security issues would think and talk by introducing concepts like “signal-to-noise ratio” in intelligence collection and analysis; the operational distinction between “first-strike” and “second-strike” capability in nuclear deterrence; “Fail-Safe” operations for nuclear-armed bomber aircraft; and the basing of intercontinental ballistic missiles in

“hardened” underground silos. “To abbreviate drastically, Albert Wohlstetter all but invented a distinctly military approach to the military problems, or prudently presumed problems, of the security and utility of nuclear forces,” wrote Colin S. Gray, a former adviser to the Reagan Administration. “Wohlstetter’s work is on a plane of importance that is exceedingly thinly populated with convincing rivals.”⁵

And what made the Wohlstetters controversial and innovative also helped to make them consequential. Although they never officially served as government policymakers during their careers in strategy, they were nevertheless able—through the clarity of their thinking, the rigor of their research, and the persistence of their personalities—to shape the views and aid the decisions of those in government both during and after the Cold War.⁶ In turn, both Democratic and Republican Administrations recognized them for their many policy-relevant contributions. In February 1965, Albert received the Medal of Distinguished Service from Secretary of Defense Robert McNamara, becoming the first ever non-Pentagon employee to receive the Department of Defense’s (DoD) highest honor. In January 1977, he received that honor again, this time from Secretary of Defense Donald Rumsfeld. And in November 1985, both Albert and Roberta were awarded Medals of Freedom, America’s highest civilian honor, by President Ronald Reagan. As political scientist Richard Rosecrance, who served on the State Department’s Policy Planning Council during the Johnson Administration, would write in 1991, “Probably no civilian strategic analyst has had more influence in the nuclear age than Albert Wohlstetter.”⁷

Contemporary Controversies and Continuing Relevance.

In the early years of the new century, there is renewed interest in the Wohlstetters. One reason why is that although Albert died 4 years before Al Qaeda’s September 11, 2001 (9/11), surprise attacks and America’s subsequent struggle against violent extremism, several of his former students emerged as figures of consequence during the presidency of George W. Bush. (It is worth observing, though, that formal and informal students of the Wohlstetters have served as policymakers in every Administration since the start of President Kennedy’s.)

Paul Wolfowitz, whose dissertation committee Albert had chaired in the University of Chicago’s political science department, served as Deputy Secretary of Defense during Bush’s first term,

and now chairs the Secretary of State's International Security Advisory Board. Richard Perle, whom Wohlstetter had informally mentored since Perle's high school days, chaired from 2001 to 2003 the Defense Policy Board, a high-level panel of outside advisers to the Pentagon. And Zalmay Khalilzad, who also earned his Ph.D. at the University of Chicago under Wohlstetter's tutelage, served as the U.S. Ambassador to post-Ba'athist Iraq and, in his current capacity as America's envoy to the United Nations, is the highest-ranking Muslim in the Executive Branch. Broadly labeled by some as "neoconservatives," Wolfowitz, Perle, and Khalilzad would join Vice President Dick Cheney, Secretary of State Colin Powell, Secretary of Defense Donald Rumsfeld, Director of Central Intelligence George Tenet, National Security Advisor Condoleezza Rice, and others in being associated with President Bush's controversial arguments for war against Ba'athist Iraq.⁸

Another reason behind the renewed interest in the Wohlstetters is the growing awareness of how their Cold War and post-Cold War writings still speak to key challenges that America and its allies are facing in the 21st century. With respect to Roberta's works, one obvious example is *Pearl Harbor: Warning and Decision* (1962), her Bancroft Prize-winning study of the failures of American intelligence and imagination that had preceded Imperial Japan's surprise attack on December 7, 1941—a study that has found new relevance in the tragic wake of Al Qaeda's 9/11 surprise attacks. In her meticulous analysis of the events and decisions prior to Pearl Harbor, Roberta found that the United States had failed to foresee the attack "not for want of the relevant materials, but because of a plethora of irrelevant ones."⁹ Decisionmakers and intelligence analysts—the latter of whom were, at the time, decentralized and dispersed among America's military services—all had failed to distinguish the small, faint signals warning of disaster in Hawaii from the larger, louder mass of background noise suggesting anything but. Only *in retrospect* did these warning signals become so obvious and so discernible. "Signals that are characterized today as absolutely unequivocal warnings of surprise air attack on Pearl Harbor become, on analysis in the context of December 1941, not merely ambiguous but occasionally inconsistent with such an attack," she wrote.¹⁰ "Indeed, at the time there was a good deal of evidence available to support all the wrong interpretations of last-minute signals, and the interpretations appeared wrong only after the event."¹¹

This perennial problem of intelligence collection and analysis—of identifying and pulling actionable warning signals

from the vast morass of irrelevant background noise — has come to be known within intelligence circles as the “signals-to-noise ratio” problem or, more simply, “the Roberta Wohlstetter Problem.”¹² The U.S. intelligence failures that preceded the attacks of 9/11 renewed public awareness of this problem, so it was therefore no surprise that Roberta’s *Pearl Harbor* study was prominently cited by *The 9/11 Commission Report*.¹³

Another example of the Wohlstetters’ continuing relevance is *The Buddha Smiles: Absent-Minded Peaceful Aid and the Indian Bomb* (1976), Roberta’s incisive study of how U.S. and Canadian civil nuclear assistance to India during the 1950s and 1960s had unwittingly furthered New Delhi’s secret construction and ultimate detonation in May 1974 of a nuclear explosive device, sometimes referred to as India’s “Smiling Buddha” bomb.¹⁴ The Indians had obtained plutonium for their bomb by using a reactor that Canada had built for them to use (in the words of their bilateral nuclear cooperation agreement) “for peaceful purposes only,” as well as heavy water to moderate the Canadian-origin reactor that the United States had given to them (according to the terms of their bilateral agreement) only “for peaceful purposes.”¹⁵ Indian government officials subsequently explained away “Smiling Buddha” by claiming that the bomb’s purpose had been “peaceful,” and that their construction and detonation of this “peaceful” nuclear explosive device had therefore not violated *their* understanding of the respective terms of the Indo-American and Indo-Canadian nuclear cooperation agreements. To Roberta, this episode plainly illustrated the need for the Executive and Legislative Branches either to obtain unequivocal terms and bilateral understandings regarding not only what is prohibited in any agreement for nuclear cooperation, but also what consequences shall follow in the event of a violation—or else to decline an agreement altogether. Such insights from *The Buddha Smiles* are worth revisiting and taking seriously today, especially with Washington having concluded a new nuclear cooperation agreement with New Delhi that would carve out an exception in U.S. and international law in order to lift the decades-long prohibition against nuclear exports to India that arose after Smiling Buddha’s detonation.

In contrast to Roberta’s works, many of Albert’s writings have remained dispersed and often difficult for all but the most determined and resourceful to find. As a result, those interested in learning more about this late strategist—a group that includes

not only government decisionmakers and policy analysts, but also journalists, scholars, and students—have not been able to read his works first-hand. Rather, they have had to turn to books and articles that offer second-hand (and, in some cases, even third-hand) accounts of his writings. Such accounts, however, have generally been incomplete, and sometimes have misunderstood or even consciously misrepresented Albert’s arguments.

In particular, when recent books and articles on “neoconservatism” in the 21st century have discussed Albert (who never identified himself as a “neoconservative,” nor was ever labeled one by the secondary literature before 2001 or 2002¹⁶), the authors of these accounts typically have neither read carefully nor analyzed closely his works. Instead, they have tended merely to cite passages from his writings out of textual and historical context in larger efforts to lionize or demonize today’s “neoconservatives.” In turn, these books and articles, and those who read them, frequently are drawing distorted and ahistorical conclusions about Wohlstetter and his work.

“Is it too much to ask,” wrote Sir Michael Howard (a military historian who describes himself as a critic of Albert’s), for someone “to bring together [the Wohlstetters’] widely scattered articles and publish them in a solid lasting form” as part of “the indispensable nucleus of a strategic studies library when all else has been swept away?”¹⁷ The present volume aims to help answer that call by providing readers not only with first-hand access to some of Albert and Roberta’s key published and previously unpublished writings on strategy, but also with a fuller understanding of their historical contributions and continuing relevance to U.S. national security policy.

The remainder of this introductory essay offers the basis for such an understanding by examining six key themes in Albert’s career in strategy, with attention to Roberta’s impact on Albert’s work and thought. These themes correspond with this edited volume’s six chapters of selected Wohlstetter writings on nuclear-age strategy and policy.

I. ANALYSIS AND DESIGN OF STRATEGIC POLICY

Albert Wohlstetter first entered the world of strategy in 1951, when at the age of 37 he began working at the RAND Corporation, a defense-oriented research organization based in Santa Monica, California. So new and so singular a place was RAND that the

U.S. press would have to coin new terms—neologisms like *think factory* and the more familiar *think tank*—just to describe more succinctly, if not accurately, what this organization was.¹⁸

RAND—the name is a contraction of the phrase *research and development*—was very much a product of the political, economic, military, and technological “cold war” competition between the West and the Soviet Union that began as World War II was ending. Recognizing the crucial roles that science and technology had played in the Allied victory over the Axis, the U.S. Army Air Forces (USAAF) in October 1945 formed Project RAND, the think tank’s institutional predecessor, as an experimental organization to retain wartime scientific and technological expertise. Written at a time when the American military services were struggling to comprehend how the atomic bomb might affect the future character of war and peace, Project RAND’s mandate was framed to encompass “study and research on the broad subject of intercontinental warfare, other than surface, with the objective of recommending to the Army Air Forces preferred techniques and instrumentalities for this purpose.”¹⁹ This broad mandate enabled a well-funded, cutting-edge, and extremely flexible research agenda that helped to attract some of America’s brightest minds in economics, physics, engineering, mathematics, and the social sciences. Although RAND would gain institutional independence from the USAAF’s successor, the U.S. Air Force (USAF), after incorporating itself as a private not-for-profit entity in 1948, the USAF would remain RAND’s main client for many years to come.²⁰

During the 1950s, Albert’s research on America’s nuclear forces would help to establish the RAND Corporation’s reputation as *the* center of U.S. strategic thought. His own journey to RAND would be a circuitous one, however. Given his undergraduate and graduate education in mathematical logic, and his later work in manufacturing as well as prefabricated housing, it may seem perhaps incongruous—even surprising—that he would spend his remaining 46 years immersed in questions of nuclear-age strategy and morality. Yet Wohlstetter would import lessons and insights from earlier disparate experiences into his defense-oriented research at RAND, and thereby shape his own unique approach to the analysis and design of strategic policy.

Road to RAND.²¹

Born in New York City on December 19, 1913, Albert was the youngest of Philip and Nellie Friedman Wohlstetter's four children. Although Philip would die when Albert was 4, a close-knit and cultured extended family—and the efforts of Albert's eldest brother, who forsook university studies to work full-time—would help widowed Nellie to care for her children.²²

Raised in Manhattan's Washington Heights neighborhood, Wohlstetter attended DeWitt Clinton High School, where he showed an early and strong interest in mathematics, Latin, and modern dance. In 1930, as the Great Depression was descending upon America, 16-year-old Albert entered the City College of New York. As an undergraduate, he concentrated his studies on mathematical logic, and was particularly stimulated by the writings of Charles Sanders Peirce (1839-1914), a philosopher of science whom he would describe in later years as "probably the greatest American philosopher" and "a major influence" on his own work in nuclear-age strategy.²³ On the side, Albert would participate in campus activities like the college's R.O.T.C.²⁴

After graduating from City College, Wohlstetter earned a fellowship to Columbia Law School. There, he met a master's degree student in psychology (whom he would marry in 1939) named Roberta Mary Morgan,²⁵ the daughter of Edmund Morris Morgan, Jr., a distinguished Harvard Law School professor who would later help to modernize the Uniform Code of Military Justice. Although Albert would leave law school after only a year, he would remain at Columbia to pursue a Ph.D., studying mathematical logic and the philosophy of science, and working with some of the era's great logicians, such as Columbia's Ernest Nagel and Harvard's Willard Van Orman Quine.²⁶ While in graduate school, Wohlstetter would take on odd jobs to help support himself, and would even work for a time as art historian Meyer Shapiro's assistant.

After earning his M.A. in 1937, Albert received several fellowships to finish his doctorate—including one from the Social Science Research Council to introduce modern mathematical methods into economics, a prestigious fellowship that in turn enabled him to intern for a time at the National Bureau for Economic Research. However, when the United States entered World War II, he halted his studies to work initially for the War Production Board's planning committee as an economic

consultant, and later for the Atlas Aircraft Products Company as a factory and quality control manager at a plant manufacturing power-generating equipment for Allied forces.

After the war, Wohlstetter declined to complete his doctorate and instead moved with his wife, Roberta, to southern California. Except for a year spent in Washington, DC, where he served as the National Housing Administration's Director of Programs (his one and only official government position), Albert would spend the rest of the decade managing research and development at the General Panel Corporation of California. General Panel would attempt—but in the end fail—to help meet the postwar housing shortage by mass-producing the “Packaged House,” a modular prefabricated housing system designed by émigré architects Walter Gropius and Konrad Wachsmann.²⁷

In February 1951, as General Panel was folding, Albert was already contemplating a change in career, and even considering a return not only to more academically oriented research, but also to the East Coast. However, Roberta—who had been working part-time in the RAND Corporation's social sciences division since late 1948 while at the same time raising her and Albert's daughter, Joan—was intent on remaining on the West Coast. Toward that end, she set up a meeting for Albert with Charles Hitch, the head of the think tank's economic division. A Missouri-born Rhodes Scholar, Hitch had served in the Office of Strategic Services during World War II before coming to RAND. Upon meeting, the two immediately clicked, and Hitch hired Wohlstetter on at RAND as a part-time consultant.

Wohlstetter's Approach: Key Features.²⁸

During the 1950s, Albert would lead a series of highly classified studies at the RAND Corporation that revolutionized how the United States based and operated its strategic nuclear forces. These studies (which the next section of this essay examines in some detail) would also stand out as exemplary applications of his unique methodology, a collaborative and interdisciplinary approach to the analysis and design of strategic policy. (Although Albert would write only a handful essays on methodology, his most accessible work on this subject is probably “Theory and Opposed-Systems Design” (1968), a version of which is included in this edited volume.²⁹)

First, Albert's approach sought to identify, frame, and answer questions directly relevant to the decisions facing government policymakers. Such decisions encompassed not only choices among "means to accomplish ends that stand a good chance of being opposed by other governments," but also choices among the ends themselves.³⁰

In Wohlstetter's view, the ends of government policy could run into opposition in a number of ways. Such opposition, of course, could take the form of a conflict of aims *between or among* several governments. "The ends of any government," he observed, "are multiple and only partially incompatible with those of other governments—even very hostile ones—and of course such conflicts may be resolved without fighting." However, he added: "A peaceful resolution may depend in part on the risks involved in combat."³¹

Such opposition could also take the form of a partial conflict of aims *within* one government. He elaborated:

While we may talk about national purpose in the singular, the first thing to observe about our aims is that we have many of them. They are connected; some depend on others; many conflict. Obviously two aims may conflict when each represents the interests of a different group. But even ends which the nation as a whole can be said to share oppose other accepted national ends.³²

Albert thus highlighted the crucial importance of including "a careful critique of constraints and objectives" in any analysis of strategic policy, with particular attention to the cost-effectiveness of available choices to meet these objectives. He explained,

A government's ends cannot be accepted as the final deliverances of authority or intuition. They are subject to revision as the result of an analysis that frequently displays incompatibilities with other ends of that government, or that indicates means so costly that the game is not worth the candle.³³

Second, Wohlstetter's analytical approach used theoretical models, empirically-driven research, and interdisciplinary collaboration to wade through the complexity and uncertainty surrounding these problems of policy, and arrive systematically

at some partial order among preferences and choices of means and ends.

Lessons from his pre-RAND experiences profoundly shaped this approach. On the one hand, Albert's education in mathematical logic and the philosophy of science had given him an appreciation of the uses—and the limits—of quantitative and qualitative theoretical models in capturing and explaining real-world interactions and phenomena. On the other hand, his professional experiences in wartime and peacetime manufacturing had taught him the importance of moving away from the abstract and grappling with the concrete. Indeed, he repeatedly stressed the critical importance in his analyses of “grubby, highly specific empirical work on technologies, operations, costs, and potential interactions among states, factors that are plainly relevant for decisions of the governments of these states—or for citizens evaluating these decisions.”³⁴ Drawing inspiration from the work of the philosopher of science Charles Sanders Peirce, Albert thus sought to use theoretical models and empirically-driven research in a heuristic manner: deductive theoretical models spurred further empirically-driven research, the findings of which helped inductively to refine and improve the deductive theoretical models, and so on, in a method of successive analytical approximation.

In addition, Wohlstetter's professional experiences impressed upon him the need to collaborate with and draw upon the insights and creativity of experts in other relevant fields. Indeed, he expressed pride in how his approach “required the cooperation of several disciplines and, in particular, a kind of close working together of natural science and social science disciplines which remains very unusual, if it exists at all, in universities.”³⁵

Third, Albert's approach aimed not only to weigh and consider the received range of possible choices, but also to invent and design new alternatives. He explained:

A central part of the inquiry must look at the current and impending state of the art and at feasible and useful changes. In the past two decades in which such inquiries have grown up, nuclear, electronic, propulsion, and transport technology have changed massively. The problem is not just to predict such changes, however. Since this is a work of design, it must explore how—in the light of interdependencies with military, political, and economic events—the changes may usefully be bent.³⁶

Indeed, he would remark in later years that invention and design figured heavily in his most successful analyses of strategic policy.

Fourth, Wohlstetter stressed the importance of being explicit about the limits of one's analytical approach, including the uncertainties surrounding the study. Yet he also noted that certain kinds of uncertainty could be leveraged to make the inquiry, inferences, and conclusions of the analysis more robust and persuasive. He elaborated:

In comparing alternative systems with one programmed, one cannot eliminate uncertainty, but one can assume that they will be resolved favorably from the standpoint of a dubious programmed system. One cannot avoid theoretical simplification, but one can design a model to favor the programmed or other losing systems and to give them the benefit of the doubt. Then if the comparison shows that, even with all the favors bestowed by the model's assumption, the system programmed or otherwise likely to be chosen is vastly inferior to an alternative, this offers substantial ground for choice. Moreover, it should not be surprising that bureaucrats exhibit enough inertia to make such *a fortiori* analyses possible and very useful, as some opposed-systems analyses have been.³⁷

In sum, Wohlstetter saw his approach as applying, in an essentially Peircean manner, the method of scientific investigation to the analysis and design of strategic policy. Moreover, he would argue that his approach stood in stark contrast to the practices of certain distinguished scientists, who would premise their arguments regarding the proper direction of nuclear-age strategy and policy less on the method of scientific investigation and much more on appeals to their own scientific authority.³⁸

That said, Wohlstetter emphasized that his particular approach to analysis and design neither exhausted the possibilities, nor could substitute for a capacity for fruitful inquiry. "There are no methods certain of result in a complex field of research," he cautioned. "None is proof against a dim awareness of interesting problems or incompetence in formulating manageable and significant questions."³⁹

II. NUCLEAR DETERRENCE

At the RAND Corporation in the 1950s, Albert Wohlstetter would lead a series of highly classified studies on U.S. nuclear forces that would evince his unique approach to the analysis and design of strategic policy, and establish his reputation within government circles as one of America's premier strategists. However, it was not until after the January 1959 publication of "The Delicate Balance of Terror"⁴⁰ in *Foreign Affairs*—an essay on the stringent conceptual and technical requirements for nuclear deterrence that military historian Marc Trachtenberg would later describe as "probably the single most important article in the history of American strategic thought"⁴¹—that Albert would be recognized as one of America's preeminent and controversial public intellectuals of defense. Together, Wohlstetter's RAND studies and the *Foreign Affairs* article would challenge what decisionmakers, military planners, and policy analysts had assumed about nuclear war and peace, and forever change how they would think and talk about nuclear strategy and operational policy.

The Base Study.

In May 1951 Charles Hitch, the head of RAND's economics division, asked Wohlstetter whether he would be interested in researching a problem that the USAF had posed to the think tank: *How should the USAF's Strategic Air Command (SAC) base itself overseas?* Initially, Albert saw this as a run-of-the-mill logistics problem, but after thinking things through over a weekend, he began to appreciate better how SAC's basing choices for its force of medium-range, nuclear-armed, manned bombers raised interesting questions and could have important implications.⁴² Wohlstetter thus accepted Hitch's invitation and began a research project that would later come to be known as the "Base Study."⁴³

As the 1940s gave way to the 1950s, the political, economic, and military competition between the Western allies and the Soviet Union had intensified. Although Soviet intentions remained unclear, its behavior had appeared at times ominous. After World War II, Soviet-supported Communists had seized power in Poland and Czechoslovakia. In 1948, the Union of Soviet Socialist Republics (USSR) had blockaded West Berlin. In August 1949, the Soviets had exploded their first atomic bomb. In 1950, the USSR not only had signed a defense treaty with the People's Republic

of China, but also had backed Kim Il Sung's Stalinist regime after North Korea invaded South Korea and thereby set in motion the Korean War.⁴⁴

Against this background, SAC's bombers, when armed with atomic gravity bombs, constituted at the time America's main military hedge against the prospect of "Central War" – that is, of a Soviet conventional military invasion of Western Europe, the nations of which lacked the political and military means to defend themselves. In time of war or crisis, SAC's *programmed system* of basing for 1956 to 1961 envisioned relocating the bombers from approximately 30 bases in the continental United States (CONUS) to roughly 70 overseas installations. Half of these installations would be large, expensive "primary bases" from which SAC's bombers would launch their offensive operations, and the other half, refueling bases, but in general, all of them would be geographically closer to the USSR than was CONUS. Moreover, this programmed basing system was viewed favorably by SAC, the USAF, and DoD, as well as by the Congress. Indeed, just for fiscal year 1952, the Congress had already appropriated \$3.5 billion (roughly equivalent to as much as \$30 billion in 2008 dollars) to construct domestic and overseas bases in accordance with the programmed system.⁴⁵

With a team that would feature economists Fred Hoffman and Henry Rowen, and aeronautical engineer Robert Lutz, Wohlstetter set out to understand the relevant economic, operational, logistical, technological, political, and military contexts in which to compare SAC's programmed system of basing to possible alternatives. Working in interdisciplinary consultation with USAF airmen, as well as with engineers, physicists, economists, intelligence analysts, geographers, and other experts, the Wohlstetter team came to identify four critical factors for evaluating base selection: the distances of a given base (1) to predetermined targets in the USSR, (2) to favorable entry points into Soviet territory, (3) to supply sources in the CONUS, and (4) to Soviet offensive airbases. In turn, they examined how variations in these factors, when applied to the SAC bomber force planned for 1956 to 1961, would *jointly* affect:

- the costs of extending the bomber force's round-trip radius;
- the Soviet military's employment of active defenses, as well as the number of SAC bombers which Soviet fighters could intercept and destroy;

- the logistical and operational costs for SAC's bomber force; and,
- the vulnerability of primary operating bases and bombers on the ground to attack by the Soviet's small but growing stockpile of atomic gravity bombs.

Wohlstetter and company's Top Secret March 1953 staff report, *The Selection of Strategic Air Bases* (R-244-S), concluded that the *preferred system* of basing was one of a new—and much less expensive—design that would rely primarily on bases within the continental United States in both peace and war, and supplement that system mainly with austere overseas refueling bases and, to a lesser extent, aerial refueling.⁴⁶ Although this alternative system was not optimal for all criteria, it was a clear, across-the-board improvement over the programmed system. When compared to alternatives, it excelled in extending the bomber force's round-trip radius more cheaply; enabling bombers to bypass Soviet defenses and interceptors and reach enemy targets more effectively; decreasing logistical and operational costs; and increasing the quality and time interval of tactical warning, as well as lowering the vulnerability of bases and bombers on the ground to attack by the Soviet Union's growing stockpile of aircraft-delivered atomic bombs.

Many in DoD, the USAF, and SAC initially and even reflexively resisted R-244-S's conclusions. In response, Wohlstetter and colleagues embarked on a briefing campaign of several months to persuade policymakers and military planners of the validity of their findings. In April 1954, they completed the Base Study's Top Secret, 400-page final report, *Selection and Use of Strategic Air Bases* (R-266), which not only detailed their findings, but also recommended new measures and operations to increase tactical warning of Soviet attack, and to better protect bomber aircraft, nuclear weapons, and personnel within each base from the various effects of nuclear explosions.⁴⁷ By that time, however, Wohlstetter and company's campaign had already shown results. By late 1953, the USAF had accepted R-244-S's main conclusion, and had begun plans to relocate SAC's primary bases to the continental United States and to implement other key recommendations.⁴⁸ In light of this success, the final text of R-266 was changed to describe SAC's originally programmed system of basing as the *formerly programmed system*.

Although the Base Study had implications for nuclear deterrence's stability, it is important to recognize that the study itself did not initially set out to focus on that issue. Rather, the effect of SAC's choices for basing and operations on the survivability, controllability, and credibility of the U.S. nuclear deterrent became evident only as the Wohlstetter team developed and refined their study. Their follow-on Vulnerability Study, however, would examine the issue of nuclear deterrence explicitly.

The Vulnerability Study.

In September 1953, around the time Wohlstetter and company embarked in earnest on their follow-on study, the military-technological context had already begun to change dramatically. Both the United States and the USSR were increasing their stockpiles of atomic bombs, starting to introduce long-range bombers and more indiscriminately destructive hydrogen bombs, and working to develop intercontinental ballistic missiles (ICBMs). Although Soviet ICBMs were likely to be extremely inaccurate, a February 1954 paper by Wohlstetter and Hoffman projected that if ICBMs were coupled with hydrogen bombs, then the hydrogen bomb's powerful blast effects and very large "lethal radius" could help to compensate for such inaccuracies, and enable even errant, imprecisely-delivered ICBMs to destroy intended military targets that were "soft" (e.g., airfields and aircraft, as well as unhardened buildings and structures) with ease and little warning.⁴⁹ The Vulnerability Study thus would seek to understand how these and other technological changes would affect the stability of deterrence.

Prior to this study, U.S. military planners had assumed that if the Soviets were to attack, their nuclear strikes—in a continuation of World War II and Korean War strategic bombing doctrine—would be aimed at American economic and industrial targets, as well as cities, and would be so large and so direct as to generate considerable strategic and tactical warning. Even historian-strategist Bernard Brodie had shared this counter-city targeting assumption. In his essays in the edited volume, *The Absolute Weapon* (1946), he had called the urban city the "made-to-order target" for nuclear weapons, and concluded that "the ability to fight back after an atomic bomb attack will depend on *the degree to which the armed forces have made themselves independent of the urban communities and their industries for supply and support.*" Brodie did

not think that U.S. strategic nuclear forces would be the primary targets of nuclear weapons.⁵⁰

Working again with Hoffman and Rowen, Wohlstetter examined not only these assumed “U.S.-preferred” Soviet methods of attack, but also other attack methods that he would later describe as *lesser excluded cases*.⁵¹ In particular, he considered the possibility of Soviet preclusive *first strikes* with nuclear weapons: that is, nuclear Pearl Harbor-style attacks in which small numbers of enemy forces would try to fly at low altitudes, circumnavigate America’s radar-warning networks, and use nuclear weapons to attack, not industrial targets or cities, but rather U.S. strategic nuclear forces themselves—with the explicit aim of precluding any substantial American retaliation or *second strikes*. (Albert and his colleagues coined the now taken-for-granted terms, *first strike* and *second strike*.)

In September 1956, the Wohlstetter team completed the Vulnerability Study’s Top Secret staff report, titled *Protecting U.S. Power to Strike Back in the 1950s and 1960s* (R-290).⁵² R-290 found that, even given the then-current range of low-to-medium intelligence estimates of existing and future Soviet military capabilities, U.S. nuclear forces could be highly vulnerable to attacks, especially Soviet attempts at a preclusive nuclear first strike, because of four central weaknesses:

1. inadequate strategic and tactical warning before Soviet bomber attacks, and almost no warning before Soviet ICBM attacks;

2. painfully slow and uncoordinated responses to any warning because SAC required hours—sometimes many days—to assemble flight crews, aircraft, and munitions for combat or evacuation;

3. ineffective active and passive defenses because forces, personnel, and command centers were too locally concentrated, and because facilities (e.g., existing aircraft shelters and depots storing nuclear arms) could not structurally resist even an errant atom bomb’s blast effects, let alone a hydrogen bomb’s; and,

4. a degraded or negated “second-strike” capability because Soviet first strikes could destroy or disable many SAC bombers on the ground, could disrupt post-attack communications and retaliation coordination, and could easily level planned above-ground ICBM launchers.

R-290's findings were startling and provocative, but Albert and colleagues were careful to attach explicit and crucial qualifications. They wrote:

The attacks described here, and many others studied, clearly indicated the present vulnerability of our strike force. *They do not, of course, imply that a Russian attack is imminent. Nor do we think it is.* That is a matter of Soviet intention rather than Soviet capability, and such intent would be affected in the first instance by Soviet knowledge of our vulnerability and in the second place by the comparative gains and risks of alternatives to central war.⁵³

Conventional wisdom in the United States held that by simply possessing nuclear weapons, a government necessarily acquired an ironclad deterrent. The Wohlstetter team took aim at the conventional wisdom by arguing that mere possession of what the historian-strategist Bernard Brodie had once famously called "the absolute weapon" was not sufficient. Their worry was that if the weaknesses of America's strategic nuclear forces remained unaddressed, and if the USSR perceived these vulnerabilities, then in a time of extreme crisis the Soviets might come to view an attempt at a preclusive first strike as a not wholly unreasonable risk. As they explained in R-290:

Deterrence is hardly attained by simply creating some uncertainty in the enemy's attack plans, that is, by making it somewhat of a gamble. The question is, *how much* of a gamble? and what are his alternatives? On the basis of past experience, we would be taking a very large gamble if we assumed that under no circumstances would the enemy take risks. If this were so, the matter would be easy and, for us, substantially costless.⁵⁴

In short, although a nuclear Pearl Harbor was far from inevitable, in a time of acute crisis U.S. carelessness and complacency could conceivably invite such an attack.

However, Wohlstetter and company stressed that, in efforts to address these serious vulnerabilities, simply numerically increasing the size of U.S. strategic nuclear forces would provide neither an affordable nor an effective solution. "National defense

programs do not now give adequate consideration to the problem of protecting the strategic force as distinct from the problem of force size,"⁵⁵ they argued. "The criterion for matching the Russians plane for plane, or exceeding them is, in the strict sense, irrelevant to the problem of deterrence."⁵⁶ Rather, Albert and his compatriots maintained that the problem of establishing a deterrent that was survivable, controllable, and therefore more credible in the face of changing dangers required U.S. strategic nuclear forces to be *not only* capable of riding out and operating coherently after an actual preemptive attack against them; *but also* completely controllable in times of peace, crisis, and war—and especially in the face of ambiguous warning—so as to avoid unauthorized operations, accidents, and war by mistake.

In turn, such controllability in the face of ambiguous warning required that strategic nuclear forces be able to cope with the operational dangers that attended *false alarm*, the belief that there is a nuclear attack underway when there actually is not, which could commit America to war accidentally; and *false reassurance*, the belief that there is not an imminent nuclear attack when there actually is, which could facilitate an enemy's preclusive first strike.

Wohlstetter and colleagues held that if U.S. strategic nuclear forces could meet these requirements for a survivable, controllable, and credible deterrent, then this would increase the likelihood that the Soviets would tend to view the choice of a preclusive first strike as the riskiest of alternatives *even if* Moscow should somehow stumble into potentially calamitous circumstances.⁵⁷ To meet these ends, they identified over 50 operational measures to limit and manage the many risks facing U.S. strategic nuclear forces.⁵⁸ In particular, they recommended that the United States should:

- *Extend* the continental radar net's perimeter; *relocate and disperse* bases deep within it; and *install* a "bomb-alarm system" to warn immediately all SAC bases and America's Continental Air Defense forces of an enemy's nuclear warhead detonation anywhere within the basing system.
- *Establish* better alert procedures; *increase* SAC's flight crew and aircraft readiness for evacuation or combat; and *implement* "Fail-Safe," a set of protective actions in which combat-ready SAC bombers would evacuate and disperse in response to ambiguous warning, fly along

predetermined routes, and return to base after arriving at predesignated locations, unless given an explicit order to continue on and attack enemy targets.

- *Shelter* personnel, bombers, fuel, and nuclear bombs in facilities more structurally resistant to atomic and hydrogen bomb blast effects; *locally disperse and protect* these facilities within bases to take better advantage of ICBM inaccuracies; and *shield* planned ICBM launchers in hardened underground silos to make active and passive defenses more effective.
- *Secure* backup civilian and military airfields in the continental United States; and *develop* robust, survivable command, control, and communications systems to protect post-attack communication and coordination with surviving forces.

Although the Vulnerability Study's findings ran into some initial institutional resistance within the U.S. Government, the earlier Base Study's successes made policymakers and military planners much less inclined to dismiss the Wohlstetter team's conclusions.⁵⁹ Indeed, many of R-290's recommendations were eventually adopted—though some recommendations, such as Fail-Safe,⁶⁰ took much longer than others for SAC, the USAF, and the Defense Department to accept and implement.

Moreover, Wohlstetter and company's Vulnerability Study inspired or helped to inspire others to develop technological innovations that would later have dramatic, and even revolutionary, impact. To take one example, the conventional wisdom prior to R-290 was that structures could be designed to resist—at most—peak overpressures of 30 or 40 pounds per square inch (p.s.i.). Working with Paul Weidlinger, a Hungarian-born engineer whom Albert had met in the 1940s at the National Housing Administration, the Wohlstetter team disproved the conventional wisdom: Weidlinger designed an underground missile silo, the concrete and steel structure of which could resist peak overpressures of as much as 200 p.s.i. In addition, he showed that it was possible to design structures of even greater blast resistance.⁶¹

To take another example, in the late 1950s RAND political scientist Fred C. Iklé, psychiatrist Gerald Aronson, and statistician Albert Madansky developed the concept of what would later come to be known as Permissive Action Links (PALs), with the aim of preventing the accidental or unauthorized use of nuclear

weapons. In brief, PALs require not only the installation of coded safety locks on nuclear weapons and missiles, but also the positive assent of two people to carry out and execute sensitive nuclear operations.⁶² PALs remain widely used by the United States to this day.

Yet another important example is the work of a brilliant RAND engineer named Paul Baran. Wohlstetter's R-290 report had helped draw attention to the Defense Department's severe command, control, and communications weaknesses: for instance, in the 1950s SAC communicated using extremely vulnerable civil telephone lines that could be easily disrupted by a nuclear-armed adversary in time of war. To remedy this problem, Baran in the early 1960s came up with the concepts of "distributed networking" and "hot-potato routing" (the latter is commonly known today as "packet-switched networking"), with a view toward creating more robust, secure, and survivable systems for command, control, and communications. Baran's concepts would prove essential to later efforts by the Advanced Research Projects Agency and other organizations that would eventually lead to the creation of the Internet.⁶³

The Delicate Balance: Deterrence as a Matter of Comparing Alternative Risks.⁶⁴

Drawing conceptual insights from his classified and empirically-driven RAND studies, Albert Wohlstetter published the article, "The Delicate Balance of Terror," in the January 1959 issue of *Foreign Affairs* that publicly took aim at the conventional wisdom surrounding nuclear deterrence. His targets were twofold: (1) the widespread belief in what his article described as *automatic deterrence*, the view that an always-reliable deterrent is an inevitable consequence of a government's mere possession of nuclear weapons;⁶⁵ and (2) the belief in what was popularly known as *minimum deterrence*, a more sophisticated version of automatic deterrence conceding that nuclear forces require the capability to survive the sort of attack they are meant to deter, but maintaining that such capability is easily achieved with only a few technologically crude and indiscriminately destructive nuclear weapons.⁶⁶ The article noted that these views were held by many members of America and Europe's foreign policy elite: "In England by Sir Winston Churchill, P. M. S. Blackett, Sir John Slessor, Admiral Buzzard, and many others; in France by such figures as Raymond Aron, General Gallois, and General Gazin;

in this country by the titular heads of both parties, as well as almost all writers on military and foreign affairs, by both Henry Kissinger and his critic, James E. King, and by George Kennan, as well as Mr. [Dean] Acheson.”⁶⁷

Wohlstetter countered that a survivable, controllable, and therefore credible deterrent against nuclear attack is neither automatically nor easily achieved. “[M]uch of the contemporary Western confidence on the ease of retaliation is achieved by ignoring the full range of sensible enemy plans,” he wrote.⁶⁸ Automatic deterrents had assumed nuclear attacks against the West that would target cities and civilians, not nuclear-armed military forces themselves; thus, their image of a nuclear attack was that of a nuclear-age extension of World War II strategic bombing campaigns or a repeat of Hiroshima and Nagasaki, not a nuclear Pearl Harbor. Minimum deterrents conceded that an opponent’s nuclear attack might target strategic nuclear forces, but failed to appreciate how deeply-rooted systemic weaknesses and operational difficulties in the face of a preclusive nuclear first strike could severely complicate attempts at retaliation.⁶⁹

The fundamental conceptual point of “The Delicate Balance” was that the credible deterrence of a preemptive nuclear attack hinges on the would-be attacker’s *comparison of alternative risks*—that is, what specific circumstances a potential aggressor faces, what alternatives to attack it perceives, and how it compares the risks of attack to the risks of perceived alternatives in those circumstances. “The balance is not automatic,” Wohlstetter explained. “It should be clear that it is not fruitful to talk about the likelihood of general war without specifying the range of alternatives that are pressing on the aggressor and the strategic postures of both the aggressor and the defender.”⁷⁰ His crucial insight was that, even despite the horrors of nuclear weapons, the prospect of catastrophic circumstances could make the seemingly sturdy nuclear-age “balance of terror” fragile, and thus make a normally unthinkable course of action (e.g., nuclear preemption) potentially thinkable.

To increase the likelihood of adversaries always viewing a nuclear attack—in particular, a preclusive first strike—as the riskiest of choices requires a nuclear-armed government to acquire and communicate to would-be aggressors the acquisition of what Wohlstetter stringently defined as *second-strike capability*. Such capability demands much more than possession of nuclear arms. It also requires the establishment of a *system* of strategic nuclear

forces—a system composed not only of nuclear warheads and delivery vehicles, but also of personnel; command, control, and communications; reconnaissance and radar warning; supporting physical and operational infrastructure; and active and passive defenses. This system would have to be capable of clearing the following six operational hurdles:⁷¹

1. The system of strategic nuclear forces must operate safely and stably in peacetime and, in particular, overcome problems associated with false alarms, accidents, and unauthorized operations.

2. It must be able to survive and operate coherently after a preclusive first strike—that is, after a preemptive nuclear attack attempting to degrade, disable, or destroy it.

3. It must be able clearly to identify the aggressor, and to receive orders to retaliate from the political leaders after an attack.

4. Delivery vehicles must be able to reach targets on the aggressor's territory.

5. Delivery vehicles must be able to survive attempts to intercept them by the aggressor's active defense.

6. And delivery vehicles must be able to deliver nuclear warheads with accuracy appropriate to the warhead's explosive yield in order to overwhelm the aggressor's passive defenses (e.g., structural hardening, geographical dispersal, and deep underground emplacement of facilities) and destroy intended targets.

Moreover, such second-strike capability needed to be maintained in relation to—and in competition with—the potential aggressor's own changing offensive and defensive military capabilities.

Finally, Albert stressed that even if a government could credibly deter a preclusive nuclear first strike, that did not mean it could also therefore credibly deter limited nuclear or less-than-nuclear aggression in all circumstances. (Albert and Roberta's work on Cuba during and after the Cuban Missile Crisis would examine this issue further.⁷²) In other words, a survivable, controllable, and credible deterrent against nuclear preemption could not substitute for a holistic approach to national security, including efforts to improve conventional non-nuclear military capabilities.

The essay's argument was controversial. "Wohlstetter puts much emphasis on the circumstances in which nuclear aggression would be, in his view, both rational and sane," wrote P. M. S.

Blackett (whose views “The Delicate Balance” had criticized) in 1962. “Wohlstetter’s argument suggests to me that he has neither thought very deeply or imaginatively about the consequences of the nuclear war, nor has he ever imagined himself in the position of taking the action which he seems to think it sane for the Soviets to take.”⁷³

However, Wohlstetter—who had derived his arguments from nearly a decade’s worth of highly classified research on U.S. strategic nuclear forces at the RAND Corporation—worried about the extent to which government decisionmakers would always act in an objectively “sane” or “rational” manner. Drawing on his wife Roberta’s work on Pearl Harbor, he came to view Imperial Japan’s December 1941 surprise strike as highly instructive. On the one hand, Tokyo, when faced with the prospect of eventual but almost certain defeat, had reasoned that a daring surprise attack on what it had *correctly perceived* to be vulnerable American naval forces in Hawaii was the less risky choice. As Admiral Osami Nagano, Chief of Japan’s Naval General Staff, had explained in 1941:

The current relations between Japan and the United States might be compared to an illness in which a decision was necessary on whether to perform an operation. Avoiding surgery would [threaten] a gradual wasting away of the patient. Great danger would attend the operation, but it could not be said that surgery offered no hope of saving the patient’s life.⁷⁴

On the other hand, U.S. and allied leaders had tragically failed to appreciate the alternative risks that were pressing down on Japan and making arguably insane strategic gambles seem less-and-less unreasonable. In a footnote to “The Delicate Balance,” Wohlstetter recalls how:

. . . in an interview with the press on December 3, 1941, Air Chief Marshal Sir Robert Brooke-Popham, Commander-in-Chief, Far East, for the British forces stated, “There are clear indications that Japan does not know which way to turn. Tojo is scratching his head.” As Japan did not have a definite policy to follow, irrevocably, step-by-step, said Sir Robert, “there is a reassuring state of uncertainty in Japan.”⁷⁵

Although Albert did not believe the Soviets were imminently bent on a nuclear Pearl Harbor, he could not exclude the possibility that, given the Cold War's vicissitudes, Moscow might someday blunder into a calamitous situation, and find itself contemplating a preemptive nuclear attack.⁷⁶ As he elaborated during a private high-level dinner seminar at the Council on Foreign Relations in March 1960:

The point is that deterrence should not be viewed as an absolute. It is a matter of *comparative risks*. Under some circumstances an aggressor might be faced with several unpleasant alternatives, and we want to guarantee that the most unpleasant always appears to be the risk of making a direct attack on the United States. There are, moreover, many foreseeable contingencies which will put a great strain on the deterrent. For example, the Russians may be faced with a catastrophic defeat in a peripheral war. Or they may fear allied intervention and support for a revolt spreading in the satellites or in Russia. Or, possibly, even more dangerous, we may have suffered some catastrophic defeat on the periphery, and they may doubt that we will accept such a loss.⁷⁷

Thus, in his view, a clear and evident second-strike capability would increase the likelihood that the USSR and other future nuclear-armed adversaries would view, under almost any and all circumstances, a preclusive first strike as the riskiest of available alternatives.

In *Pearl Harbor: Warning and Decision* (1962), a Bancroft Prize-winning book which was published in the same year as the Cuban Missile Crisis, Roberta would describe major practical lessons that had emerged from her study of Imperial Japan's December 1941 surprise attack:

We cannot *count* on strategic warning. We *might* get it, and we might be able to take useful preparatory actions that would be impossible without it. We certainly ought to plan to exploit such a possibility should it occur. However, since we cannot rely on strategic warning, our defenses, if we are to have confidence in them, must be designed to function without it. If we accept the fact that the signal picture for impending attacks is almost

sure to be ambiguous, we shall prearrange actions that are right and feasible in response to ambiguous signals, including signs of an attack that might be false. We must be capable of reacting repeatedly to false alarms without committing ourselves or the enemy to wage thermonuclear war.⁷⁸

In an application of his wife's insights, Albert's work in nuclear deterrence had sought to identify the sort of posture, operations, and technologies that would enable America's strategic nuclear forces not only to function stably in peacetime, but also to ride out and survive a nuclear-armed adversary's attempt to preclusively degrade, disable, or destroy them—and by so doing, help the United States deter safely and credibly a nuclear-age Pearl Harbor-style attack against it. In "The Delicate Balance," however, he stressed that maintaining such capability in the face of changing nuclear dangers would not be easy. It would require "sustained intelligent effort, attainable only by continuing hard choice."⁷⁹

In later years, some authors and journalists would erroneously associate Wohlstetter with "bomber gap" arguments, and even Senator John F. Kennedy's "missile gap" arguments. However, through outreach like *General Comments on Senator Kennedy's National Security Speeches* (circa 1960),⁸⁰ a memorandum to JFK's presidential campaign, Wohlstetter would try to clarify how his work on nuclear deterrence had not only explicitly rejected "bomber gap" and "missile gap" claims, but also refuted arguments for brute numerical increases in U.S. nuclear weapons and delivery vehicles as a feasible, economic, or sensible way of preserving second-strike capability.

"The Delicate Balance of Terror" would be the first of many Wohlstetter writings to publicly challenge developing doctrines of automatic and minimum deterrence, as well as policies derived from these doctrines. In the early 1960s, one such policy would be a contentious U.S. proposal to share nuclear weapons with America's allies in Europe.

III. NUCLEAR PROLIFERATION

Albert Wohlstetter's pioneering research on nuclear deterrence in the 1950s helped to establish his reputation as one of America's premier and most controversial strategists. In the

following decades, his efforts to stem nuclear proliferation—efforts which drew insights directly from his RAND studies on the requirements for a survivable, controllable, and credible U.S. nuclear deterrent—would serve to enhance that reputation. During the early 1960s, he would work to debunk an American proposal for a so-called “nuclear sharing” arrangement with the North Atlantic Treaty Organization (NATO) and to promote instead nonproliferation within NATO by convincing the United States to make stronger, clearer, and more believable its promise to protect Western European allies from any potential Soviet nuclear and non-nuclear military aggression. Moreover, in the late 1960s and early 1970s, he and Roberta would conduct a sustained examination of civil nuclear energy’s military potential, as well as of the degree to which national and international approaches to nonproliferation were effectively constraining such potential. The Wohlstetters’ analyses would help not only to reframe nuclear nonproliferation debates going forward, but also to change U.S. nuclear energy and export policy.

Alliance Commitments.

After France’s February 1960 test of an atomic bomb, U.S. policymakers faced again the same sorts of worries that Britain’s October 1952 test had raised: *How would the addition of a new nuclear-armed government affect relations within NATO, especially the cohesion among allies? Would other Western European governments move to acquire their independent nuclear arsenals?* Such worries led some in the outgoing Eisenhower Administration to propose that Washington establish with Western Europe a nuclear-armed Multilateral Force (MLF), an expansive “nuclear sharing” arrangement in which not just the United States, but all NATO members themselves would multilaterally command and control naval vessels manned by multinational crews and armed with American-supplied nuclear *Polaris* sea-launched ballistic missiles (SLBMs).⁸¹ The hope was that the proposed MLF would satisfy NATO members who were agitating for greater roles in Western Europe’s nuclear defense, and thereby arrest the impulse for more governments to get nuclear weapons. The proposed MLF, it was hoped, would also strengthen the sinews of the alliance.

Wohlstetter, however, opposed not only the acquisition of new nuclear arsenals by individual NATO governments, but also the Multilateral Force nuclear-sharing proposal itself. As an

outside adviser to the Kennedy Administration, he would help to persuade key decisionmakers to reject both. In particular, he would serve as DoD's informal representative to the Committee on U.S. Political, Economic, and Military Policy in Europe, an advisory body chaired by former Secretary of State Dean Acheson, and charged by the Kennedy Administration to reexamine transatlantic relations between America and Western Europe. Albert would play a key role in helping Acheson to author draft policy guidance for the White House's National Security Council (NSC) that would aim to promote nuclear nonproliferation in Western Europe through increased political, economic, and military interdependence among the United States and its allies, as well as through improvements in NATO's conventional defense capabilities for resisting less-than-nuclear aggression.⁸² This draft guidance would form the basis for the Kennedy NSC's National Security Action Memorandum (NSAM) 40.⁸³ Wohlstetter's article "Nuclear Sharing: NATO and the N+1 Problem" — published in the April 1961 issue of *Foreign Affairs* (at roughly the same time NSAM 40 was approved)—provides insights into the sort of arguments he made to the Acheson Committee.⁸⁴

To justify the French *force de frappe*, proponents had made use of doctrines of automatic and minimum deterrence. For example, General Pierre Gallois, an adviser to French President Charles de Gaulle, had asserted in *Stratégie de l'âge nucléaire* (1960) that the destructiveness of nuclear weapons created uncertainty for potential aggressors that necessarily "increases the risk, counsels discretion, and consequently strengthens the strategy of dissuasion."⁸⁵ At the time, Gallois believed that the spread of nuclear weapons to additional states would have a pacifying effect: "As atomic armament grows more widespread and other nations besides America and Great Britain gain possession of it, either in their own right or under a 'double check,' the notion of dissuasion will also become more common, each nation practicing it according to its means."⁸⁶ Gallois added: "It will not be long before we may have to give up war altogether."⁸⁷

In "Nuclear Sharing," however, Wohlstetter countered, first, that the independent nuclear arsenals of France—and of other allies that might follow the French example—would face, in times of acute crisis, severe difficulties in deterring safely and believably a Soviet preclusive nuclear first strike. Here, he was very much informed by his earlier RAND Corporation research on strategic nuclear forces, which had revealed how hard it could be for the United States to establish a survivable, controllable, and therefore

credible second-strike capability in the face of changing dangers. In his view, the independent nuclear forces of American's allies would likely face an even harder time.

Moreover, Albert was deeply critical of how France's raw desire for greater prestige had played a decisive role in its acquisition of a nuclear-armed *force de frappe*. He believed that de Gaulle's decision would be a costly mistake with little real payoff. In "The Delicate Balance of Terror," he had argued that "[m]ere membership in the nuclear club might carry with it prestige, as the applicants and nominees expect, but it will be rather expensive and in time it will be clear that it does not necessarily confer any of the expected privileges enjoyed by the two charter members."⁸⁸ In "Nuclear Sharing," he elaborated this point:

The burden of deterring a general war as distinct from limited wars is still likely to be on the United States and therefore, so far as our allies are concerned, on the alliance. . . . The problem of deterring a major power requires a continuing effort because the requirements for deterrence will change with the counter-measures taken by the major power. Therefore, the costs can never be computed with certainty; one can be sure only that the initiation fee is merely a down payment on the expense of membership in the nuclear club.⁸⁹

Second, Wohlstetter worried about the effects that the spread of independent nuclear arsenals or the Multilateral Force would have on the Western alliance's cohesion and decisiveness. On the one hand, independent arsenals not only were undermining the U.S. nuclear "umbrella" guarantee in behalf of Europe's security, but also were unraveling the interdependence between the United States and some of its allies. (France would leave NATO in the mid-1960s.) On the other hand, the proposed MLF would multiply and dangerously complicate the allied decisionmaking process: *In the event of a nuclear attack against one or more NATO members, which governments would have the power to decide when to use the MLF's jointly-controlled nuclear weapons? Which governments, if any, would have the right to veto such use? Just the U.S.? All participating NATO members? What would the process for making decisions be? Simple majority? Consensus?* The answers to these critical questions were far from clear.

Moreover, Albert was concerned that both independent nuclear arsenals and the MLF would erode *from within* America's promise to protect Western Europe from nuclear and non-nuclear Soviet military aggression. He wrote:

[O]ne of the most serious troubles with moves towards NATO or national nuclear strike forces is that they might weaken the American guarantee in the future. If either a national or a joint deterrent can really deter the Soviet Union, it is hard to justify an American commitment for this purpose. If European nuclear forces should present merely a façade of deterrence, they might convince the American Congress even if they do not convince the Russians.⁹⁰

Third, and finally, Wohlstetter feared that the emergence of new independent nuclear arsenals or the Multilateral Force would set precedents encouraging ever more states, both allied and hostile, to acquire nuclear weapons. In his view, American policy needed to account not just for the "Nth" problem country — that is, the immediate would-be nuclear proliferator. It needed also to account for what he termed the "N+1 problem" — that is, the precedent for or against further proliferation which other governments would draw from U.S. policy toward the last prospective "Nth" nuclear power.

Thus Wohlstetter argued that if the United States strengthened its commitment to defend NATO allies from all forms of nuclear and non-nuclear military aggression, then this would serve to reassure allies of their security and interdependence with America, and promote nuclear nonproliferation within Western Europe. To that end, he urged Washington to retain sole launch authority over U.S. nuclear weapons; to emphasize an American "umbrella" strategy in behalf of Europe to deter Soviet preclusive nuclear attacks against both the United States and individual NATO allies; and to work with NATO members to develop more believable conventional military options to meet limited-nuclear and less-than-nuclear provocations. He explained:

The alliance is viable, because neither our allies nor the United States in the long run can survive without it. This is the reason for deliberately entangling our forces and their dependents in the lot of Europe. We identify

our short-term fate with Europe's because we think our long-term fate cannot be extricated from theirs. . . . In fact, the principal implication of my argument is that the much used notion of interdependence has to be taken seriously.⁹¹

Following Wohlstetter's arguments, the United States would work to reassure non-nuclear-armed NATO allies through increased American security commitments to Europe, and to convince them not to build independent nuclear strike forces. Consequently, Albert's arguments against proliferation within the Western alliance would earn considerable fame (and infamy) in Europe. In a 1962 memorandum to the Department of State, Henry Kissinger (who at the time was serving as an outside adviser to the Kennedy Administration) would report the response of French generals in Paris when he had questioned why they believed their small and unprotected force would be capable of retaliating after a Soviet first strike: "The generals replied that I seemed infected by the pernicious Wohlstetter doctrine."⁹²

Although Albert also had helped to convince the Kennedy Administration to bury the Multilateral Force for a time, the proposal would die a slow death. Indeed, the proposal would resurface periodically during the Johnson Administration, and at times severely encumber negotiations between the United States and the USSR within the Eighteen-Nation Disarmament Committee, the multilateral forum from which the *Treaty on the Nonproliferation of Nuclear Weapons* (Nuclear Nonproliferation Treaty or NPT) would later emerge.⁹³

Civil Nuclear Energy's Military Potential.

During the late 1960s and early 1970s, as Albert split time between his professorship at the University of Chicago (a position which political scientist Hans Morgenthau had encouraged and helped him to get⁹⁴) and his work as an outside adviser to government, he and Roberta embarked on research to understand better civil nuclear energy's military potential and economic viability.⁹⁵ In late 1975, the Wohlstetters—along with their colleagues at Pan Heuristics, a consulting company that Albert and Roberta had helped to form—would complete the study *Moving Toward Life in a Nuclear Armed Crowd?* for the U.S. Arms Control and Disarmament Agency (ACDA).⁹⁶

Styled as a “primer for policy,” *Moving Toward Life in a Nuclear Armed Crowd?* was written during a time when the U.S. nuclear industry and many within government were aggressively pushing for the domestic use and foreign export of spent-fuel reprocessing and other plutonium-related nuclear fuel-making technologies. Building on Albert’s earlier work on nuclear deterrence and nuclear nonproliferation, their study argued that the prevailing interpretation of the *Treaty on the Nonproliferation of Nuclear Weapons* was dangerously permissive, enabling and even encouraging non-nuclear-weapon states to claim legitimacy as they acquired nuclear fuel-making technologies, accumulated fissile material (principally high enriched uranium and separated plutonium), and came within months—or even days—of building nuclear explosive devices. Moreover, although the NPT requires non-nuclear-weapon signatories to allow the International Atomic Energy Agency (IAEA) to safeguard and inspect their nuclear materials involved in peaceful nuclear energy, the Wohlstetter team worried that IAEA safeguards would not be broad enough, intrusive enough, and transparent enough to provide *timely warning* of a military diversion—that is, to sound a clear and unambiguous alarm in the case of a state’s misuse of civil nuclear energy for nuclear weapons or unknown purposes sufficiently early so that other governments could respond effectively before that state acquired a nuclear weapon.

From this, Albert and company identified three main paths—besides the outright purchase, theft, or gift of weapons-usable nuclear material—by which would-be proliferators could obtain material for their first nuclear explosive device. First, nations outside of the Nuclear Nonproliferation Treaty could pursue, covertly or overtly, military programs to get weapons-usable nuclear material. (As Roberta would detail in *The Buddha Smiles: Absent-Minded Peaceful Aid and the Indian Bomb*, India did this by taking advantage of unwitting Canadian and American nuclear assistance.⁹⁷) Second, NPT signatories could cheat the treaty by concealing from the IAEA weapons-related nuclear activities and then withdrawing from the treaty after illegitimately obtaining fissile material. Third, NPT signatories could declare all civil nuclear activities with military potential to the IAEA, accumulate weapons-usable nuclear material in plain sight and with an air of legitimacy, and then later withdraw from the NPT to build nuclear weapons.

This last path particularly disturbed the Wohlstetter team, for it raised the risks of what they dubbed a *Damoclean overhang* of non-nuclear-armed NPT states, for which:

the critical time required to make a nuclear explosive has been diminishing and will continue to diminish without any necessary violation of clear, agreed rules—without any ‘diversion’ [of nuclear material declared for civil purposes] to secret military programs needed—and therefore without any prospect of being curbed by safeguards which have been elaborated for the purpose of verifying whether the mutually agreed rules have or have not been broken.⁹⁸

In their view, the growth of such latent or virtual nuclear-weapon states posed *the* fundamental challenge to nuclear nonproliferation. “The real problem of proliferation,” they wrote,

is not that there are numerous countries “champing at the bit” to get nuclear weapons, but rather that all the non-nuclear countries, without making any conscious decision to build nuclear weapons, are drifting upwards to higher categories of competence. This means that any transient incentive, in the ebb and flow of world politics, which inclines a country to build nuclear weapons at some point in the future, will be just that much easier to act upon.⁹⁹

That said, the Wohlstetters and their colleagues rejected fatalism regarding the spread of nuclear weapons. Such fatalism sometimes found expression in phrases like “nuclear proliferation is inevitable,” a statement which mechanistically envisions the further spread of weapons-usable nuclear fuel-making and fissile materials, and appears to imply that little, if anything, can be done politically, economically, or otherwise even to slow, let alone reverse, the rate of this spread. “A fatalism which holds that nothing can be done today may be an unconscious cover for a desire to do nothing, to continue as before,” they countered.¹⁰⁰ “While it is very likely that there will be *some* further spread, how much and how rapidly is not a matter of fate, but a subject for policy.”¹⁰¹

Indeed, the Wohlstetter team stressed that the world's movement toward a nuclear-armed crowd is not inevitable. "Although there is a real chance that many countries will take the additional step and acquire nuclear weapons, it is not certain," they argued. "There exist contradictory forces which may substantially moderate the rate of acquisition of nuclear weapons."¹⁰² The steps by which nations decide to acquire nuclear weapons are "more complex than the exponential physical and biological steps which have suggested the standard metaphors of proliferation," they continued. "They are not automatic, but depend on a complex set of political, military, and economic conditions."¹⁰³

To balance better the aims of national security, nonproliferation, and energy security policies, they put forward a number of prudent alternatives for limiting nuclear proliferation and managing its risks when it did occur. In particular, their study urged the United States:

- to strengthen its security commitment to and interdependence with non-nuclear-armed allies, including those outside of the NATO alliance system, and assure them of their safety in the face of changing proliferation dangers so as to obviate any movement toward getting their own nuclear weapons;
- to interpret the NPT less permissively and more pragmatically, using the extent to which the IAEA can *effectively safeguard* a given type of nuclear material or civil nuclear activity as a key metric for determining whether or not Article IV of the Treaty's "inalienable right" to "nuclear energy for peaceful purposes ... in conformity with Articles I and II" actually protects the material/activity in the first place;¹⁰⁴
- to evaluate transparently the economic viability and military dangers of nuclear energy and nuclear fuel-making;
- to limit government energy subsidies and loan guarantees not only to the nuclear industry, but also to other energy industries, so as to enable all energy alternatives — nuclear, fossil fuels, natural gas, cleaner coal, and renewables — to compete on a neutral, market-driven playing field;
- to establish stringent domestic and international controls on the export and use of fissile material and fuel-making technologies; and

- to work both with the IAEA and with other governments to revise and adequately fund the Agency's safeguards system so that it could have a better chance of providing timely warning of a state's close approach to nuclear weapons capability.

With this and later studies,¹⁰⁵ Wohlstetter and colleagues worked with the Arms Control and Disarmament Agency's director Fred C. Iklé, the Nuclear Regulatory Commission's Victor Gilinsky, and others, to forge a consensus in Washington regarding the dubious economic rationales for, and the military dangers of, hitherto encouraged weapons-relevant nuclear activities—in particular, the use and export of plutonium-based fuel and fuel-making technologies.

Partial yet nontrivial changes to America's energy and export policies followed. In October 1976, President Ford decided to defer America's commercial use and export of plutonium-related fuel and fuel-making capabilities, and to call for an international moratorium on the export of plutonium reprocessing and uranium enrichment technologies.¹⁰⁶ (Ford's deferral decision effectively killed earlier proposals to export nuclear fuel-making technologies to the government of Shah Mohammad Reza Pahlavi in Iran.¹⁰⁷) In April 1977, President Carter made Ford's deferral indefinite.¹⁰⁸ And in 1978, the Congress passed the *Nuclear Nonproliferation Act* (P.L. 95-242), which among other things established stricter guidelines for U.S. nuclear cooperation with and nuclear exports to other governments.¹⁰⁹ As Atomic Industrial Forum president Carl Walske—who, as the nuclear industry's chief representative, had vehemently opposed such changes to U.S. policy—would grudgingly concede:

The most significant single event [in the current call for change], in my view, was the appearance in December 1975 of Albert Wohlstetter's study for the U.S. Arms Control and Disarmament Agency entitled, *Moving Toward Life in a Nuclear Armed Crowd?*¹¹⁰

Significant revisions to international nonproliferation controls would not follow, however. Although nuclear proliferation would often take a backseat to the larger struggle between the West and the Soviet bloc, proliferation problems would come to dominate U.S. foreign policy after the Cold War's end, especially in the early years of the 21st century.

IV. ARMS RACE MYTHS VS. STRATEGIC COMPETITION'S REALITY

In the late 1960s, as Albert Wohlstetter expanded the scope of his nonproliferation research, he also became increasingly involved in heated policy debates over whether the United States should qualitatively improve the capabilities of its strategic nuclear forces.

Many proponents of arms control opposed qualitative improvements. They premised their arguments on automatic deterrence and minimum deterrence, doctrines holding that a government could easily and reliably deter a wide range of aggression against it merely by possessing a few technologically crude nuclear weapons which, in the event of an attack, would be used against an aggressor's cities and civilian populations. Moreover, arms controllers typically believed that worst-case analyses were leading the United States to pursue qualitative nuclear improvements that would go far beyond a mere "minimum deterrent" nuclear posture. In their view, such innovations were activating an action-reaction dynamic that was forcing the USSR — which many arms controllers believed wanted only a "minimum deterrent" — to engage in a nuclear arms race with the United States, one that was spiraling out of control, exacerbating bilateral tensions, and increasing the likelihood of war.

In contrast, Wohlstetter (along with other like-minded strategists) supported military-technological innovation. A longtime skeptic of automatic and minimum deterrence, he held that a government's mere possession of nuclear weapons did not guarantee a survivable, controllable, and credible deterrent against a nuclear first strike; rather, the requirements for a system of nuclear forces capable of providing such a deterrent were far more stringent. Moreover, he countered that an action-reaction dynamic was not inexorably governing strategic competition in general, nor Soviet nuclear-weapons development and procurement decisions in particular; and that qualitative improvements would not invariably lead to spiraling arms races and increased tension, let alone to a greater likelihood of war. Indeed, Albert believed that some technological innovations would tend to encourage stability.

These largely opposing views would clash publicly in 1969, when the Senate deliberated over whether to approve the

initial deployment of the Safeguard antiballistic missile (ABM) defense system.¹¹¹ In the mid-1970s, the aftermath of the ABM debate would inspire Wohlstetter to study systematically the history of the U.S. and USSR's strategic competition in nuclear arms. That study's conclusions would lead him to criticize the arm controllers' claims of inevitable worst-casing, of immutable action-reaction dynamics, and of consequent spiraling arms races as muddled myths that were driving a Luddite approach to arms control. The Wohlstetters and their colleagues would articulate as a better alternative an approach to arms control derived from what they considered to be a more nuanced understanding of strategic competition.

The 1969 ABM Debate.

A revised version of the Johnson Administration's Sentinel ABM program, the Nixon Administration's Safeguard program envisioned using nuclear-tipped missile interceptors to defend U.S. land-based strategic forces as well as the nation's political and military leaders against attacks by Soviet nuclear-armed ICBMs and SLBMs. It also sought to protect population centers against either the accidental or unauthorized launch of an adversary's ICBM or SLBM, or a deliberate but numerically small missile attack by nascent nuclear-armed governments like the People's Republic of China. Safeguard was therefore called a "thin" ABM system because it was intended to defend mainly military and leadership targets and provide only limited protection to civilians—a sharp contrast to the more ambitious "thick" ABM systems that would try to defend most or all of America's civilian population from very large missile attacks. In the early 1960s, the Soviet Union had already begun developing the so-called A-35, a comparable "thin" ABM system using nuclear-tipped Galosh missile interceptors, with the aim of protecting political-military leaders in Moscow from attack.

In the Senate, prominent Safeguard opponents included Stuart Symington (D-MO) and Edward Kennedy (D-MA), as well as Senate Foreign Relations Committee chair J. William Fulbright (D-AR). Outside anti-ABM experts included Jerome Wiesner and George Rathjens, both of the Massachusetts Institute of Technology; former State Department legal adviser Abram Chayes of Harvard Law School; and Wolfgang Panofsky of the Stanford Linear Accelerator Center. Some of these experts would form advocacy groups to assist the anti-ABM senators.

Prominent Safeguard supporters included Senate Armed Services Committee chair John Stennis (D-MS) and Senate Subcommittee on National Security and International Operations chair Henry “Scoop” Jackson (D-WA), as well as the Pentagon’s Director of Defense Research and Engineering, Johnny Foster. Outside pro-ABM experts included Albert Wohlstetter, now a professor at the University of Chicago; former Secretary of State Dean Acheson; and former Deputy Secretary of Defense Paul Nitze. These three would join together to form the Committee to Maintain a Prudent Defense Policy, a group that would seek to provide pro-ABM senators with analytic support. (Paul Wolfowitz and Peter Wilson, both of whom were at the time doctoral candidates at the University of Chicago, and Richard Perle, a graduate student at Princeton, would help to staff this group.)

During Senate hearings on the ABM, opponents raised three main objections. First, they asserted that anticipated Soviet strategic nuclear forces would not be capable of knocking out America’s land-based second-strike capability, therefore obviating one of Safeguard’s stated purposes. In particular, George Rathjens submitted to the Congress an analysis calculating that any attempts at a preclusive nuclear first strike by the Soviets would destroy, at the most, three-quarters of America’s land-based *Minuteman* ICBMs.¹¹² Moreover, Jerome Wiesner charged that ABM proponents were using worst-case scenarios to strengthen their argument. “We always underestimate our own capabilities and overestimate those of the other fellow,” Wiesner later claimed in an essay on the ABM.¹¹³

Second, they argued that qualitative improvements – not only active defense systems like the ABM, but also efforts to develop multiple independently targetable reentry vehicle (MIRV) systems and to improve the delivery accuracy of ICBMs and other nuclear-armed delivery vehicles – would necessarily spark spiraling and therefore destabilizing arms races. To halt what they saw as the action-reaction dynamic governing the strategic competition between the United States and USSR, they called for arms control agreements that would quantitatively cap American and Soviet strategic nuclear forces, and prohibit qualitative improvements to military nuclear technologies.

Third, anti-ABM experts claimed that the United States, at any rate, had cheaper and more effective ways than the ABM to protect its second-strike capability. For example, Rathjens held that a brute increase in the numbers of American ICBMs would

be a better alternative than Safeguard. Senator Fulbright even suggested that a “launch-on-warning” nuclear posture would render the ABM unnecessary and provide what he described as “the greatest deterrence.” The Senator explained:

It would seem to me that assurance, the knowledge that these ICBMs, even part of them, would be released immediately without any fiddling around about it, even without asking the computer what to do, it would be the greatest deterrence in the world.¹¹⁴

Indeed, as ABM opponent Ralph Lapp would reiterate in *The New York Times*: “As Senator Fulbright pointed out, empty holes [of the ICBMs that would be launched on warning of an attack] may be our most powerful deterrent weapon.”¹¹⁵

At an April 1969 hearing of the Senate Armed Services Committee, Wohlstetter issued a forceful rejoinder to these Safeguard opponents. First, he challenged claims that anticipated Soviet strategic nuclear forces would be wholly incapable of launching a nuclear first strike to preclude substantially an American second strike by U.S. land-based ICBMs. In particular, Albert criticized Rathjens’ analysis, charging that he had found significant methodological errors and distortions of intelligence estimates when he had tried to replicate Rathjens’ calculations.¹¹⁶

(After the hearing, Wohlstetter and Rathjens’ increasingly acerbic exchanges would spill onto the opinion pages of *The New York Times* and other forums. In July 1971, a special committee appointed by the Operations Research Society of America’s president would release a detailed peer review of the Wohlstetter-Rathjens debate. This peer review—the idea for which was adamantly opposed by Rathjens, Wiesner *et al.*—would come out in favor of Wohlstetter’s analysis as well as of his criticisms of the anti-ABM opponents.¹¹⁷ In particular, the peer review would conclude that the analyses of the anti-ABM experts “were often inappropriate, misleading, or factually in error.”¹¹⁸ The Society’s findings would do little to quell Wohlstetter and Rathjens’ increasingly bitter dispute, however.)

Second, Wohlstetter countered claims that Safeguard would necessarily start a spiraling race in nuclear arms or arms spending. “Indeed, despite the stereotype,” he said of the U.S. spending on nuclear arms during the 1960s, “there has been no quantitative arms race in the strategic offense and defense budget, no ‘ever-

accelerating increase,' nor, in fact, any long-term increase at all."¹¹⁹ (As this essay details below, the Wohlstetters and their colleagues would conduct a study in the 1970s detailing this point.)

Third, Albert argued that Safeguard would be a cheaper and less destabilizing way than brute numerical increases of America's nuclear arsenal to protect land-based U.S. second-strike capability against Soviet strategic nuclear forces—forces which were likely to add more accurate ICBMs with modest MIRVed warhead capability. He elaborated:

There is an important difference between making qualitative adjustments to technical change and expanding the number of vehicles or megatons or dollars spent. The difference has been ignored in a debate on ABM that seems at the same time impassioned and very abstract, quite removed from the concrete political, economic, and military realities of nuclear offense and defense and their actual history.¹²⁰

He continued:

For example, one alternative to protecting *Minuteman* [land-based ICBMs] is to buy more *Minutemen* without protection. But adding new vehicles is costly and more destabilizing than an active defense of these hard points, since it increases the capacity to strike first. A one-sided self-denial of new technology can lead simply to multiplying our missiles and budgets, or to a decrease in safety, or to both.¹²¹

Indeed, in the Base and Vulnerability Studies that Wohlstetter had led at the RAND Corporation during the 1950s, qualitative technological improvements had figured heavily in efforts to protect U.S. second-strike capability without having to resort to destabilizing quantitative increases in the nuclear arsenal. In particular, his research team had leveraged the breakthrough designs of a brilliant engineer named Paul Weidlinger to show that it was indeed possible to shelter and passively defend ICBMs and command-and-control facilities by building complex underground structures that were orders of magnitude more resistant to the blast effects of nuclear explosions than most engineers had ever thought possible.¹²² In Albert's view, active defense programs like

the ABM fell into a long line of useful and stabilizing qualitative improvements to the capabilities of U.S. strategic nuclear forces.

On a related note, Wohlstetter was deeply critical of statements by Senator Fulbright and others promoting “launch-on-warning” as an actual operational policy. Albert found “launch-on-warning” to be deeply dangerous and politically irresponsible:

The revival today, by several distinguished senators and some able physicists opposing ABM, of the suggestion that, rather than defend ICBM's, we should launch them at Russian cities simply on the basis of radar represents a long step backward. If we were willing to do this, we would dispense with silos or *Poseidon* submarines or any other mode of protecting our missiles. And we would increase the nightmare possibility of nuclear war by mistake.¹²³

The fierce debate between the pro- and anti-ABM crowds would continue into the summer of '69. In August, the Senate would end up approving the initial deployment of Safeguard, with Vice President Spiro Agnew casting the deciding vote to break the Senate's 50-to-50 split. However, 3 years later, at the end of the first round of the Strategic Arms Limitation Talks (SALT), the Nixon Administration would conclude with the Soviets an agreement severely limiting deployments of ballistic missile defense.¹²⁴ The ABM Treaty of May 1972 initially allowed the United States and USSR each to field two ABM sites, but was later modified in July 1974 to allow each country only one site.

The United States worked to finish its Safeguard site in North Dakota, but Congress voted to shut it down in late 1975.¹²⁵ In contrast, the Soviets would continue to field the A-35 ABM system near Moscow that they had first begun installing in the early 1960s. (Today, the Russian Federation now fields the A-135, an updated version of the A-35 that relies on missile interceptors tipped with non-nuclear explosives, while at the same time opposing U.S. and European Union efforts to build a “thin” ABM system to defend against ballistic missile threats from Iran and other rogue states.)

Strategic Nuclear Competition: Rivalry, But No Race.

As the 1960s gave way to the 1970s, controversies over the wisdom of incorporating technological innovations in U.S. strategic nuclear forces intensified. One key issue was whether

the United States should try to improve the accuracy with which nuclear-armed delivery vehicles could be delivered to their intended military targets, even if the purpose was to decrease the possibility of harm to civilian noncombatants.

Echoing their earlier arguments against the ABM, advocates of arms control charged that such technological innovations would inevitably spark new arms races. They held that the United States, which was wrongly alarmed by worst-case analyses, was pursuing technological military innovations that, in turn, were activating the action-reaction dynamic that governs military competition, and inexorably leads to spiraling arms races characterized by increased defense spending, larger and more destructive nuclear arsenals, and a greater likelihood of war. Again, arms controllers called for new treaties that would limit qualitative technological improvements to strategic nuclear forces.

It was in this context that Albert and Roberta Wohlstetter, along with colleagues at their Pan Heuristics consulting company, set out to study the history of how the United States and USSR had competed in strategic nuclear arms. Their research aimed to determine the extent to which the American-Soviet strategic nuclear rivalry actually had conformed to the concept of a spiraling arms race.

The Wohlstetters and their colleagues began by observing that arms control advocates often had not carefully and precisely defined what they meant by the concept, *arms race*. They found that while *arms race* resonated with powerful emotional and pejorative connotations, the term typically had only vague, and sometimes confusing, denotations. In "Is There a Strategic Arms Race?" part one of his controversial two-part essay in *Foreign Policy* (1974), Albert expanded on this point:

When we talk of "arms" are we referring to the total budget spent on strategic forces? The number of strategic vehicles or launchers? The number of weapons? The total explosive energy that could be released by all the strategic weapons? The aggregate destructive area of these weapons? Or are we concerned with qualitative change—that is, alterations in unit performance characteristics—the speed of an aircraft or missile, its accuracy, the blast resistance of its silo, the concealability of its launch point, the scale and sharpness of optical photos or other sensing devices, the controllability of a weapon

and its resistance to accidental or unauthorized use? When we talk of a “race” what do we imply about the rate at which the race is run, about the ostensible goal of the contest, about how the “race” is generated, about the nature of the interaction among strategic adversaries?¹²⁶

With the concept of arms races, arms controllers had sought to lay bare the action-reaction dynamic that underlay the strategic nuclear competition between the United States and USSR. Albert, however, was deeply skeptical of the notion behind this dynamic. He wrote:

The very phrase “action-reaction” has an aura of mechanical inevitability. Like Newton’s Third Law: For Every Action There Is An Equal and Opposite Reaction. Only here, since the mechanism is explosive, it seems the law is supposed to read: For Every Action There Is An Opposing Greater-Than-Equal Reaction.¹²⁷

Wohlstetter and company acknowledged the concept of spiraling arms races had correctly demonstrated that one government’s military decisions may have a partial impact on the decisions of another. However, they believed that spiraling arms races grossly overstated the extent to which an action-reaction dynamic singly and inexorably drove how governments competed militarily. He explained:

To build a national defense is to recognize serious differences, potentially incompatible goals of possible adversaries. Military forces then are at least partially competitive: What one side does, whether to defend itself or to initiate attack or to threaten attack or response, may be at the partial expense of another side. (Weapons are not by nature altogether friendly.) This means in turn that *some* connection is only to be expected between what one side does and the kind and probable size of a potential opponent’s force.

Arms race doctrines plainly want to say much more than these simple truths. They suggest that the competition results from exaggerated fears and estimates of opposing threats, and therefore is not merely, or even mainly,

instrumental to the partially opposed objectives of each side. The competition takes on an explosive life of its own that may frustrate the objectives of both. Explosive in two senses: (a) it leads to “accelerating” (or “exponential” or “spiraling” or “uncontrolled” or “unlimited” or “unbridled” or “infinite”) increases in budgets and force sizes; (b) it leads inevitably to war, or at any rate makes war much more likely.¹²⁸

Having attempted to make clearer the conceptual confusions surrounding spiraling arms racing, Wohlstetter and colleagues sought to see whether the history of the U.S.-USSR strategic nuclear competition up to that point in time actually had resembled such an arms race. Their study proceeded in three main parts.

First, they reviewed available American intelligence forecasts to evaluate the extent to which, in fact, the United States had regularly overestimated Soviet strategic nuclear deployments with “worst-case” analyses, as arms race proponents had frequently charged. To begin with, they noted that while U.S. intelligence had overestimated the rapidity with which the USSR would deploy long-range ICBMs in the late 1950s, it had underestimated, at the same time, the number of deployed Soviet intermediate range and medium range ballistic missile (IR/MRBMs) launchers. Moreover, after carefully examining annual intelligence predictions and estimates submitted by the Secretary of Defense to the Congress between 1962 to 1972, Wohlstetter and company arrived at surprising and counterintuitive findings. Within this population of before-the-fact intelligence predictions and after-the-fact observed estimates of Soviet nuclear deployments, the U.S. had *underestimated* repeatedly and systematically over a 10-year period how much the USSR would annually add to its strategic nuclear forces.¹²⁹

Second, the Wohlstetter team looked carefully at the history of budgets for U.S. strategic nuclear forces to determine the rate at which spending on these forces had increased. Again, they arrived at startling and counterintuitive findings. U.S. annual spending on strategic offensive forces, in fact, had decreased from the mid-1950s until the early 1970s. In particular, spending in the 1950s was more than four times spending in 1976 in terms of constant dollars, and the budget for U.S. strategic nuclear forces had declined in an almost exponential manner since 1961.¹³⁰

Third, Wohlstetter and colleagues examined whether qualitative improvements had actually led to more indiscriminate and destabilizing forces. They found that, even though both the United States and Soviets had pursued technological innovations during the 1960s, American trends pointed decidedly downward, not only for spending on U.S. strategic nuclear forces, but also for key qualitative indicators—for example, the stockpile’s total explosive energy yield, the number of strategic offense and defense warheads, and the arsenal’s equivalent megatonnage.¹³¹

Taken together, these findings sharply contradicted the sort of invariable enemy overestimation and worst-casing, the unchecked growth in strategic nuclear arms and spending, and the ever-increasing arsenal destructiveness that arms race theorists had claimed was occurring on the U.S. side. This led the Wohlstetter team to caution that arms racing did not provide an insightful model of how the U.S. and USSR actually had competed strategically in the nuclear age. Arms racing was, at best, an emotionally-charged but muddled and inaccurate metaphor.

What disturbed the Wohlstetters perhaps most of all, however, was how many arms control proponents had used (and were still using) the concept of arms racing to advocate for a U.S. nuclear posture based on doctrines of automatic deterrence, minimum deterrence, or the then-emerging doctrine of mutual assured destruction (MAD): that is, for a nuclear posture which, in essence, would assure, in the event of any attack by nuclear-armed adversaries, that the United States would escalate to massive nuclear retaliation against cities and civilian populations. The underlying hope of many such arms control proponents was that if the United States and USSR kept numerically small, technologically crude, and explosively indiscriminate nuclear arsenals aimed only at civilian noncombatants, the sheer horror of this posture would not only make all forms of nuclear war less probable, but also make movement toward total nuclear disarmament—and perhaps toward the dissolution of national sovereignty, world government, and perpetual peace—more likely.

In contrast, Albert and Roberta fiercely opposed such “countervalue” doctrines of nuclear deterrence that targeted cities and civilian noncombatants instead of military forces. Although they deeply doubted the likelihood and verifiability of total nuclear disarmament, they saw themselves as sharing the arms controllers’ goal of making nuclear war less likely. But they maintained that the arms control establishment’s preferred nuclear

posture—a “minimum deterrent” posture which privileged a sort of indiscriminate destructiveness against civilians that U.S. decisionmakers might not be willing to carry out, even in the most extreme of circumstances—was unstable, immoral, and unlikely to deter plausible forms of aggression. In his article, “Racing Forward? Or Ambling Back?” (1976), Albert elaborated on this point:

Perverse current dogmas center most of all on an attempt to stop or slow technologies of discrimination and control. However, the remarkable improvements in accuracy and control in prospect will permit non-nuclear weapons to replace nuclear ones in a wide range of contingencies. Moreover, such improvements will permit new forms of mobility for strategic forces, making it easier for deterrent forces to survive. More important, they will also increase the range of choice to include more discriminate, less brutal, less suicidal responses to attack—responses that are more believable. And only a politically believable response will deter.¹³²

In other words, the Wohlstetters held that credible deterrence need not rely on a choice between indiscriminate, massively destructive, and therefore implausible forms of nuclear retaliation, or no response at all. Rather, a principal aim of responsible nuclear-age strategic competition should be to increase the range of credible (and especially non-nuclear) responses available to decisionmakers, especially against limited-nuclear and less-than-nuclear aggression, and by so doing actually strengthen U.S. deterrence. Albert explained:

Some technologies reduce the range of political choice; some increase it. If our concern about technology getting beyond political control is genuine rather than rhetorical, then we should actively encourage the development of techniques that increase the possibilities of political control. There will be a continuing need for the exercise of thought to make strategic forces secure and discriminatingly responsive to our aims, and to do this as economically as we can.¹³³

Although the Wohlstetters were skeptical of many of the arms controllers’ canonical dogmas, this did not mean that they saw

arms control agreements as having no utility. Rather, they viewed such agreements as being useful within clear limits. "Agreements with adversaries can play a useful role, but they cannot replace national choice," Albert pointed out in "Racing Forward? Or Ambling Back?" But he added: "Neither the agreements nor the national choices are aided by the sort of hysteria implicit in theories of a strategic race always on the point of exploding."¹³⁴

In the early 1980s, Albert and Roberta would draft an essay titled "On Arms Control: What We Should Look for in an Arms Agreement" which provides insight into what they viewed to be—and not to be—viable approaches for arms control agreements. (This previously unpublished essay is included in the present volume.) And in the mid-1980s, Albert and his Pan Heuristics colleague, Brian Chow, would coauthor a detailed technical proposal for an arms control agreement to establish self-defense zones in space.¹³⁵ (This volume also includes a condensed summary of this proposed agreement as published in the *Wall Street Journal*.)

The Study's Aftermath.

The Wohlstetters' study on the nature of the U.S.-USSR strategic competition exerted influence and elicited controversy in the mid-to-late 1970s. Most notably, their study would form part of the larger context for the so-called "Team B" experiment in competitive intelligence analysis. First suggested by members of the Ford Administration's Presidential Foreign Intelligence Advisory Board (PFIAB) in August 1975, this experiment was officially begun by Director of Central Intelligence (DCI) George H. W. Bush and President Ford's National Security Advisor Brent Scowcroft in June 1976.

A now-declassified December 1976 memorandum provides a summary of the "Team B" exercise from the White House's point of view.¹³⁶ The experiment would begin with two groups, an "A" team composed of members of the Intelligence Community that would prepare "the 1976 estimate of Soviet forces for intercontinental attack . . . in accordance with established Community practices," and a "B" team composed of "experts inside or outside of government" that would prepare an alternate assessment.¹³⁷ Both teams would be provided with the same body of intelligence information, and each would work to arrive at independent conclusions about three specific topics: namely,

"[1] Soviet ICBM accuracy, [2] Soviet low altitude air defense capability, and [3] Soviet strategic policy objectives."¹³⁸ Both teams would have access to each other's final products and be allowed to write comments on each other's assessments. Finally, the National Security Advisor, in consultation with the DCI and PFIAB, would review and critique the highly classified results.

In December 1976, Team B completed its Top Secret final report, *Intelligence Community Experiment in Competitive Analysis: Soviet Strategic Objectives: An Alternative View*.¹³⁹ Two months earlier, however, information about the exercise had already been leaked to the *Boston Globe* and *Washington Star*. The resulting news stories had set off a politicized firestorm within Washington that prevented dispassionate public discussion of the intelligence experiment's pluses and minuses. Although the highest levels of the Ford Administration had authorized the Team B exercise, critics insistently viewed this experiment in competitive intelligence analysis as nothing more than a direct assault on the Nixon and Ford Administrations' policy of *détente* with the Soviet Union.

Wohlstetter had declined an invitation to join Team B.¹⁴⁰ Nonetheless, a number of journalists and opinion-makers would mistakenly assert that he had worked on the intelligence experiment. In response to a January 4, 1977, op-ed by Joseph Kraft in the *Washington Post*, Albert wrote a letter to the editor to correct the record: "I had no part in the team that recently took an independent look at past and present national intelligence estimates. Nor have I seen their report."¹⁴¹

These controversies notwithstanding, Albert and Roberta's study on arms racing helped to reframe Washington's understanding of the U.S.-USSR strategic competition. Indeed, key government decisionmakers would publicly refute the "mirror-imaging" assessments of Soviet nuclear spending and procurement that had led some arms controllers to claim that while the USSR wanted only to field a "minimum deterrent," U.S. actions were activating an action-reaction dynamic that was forcing the Soviets to build more weapons and sparking an unnecessary nuclear arms race.¹⁴² On that point, President Carter's Secretary of Defense Harold Brown would famously observe before a joint meeting of the Senate and House budget committees in 1979: "Soviet spending has shown no response to U.S. restraint—when we build, they build; when we cut, they build."¹⁴³

V. TOWARDS DISCRIMINATE DETERRENCE

In 1962, Thomas Schelling and Morton Halperin published (with research assistance from Donald Brennan) *Strategy and Arms Control*, a book that famously identified what they took to be the three core objectives of all arms control agreements: to reduce “[1] the likelihood of war, [2] its scope and violence if it occurs, and [3] the political and economic costs of being prepared for it.”¹⁴⁴ Albert and Roberta Wohlstetter saw themselves as sharing these very same goals, but they diverged from the conventional wisdom of most arms controllers in that they believed the United States (and the USSR) could often achieve these objectives more reliably and effectively by means of independent technological innovation.

In the 1970s and 1980s, Albert would work to demonstrate the stabilizing potential of technological innovation. In particular, he would join a small circle of analysts who identified for U.S. decisionmakers new alternatives for responding to—and thus for deterring—a wide spectrum of possible enemy aggression *without* resorting to the sort of massive nuclear retaliation against cities and civilian populations prescribed by MAD and other doctrines of automatic and minimum deterrence. By promoting the development of technologies and systems that stressed precision, control, and information, Wohlstetter would help the United States to reject MAD-inspired threats against noncombatants, and instead to field a new generation of more discriminate and less destructive non-nuclear capabilities that, in turn, would substantially reduce America’s reliance on nuclear weapons.

Birth of MAD: A New Doctrine of Deterrence by Massive Retaliation.

The doctrine of mutual assured destruction first emerged in the late 1960s. Like earlier doctrines of automatic and minimum deterrence, MAD held that a government could deter stably and reliably a wide range of nuclear and non-nuclear aggression simply by threatening to escalate any conflict with massive retaliatory attacks targeting the aggressor’s cities and populations. Because MAD required a government to field only a “minimum deterrent” second-strike capability consisting of technologically crude and indiscriminately destructive nuclear weapons aimed at civilians, the doctrine counseled against technological

innovation. The reason was that when two governments adopted “minimum deterrent” nuclear postures, MAD doctrine holds that the necessary outcome will be a stable, mutual deterrence. Arms controllers—especially arms race theorists who sought to limit qualitative technological improvements to America’s strategic nuclear forces—thus gravitated toward MAD.

In a curious twist, however, it was Donald Brennan, an arms controller at Herman Kahn’s Hudson Institute, who first coined the phrase “mutual assured destruction” in the mid-to-late 1960s. Brennan meant MAD as a tongue-in-cheek way of mocking arms controllers who had advocated escalatory threats of massive nuclear retaliation as a means not only of deterring a wide range of nuclear and non-nuclear aggression, but also of achieving deep cuts in nuclear arms. Nonetheless, many such arms controllers ended up embracing the phrase and the concept.

MAD alludes to a concept that was birthed during Secretary of Defense Robert McNamara’s tenure. Upon arriving at the Pentagon, Secretary McNamara and his team of analysts—a group which included Charles Hitch, William W. Kaufmann, Alain Enthoven and other alumni of the RAND Corporation—set out to rein in what they saw as the budgetary excesses of the military services. To constrain military spending on nuclear weapons and delivery vehicles, they had introduced by late 1963 the metric of *assured destruction* capability. (Although assured destruction capability is traditionally referred to by the acronym AD, this essay shall refer to it as ADCAP.) Enthoven, a protégé of Albert Wohlstetter who had served initially as McNamara’s Deputy Assistant Secretary of Defense for Systems Analysis, explained the concept behind ADCAP in a 1977 essay:

[T]he size and composition of our strategic retaliatory forces would be determined by the “assured destruction mission.” Under this policy, we would buy amounts and kinds of forces sufficient to be sure, even under very pessimistic assumptions, that they could survive a deliberate Soviet attack [aimed directly against them] well enough to strike back and destroy 20 to 25 percent of their population.¹⁴⁵

With the ADCAP metric, the McNamara Pentagon had sought to provide an argument for limiting the procurement of second-strike nuclear forces among the military services. However, ADCAP was not meant to imply that, in time of war, the United

States would actually target the Soviet civilian population with massive nuclear retaliation. In *How Much is Enough?* (1971), Enthoven and K. Wayne Smith underscored this point:

The assured destruction test did not, of course, indicate *how* these forces would actually be used in a nuclear war. United States strategic offensive forces have been designed with the additional system characteristics—accuracy, endurance, and good command and control—needed to perform missions other than assured destruction, such as limited and controlled retaliation.¹⁴⁶

Indeed, when President Kennedy entered into office in 1961, his Administration sought to break away from the Eisenhower Administration's "New Look," a declaratory nuclear policy that sought to deter a broad range of Soviet aggression (including even minor provocations in Western Europe) through threats to escalate any conflict to higher levels of violence with massive nuclear retaliation. Instead, the Kennedy Administration decided to stress a more proportional "flexible response" approach to defense, to that end renouncing "countervalue" or "countercity" targeting of civilians with nuclear weapons. During his 1962 State of the Union address, for instance, President Kennedy declared:

... our strength may be tested at many levels. We intend to have at all times the capacity to resist non-nuclear or limited attacks—as a complement to our nuclear capacity, not as a substitute. We have rejected any all-or-nothing posture which would leave no choice but inglorious retreat or unlimited retaliation.¹⁴⁷

Moreover, at a commencement speech before the University of Michigan on July 9, 1962, Secretary McNamara delivered his famous "Ann Arbor speech" in which he made public the U.S. Government's explicit renunciation of countervalue targeting:

The U.S. has come to the conclusion that to the extent feasible, basic military strategy in a possible general nuclear war should be approached in much the same way that more conventional military operations have been regarded in the past. That is to say, principal military objectives, in the event of a nuclear war stemming from a major attack on the Alliance, should be the destruction of military forces, not of his civilian population.¹⁴⁸

In the mid-to-late 1960s, however, McNamara began issuing statements that consciously but less-than-accurately conflated assured destruction capability with U.S. targeting policy. Such conflation encouraged advocates of automatic/minimum deterrence to construe ADCAP to be not merely a metric to cap the size and composition of the U.S. nuclear arsenal, but also to constitute actual declaratory policy regarding whom—namely, civilian noncombatants—the United States would target nuclear forces. Arms controller Donald Brennan referred to holders of such views as “MADvocates,” and Wohlstetter would join him in denouncing their preferred MAD-inspired threats of massive nuclear retaliation as disproportionate, out of control, and not credible. Moreover, Albert’s own work on promoting technologies of precision, control, and information would later help to create non-MAD response options to a broad range of potential nuclear and non-nuclear military provocations.

The Long Range Research and Development Planning Program.¹⁴⁹

In the early-to-mid 1970s, Wohlstetter participated in a highly classified DoD study that would help to clarify the potentially revolutionary implications that new technologies could have for war and peace in the nuclear age. This study would not only help the United States over time to reject doctrines of automatic and minimum deterrence and MAD-inspired threats of massive nuclear retaliation, but also lay the seeds for America’s own “revolution in military affairs.”

Initiated by Stephen J. Lukasik, director of the Pentagon’s Advanced Research and Projects Agency (ARPA), and Fred Wikner, an informal representative of the Defense Nuclear Agency (DNA), this study was known as the Long Range Research and Development Planning Program or LRRDPP. Because Lukasik and Wikner had intended to keep the study initially low-key, they consciously chose a name for the study that would be clunky, and the acronym for which would not be easy to pronounce.

The LRRDPP sought to examine military applications for emerging technologies: for example, new methods of autonomous-terminal homing to deliver munitions more precisely, planned global positioning system satellites, and anticipated improvements in micro-computing and information-processing. The goal was to lay out how America’s military services could leverage

these technologies to provide U.S. decisionmakers with new alternatives – that is, choices that would not rely on indiscriminate massive nuclear retaliation—for responding to limited-nuclear and less-than-nuclear aggression.

To work on the study, Lukasik and Wikner brought together technologically innovative industrial contractors with Albert Wohlstetter, Joseph Braddock, Don Hicks, Dom Paolucci, Jack Rosengren, and other analysts who had strong knowledge of the subject of nuclear-age strategy and intimate familiarity with the military services. Lukasik—in the commentary that he contributes to the present edited volume—summarizes how the LRRDPP worked and some of Wohlstetter’s contributions:

The program was organized into three panels supported by four industrial contractors to contribute expertise and advanced concepts in ground, air, and naval warfare, conventional and nuclear munitions, reconnaissance, command and control, and system integration. Albert chaired the strategic alternatives panel, Don Hicks the advanced technology panel, and Jack Rosengren the munitions panel. Senior-level executives from OSD [Office of the Secretary of Defense] and the Services participated in panel sessions. The team members were selected for their in-depth knowledge as well as their skill in working as a multidisciplinary group, combining history, strategy, technology, military operations, and systems. In addition to Albert’s broad skills, his ability to synthesize the essence of a problem and its solution and to communicate it to senior executives and political leaders was invaluable.

A number of factors motivated the LRRDPP. For one, both Wikner (who had served as General Creighton Abrams’s scientific advisor at Military Assistance Command, Vietnam, and helped to push into the field very early forms of precision-guided munitions) and Lukasik believed that future technological innovations could change the nature of strategy and warfare—just as the advent of nuclear weapons had. For another, contemporaneous Soviet writings on the concept of revolutions in military affairs (RMAs)—in particular, Colonel General Nikolai Andreevich Lomov’s 1972 edited volume *Scientific-Technical Progress and the Revolution in Military Affairs (A Soviet View)*¹⁵⁰—had encouraged high-level strategic thinkers within the U.S. Government to

challenge conventional thinking on the transformative potential of military innovation.

In addition, the LRRDPP's summary report of February 1975 would cite two additional crucial developments. The strategic nuclear forces of both the United States and the USSR had apparently acquired survivable, controllable, and therefore credible second-strike capability; and in part because of this, the Executive Branch had called for a reassessment of the World War II-era "strategic bombing" metrics that were still being used to measure the effectiveness of nuclear and conventional strategic attacks—namely, "the number of targets destroyed" and "the percentage of the targets at risk that have been destroyed by the attack."¹⁵¹

Citing the potential feasibility of "weapons with near zero miss distance," the LRRDPP strategists proposed what Wohlstetter had termed the *dual-criterion* (or, alternatively, the *dual-criteria*) to replace the persisting World War II-era targeting metrics. Under the dual-criterion, the U.S. military would aim: "(1) to achieve the desired damage expectancy on an intended target or target system with high confidence, while simultaneously (2) not damaging particular regions or population areas, again with high confidence."¹⁵² To meet the dual-criterion's much more stringent targeting requirements, the strategists identified promising weapon system concepts which, by capitalizing on foreseeable improvements in the accuracy of warhead delivery and other technologies, could accomplish their missions using extremely low-yield nuclear and even non-nuclear explosives. Such weapon-system concepts included remotely-piloted vehicles, precision-delivered ballistic missiles, deep-earth penetrators, shallow-earth penetrators, and advanced precision-guided munitions.¹⁵³ Improvements in a warhead's delivery accuracy can make greater reliance on non-nuclear explosives possible. When it comes to increasing the probability of destroying a hardened point target (e.g., a missile silo), a ten-fold improvement in the accuracy of a warhead's delivery vehicle is roughly equivalent to a thousand-fold increase in the warhead's indiscriminate explosive yield. This, in part, is why Wohlstetter saw revolutions in precision, control and information as potentially trumping the so-called nuclear revolution.

The LRRDPP strategists then used a number of possible conflict scenarios—contingencies like less-than-nuclear Soviet aggression against non-NATO nations peripheral to the USSR, and Soviet attacks against individual NATO member states—to

think through the sort of strategic contexts and operations in which the United States might use these technologically-driven military capabilities to deter and, if necessary, halt such aggression. In particular, they identified two strategies for employing these capabilities:

- *Coercive response.* A “declaratory or implied policy which threatened attack against limited numbers of selected targets in the USSR,” the objective of which “would be to help initiate negotiations or to support ongoing negotiations involved with halting the war”; and
- *Stemming the aggression.* A deterrent response policy which would use the military forces of “the threatened country, along with prompt assistance by U.S. forces, [for] actually halting the aggression.”¹⁵⁴

To be sure, the LRRDPP strategists were aware of the positive and potentially negative implications of more precise, less destructive military capabilities. The summary report acknowledges that such capabilities could raise potential “politico-military issues,” such as crisis stability, military escalation and the nuclear threshold, and the possibility of heightened arms competition.¹⁵⁵ The strategists cautioned: “The capability to destroy military targets with little collateral damage could be of high utility under some circumstances; but always, there is the other side of the coin, that the very existence of the capability may make conflict more probable.”¹⁵⁶

Yet the LRRDPP strategists also saw the opportunities that military capabilities using non-nuclear technologies of discrimination, control, and information could afford by enabling America to rely substantially less on threats of massive nuclear retaliation, to respond decisively to provocations short of all-out nuclear war, and, by so doing, to deter such aggression all the more credibly.

Revolutions in Technologies of Precision, Control, and Information.

The LRRDPP study profoundly influenced Wohlstetter’s thinking. Long opposed to automatic deterrence, minimum deterrence, and other doctrines of massive nuclear retaliation, he had sought as early as the late 1950s to identify for decisionmakers new alternatives to meet limited-nuclear and less-than-nuclear forms of aggression.¹⁵⁷ Indeed, in a conference speech titled

Strength, Interest, and New Technologies delivered in September 1967 and sponsored by the Institute for Strategic Studies (now the International Institute for Strategic Studies), he had displayed remarkable prescience regarding the transformative potential of emerging technologies, suggesting that revolutions in precision, control, and information could very well trump the nuclear revolution and the fatalism that had flowed from it.¹⁵⁸ America's technological means had not yet caught up with Wohlstetter's strategic ends, however.¹⁵⁹ The Long Range Research and Development Planning Program would help to change that.

The education and expertise gained from Lukasik and Wikner's LRRDPP study would considerably inform Wohlstetter's own heated criticisms of MAD-inspired nuclear deterrence and targeting doctrines.¹⁶⁰ The LRRDPP experience would also shape the later work of President Reagan's Commission on Integrated Long-Term Strategy, a high-level panel that outgoing Undersecretary of Defense for Policy Fred C. Iklé and Wohlstetter chaired in the mid-to-late 1980s. (The other members of the Commission were Anne L. Armstrong, Zbigniew Brzezinski, William P. Clark, W. Graham Clayton, Jr., Andrew J. Goodpaster, James L. Holloway III, Samuel P. Huntington, Henry A. Kissinger, Joshua Lederberg, Bernard A. Schriever, and John W. Vessey.) With its final report, the Commission offered a new doctrine of *discriminate deterrence* to meet the future security environment's changing dangers, with the aim of increasing American and allied ability "to bring force to bear effectively, with discrimination and in time, to thwart any of a wide range of plausible aggressions against their major common interest—and *in that way to deter* such aggression."¹⁶¹

In the decades following the LRRDPP, the United States developed and acquired, though in stops and starts, many of the technologically-driven military capabilities that the study's strategists had identified.¹⁶² In turn, these non-nuclear technologies of precision, control, and information—the development of which many arms controllers had fiercely opposed in the 1970s and 1980s on the grounds that they would spark spiraling arms races—would substantially reduce America's reliance on indiscriminately destructive nuclear weapons, and thereby help to make all-out nuclear war less likely.

VI. LIMITING AND MANAGING NEW RISKS

In the late 1980s, especially after the fall of the Berlin Wall, the dramatic Soviet decline was leading some to foresee a pacific post-Cold War world. However, Albert Wohlstetter, now a Medal

of Freedom-winning strategist¹⁶³ in his mid-70s, was already thinking about the next set of strategic challenges. “Does [the Cold War’s potential end] mean there are no latent long term dangers demanding prudence?” he asked himself in the conclusion of a June 1989 outline for his memoir. “[T]he political and economic futures of the heavily armed Communist states and of the increasingly lethally armed Third World countries are, to say the least, rather cloudy,” he observed apprehensively, adding:

Even if, implausibly, the Second and Third Worlds change rapidly to the market economies of the First World, nice though this would be, we are likely to discover once again that, contrary to Cobden and the Manchester School, trade and investment—good things though they are—are not all that pacifying. Trading partners have found a good many reasons to go to war. We haven’t seen the end of fanaticism, mortal national and racial rivalries, and expansionist ambitions. It is conceivable that all the variously sized lions and lambs will lie down together, that there will be the kind of moral revolution that many hoped for at the end of World War II when they thought it, in any case, the only alternative to nuclear destruction. But, as Jacob Viner [a University of Chicago economist] wrote at the time, “It is a long, long time between moral revolutions.” We should not count on it.¹⁶⁴

In the years following, Wohlstetter’s apprehensions would prove well-founded as the end of the Cold War—a global competitive order that his work in strategy had helped in some ways to sustain and in other ways to end—gave way to growing international disorder.

Seventeen months before the USSR’s December 1991 dissolution ended the Cold War, Saddam Hussein’s Ba’athist Iraqi military invaded Kuwait—producing a Persian Gulf conflict contingency that Wohlstetter and his colleagues had presciently warned of as early as 1980.¹⁶⁵ In the early 1990s, Slobodan Milosevic’s pan-Serbian ambitions ignited long-suppressed ethnic rivalries, and then genocide, in the Balkans. In the mid-1990s, deep racial rivalries would also lead to genocide in Rwanda. And in the late 1990s, after Osama bin Laden had issued a *fatwa* urging attacks on American citizens, his Al Qaeda organization carried out deadly bombings against U.S. embassies in Kenya and

Tanzania – in retrospect, harbingers of the violent extremism and suicidal fanaticism that were yet to come.

Moreover, the United States would discover just how lethally armed the former Third World and the Communist holdouts were becoming. In the aftermath of the Gulf War, the American-led coalition uncovered a Ba’athist Iraqi nuclear program far closer to producing a nuclear weapon than either the Western intelligence services or the International Atomic Energy Agency (IAEA) had ever anticipated. And at mid-decade, after North Korea had refused to grant the IAEA access to suspected nuclear weapons-relevant facilities, Washington began long negotiations with Pyongyang for an “Agreed Framework,” a “grand bargain” that sought to prevent the North Koreans from acquiring fissile material for a nuclear explosive device.

Wohlstetter remained intellectually active during the post-Cold War period until his death in 1997. As a member of the Defense Policy Board, he supported U.S. efforts to liberate Kuwait from Ba’athist Iraq during the Gulf War. After the war, he lambasted Presidents George H. W. Bush and Bill Clinton for what he saw as their failures to respond meaningfully to Ba’athist aggression against Iraqi Shi’a and Kurdish populations, as well as to Saddam’s other violations of the United Nations Security Council resolutions that had established the stringent conditions for the Gulf War’s cessation.¹⁶⁶

In the mid-1990s, Albert, now an octogenarian, focused much of his attention on the Balkans, publishing numerous op-eds (especially on the opinion page of the *Wall Street Journal*, edited by his long-time friend and colleague, Bob Bartley) and articles that sharply rebuked Western leaders for their indifference and indecisiveness towards Slobodan Milosevic’s pan-Serbian expansionism, and agitated for greater Western involvement on behalf of Bosnian Muslims and other victims of Milosevic’s aggression.¹⁶⁷ Of note, he and former British Prime Minister Margaret Thatcher coauthored “What the West Must Do in Bosnia,” an open letter to President Clinton published in the *Wall Street Journal* in September 1993, and signed by more than 100 people from across the globe and the political spectrum – people like Morton Abramowitz, Zbigniew Brzezinski, Osama El Baz, Henry Louis Gates, Jr., Zuhair Humadi, Marshal Freeman Harris, Pierre Hassner, Zalmay Khalilzad, Prince Sadruddin Aga Khan, Teddy Kollek, Laith Kubba, Czeslaw Milosz, Paul Nitze, Richard Perle, Karl Popper, Eugene Rostow, Henry Rowen, George Shultz, George Soros, Susan Sontag, Elie Wiesel, Leon Wieseltier,

and Paul Wolfowitz.¹⁶⁸ (The text of this letter is reprinted in this volume.)

And in response to what he considered to be the shortcomings of the Agreed Framework between the United States and North Korea, Wohlstetter called on Washington to admit that the global spread of nuclear fuel-making is significantly driving the problem of proliferation and to face “squarely the challenge of persuading our major allies, not to say our potential adversaries [such as Pyongyang], to abandon the sale or use of plutonium fuel” and other weapons-usable nuclear materials.¹⁶⁹

Although Albert Wohlstetter died in Los Angeles on January 13, 1997, and Roberta, in New York City on January 6, 2007, their work in strategy remains all too relevant and timely.

In the early years of the 21st century, the United States and its allies are now struggling with many of the problems of nuclear-age policy that the Wohlstetters themselves had anticipated and grappled with throughout their long careers in strategy—problems like the dangers posed by the spread of nuclear bombs, fuel-making technologies, and fissile materials to new states and nonstate actors; the difficulties of enforcing ambiguously interpreted international law and nuclear nonproliferation rules; the uncertain economics surrounding energy security and alternatives for power production; and the proper role of deterrence and military force in an increasingly lethally-armed and disorderly world. Their writings on nuclear-age strategy and policy thus can help decisionmakers and policy analysts (as well as those who aspire to these positions) to clarify their thinking on these most urgent matters.

When Albert spoke of his approach to the analysis and design of strategic policy, he often liked to describe it as “coming down at right angles to an orthodoxy.”¹⁷⁰ Indeed, Wohlstetter’s approach did not fit well the conventional dichotomy of hawk and dove. He was a strategist who had originally established his reputation for his path-breaking work on nuclear deterrence, a traditionally hawkish concept; yet he had added to that reputation not only by supporting nuclear nonproliferation, an often dovish concern, but also by consistently urging the U.S. Government to block the spread of nuclear weapons, weapons-relevant nuclear technologies, and weapons-usable nuclear material to America’s allies and adversaries alike. He was a strategist who, like the doves, was horrified by the brute destructiveness of nuclear weapons

and nuclear war, yet hawkishly saw U.S. innovation in military technologies of precision, control, and information as a way of markedly limiting the potential of weapons for indiscriminate killing, thereby strengthening deterrence and making nuclear war less likely in the first place.

Indeed, when President Reagan awarded Medals of Freedom to the Wohlstetters in November 1985, he summarized their work in the following way:

Albert has always argued that in the nuclear age technological advances can, if properly understood and applied, make things better; but his point, and Roberta's, has been a deeper one than that. He has shown us that we have to create choices and, then, exercise them. The Wohlstetters have created choices for our society where others saw none. They've taught us that there is an escape from fatalism.¹⁷¹

In the 21st century, the writings of Albert and Roberta Wohlstetter on strategy can challenge today's and tomorrow's decisionmakers to "escape from fatalism," and come "down at right angles" to stagnant orthodoxies; to move beyond the sort of partisan dichotomies that have come to dominate and even cloud thinking on limiting and managing nuclear risks and to search for, discover, and even invent new policy choices that help America to avoid the nuclear age's worst dangers, and in Albert's own words, "slowly and piecemeal, [to] build a more orderly and safer world."¹⁷²

To these ends, this edited volume provides readers not only with the present essay on the Wohlstetters' key historical contributions, but also with many of Albert and Roberta's most enduring and relevant writings, some of which have never before been published. This volume's six chapters correlate directly with the six themes set forth in the present introductory essay — namely, (1) Analysis and Design of Strategic Policy, (2) Nuclear Deterrence, (3) Nuclear Proliferation, (4) Arms Race Myths vs. Strategic Competition's Reality, (5) Towards Discriminate Deterrence, and (6) Limiting and Managing New Risks. (However, the editors of this volume have remained mindful of James Digby and J. J. Martin's wise caveat that, given Albert and Roberta's "continuity of concepts across many diverse types of military problems," it therefore "may be inconsistent with the nature of [the Wohlstetters'] work to summarize their contributions in

terms of discrete categories."¹⁷³) Moreover, each chapter begins with a short commentary by a former colleague or student of Albert and Roberta—Henry S. Rowen, Alain Enthoven, Henry Sokolski, Richard Perle, Stephen J. Lukasik, and Andrew W. Marshall, respectively—before offering the selected Wohlstetter writings themselves.

To conclude, at least two larger themes emerge from a close reading and careful appreciation of the Wohlstetters' work in strategy. First, as a palliative to the fatalism that sometimes besets the nuclear age and gives rise to the extreme responses of the Utopian or the Dystopian, we must learn to tolerate the fact of uncertainty. Indeed, in the conclusion to her magisterial 1962 study of one of America's worst military disasters, Roberta soberly observed, "If the study of Pearl Harbor has anything to offer for the future, it is this: We have to accept the fact of uncertainty and learn to live with it. No magic, in code or otherwise, will provide certainty. Our plans must work without it."¹⁷⁴

Second, as the United States struggles not only to limit and manage the nuclear risks and changing dangers it faces in this new century, but also to "slowly and piecemeal, build a more orderly and safer world," we must weigh and consider carefully Albert's sober words on the need for facing up to hard choices and sustaining intelligent effort as expressed in *No Highway to High Purpose* (1960):

The great issues of war and peace deserve to be treated candidly and objectively, without wishfulness or hysteria. . . . [They] are tall orders. They cannot be filled quickly, or finally, or by means of some semiautomatic gadget, or in one heroic burst of energy. Nor will the answer come to us in a dream. . . . Our problem is more like staying thin after thirty—and training for some long steep, rocky climbs. If, as we are told, America is no longer a youth, we may yet hope to exploit the advantages of maturity: strength, endurance, judgment, responsibility, freedom from the extremes of optimism and pessimism—and steadiness of purpose.¹⁷⁵

ENDNOTES - Zarate

1. Arthur Herzog, *The War-Peace Establishment*, New York: Harper & Row, 1965, p. 66.

2. Albert Wohlstetter, "Technology, Prediction, and Disorder," *Vanderbilt Law Review*, Vol. 17, No. 1, December 1963, pp. 11-12.

3. Quoted in John J. Fialka's profile of Albert Wohlstetter, "Veteran 'Lone Ranger' Strategist Packs Firepower with Cold-Eyed Outlook on Soviet Nuclear Policy," *Wall Street Journal*, July 15, 1987, p. 56.

4. Michael Howard, "Brodie, Wohlstetter, and American Nuclear Strategy," *Survival*, Vol. 34, No. 2, Summer 1992, p. 113. The military historian Sir Michael Howard (b. 1922) should not be confused with the British conservative politician Michael Howard (b. 1941).

5. Colin S. Gray, "The Holistic Strategist," *Global Affairs*, Vol. 7, No. 1, Winter 1992, pp. 174-175, 172-173.

6. Although Albert did not serve in an official capacity in the U.S. Government, he served in many instances as an adviser. For example, he served in 1958 as deputy science adviser of the U.S. delegation to the Surprise Attack Conference in Geneva, Switzerland; during the Cuban Missile Crisis, he and Roberta served on the Quarantine Committee; in 1961 as the Department of Defense's informal representative to the Kennedy Administration's Committee on U.S. Political, Economic and Military Policy in Europe; from 1970 onward as a member of the Chief of Naval Operations Executive Panel; from 1985 to 1992 as a member of the Presidential Foreign Intelligence Advisory Board; and from 1986 to 1992 as a member of the Defense Policy Board. In addition, Albert and Roberta helped to organize numerous seminars and forums within which senior policymakers, military planners, and strategists from the United States, Europe, and East Asia could meet and exchange views. These included: the California Seminar on Arms Control and Foreign Policy (also known as California Seminar on International Security and Foreign Policy), formed with assistance from James F. Digby; the European-American Workshop (later the European American Institute for Security Research or EAI), which they formed and perpetuated with the help of Digby, Uwe Nerlich of West Germany, Pierre Hassner of France, and many others; the Security Conference on Asia and Pacific (SECAP), formed with the assistance of Kiichi

Saeki of Japan; and the New Alternatives Workshop, which built upon themes first examined by the Long Range Research and Development Planning Program (LRRDPP), which section V of this introduction discusses.

7. Richard Rosecrance, "Albert Wohlstetter," in John Baylis and John Garnett, eds., *Makers of Nuclear Strategy*, London, UK: Pinter Publishers, 1991, p. 57.

8. Some authors and journalists have erroneously claimed that when Ahmed Chalabi attended the University of Chicago, he had studied under Albert Wohlstetter in the political science department. According to University records, Chalabi, who had pursued a doctorate in mathematics at the University of Chicago, never took any courses from Wohlstetter. See "Letters: Department of Corrections," *The University of Chicago Magazine*, Vol. 95, No. 6, August 2003, available from magazine.uchicago.edu/0308/issue/letters.shtml; and "Letters: Department of Corrections," *The University of Chicago Magazine*, Vol. 95, No. 6, August 2003, available from magazine.uchicago.edu/0310/issue/letters-dept.shtml. Indeed, Wohlstetter and Chalabi apparently did not first meet until the early 1990s, around the time of the Persian Gulf War, long after both had left the University of Chicago.

9. Roberta Wohlstetter, *Pearl Harbor: Warning and Decision*, Stanford, CA: Stanford University Press, 1962, p. 387.

10. *Ibid.*, pp. 387-388.

11. *Ibid.*, p. 392.

12. For example, see "This is the Tempest Long Foretold, editorial, *The Daily Telegraph*, September 12, 2001, p. 19.

13. See *The 9/11 Commission Report*, final report of the National Commission on Terrorist Attacks Upon the United States, Washington, DC: U.S. Government Printing Office, July 22, 2004, esp. p. 339, available from www.gpoaccess.gov/911/index.html. See also James Johnson and Robert Zarate, "Slow Pearl Harbors: Some Foreign Policy Disasters are a Long Time in the Making," *The Weekly Standard*, Vol. 11, No. 14, December 19, 2005, pp. 14-15, available from www.weeklystandard.com/Content/Public/Articles/000/000/006/476fjioj.asp; and Zarate, "First Lady of

Intelligence: Roberta Wohlstetter, 1912-2007," *The Weekly Standard*, Vol. 12, No. 18, January 22, 2007, pp. 16-17, available from www.weeklystandard.com/Content/Protected/Articles/000/000/013/171kclou.asp.

14. Roberta Wohlstetter, *The Buddha Smiles: Absent-Minded Peaceful Aid and the Indian Bomb*, PH-78-04-370-23, final report prepared for the U.S. Energy Research and Development Administration in partial fulfillment of E (49-1)-3747, Los Angeles, CA: Pan Heuristics, November 15, 1976, revised November 1977, available from www.npec-web.org/essays/19771100-RW-BuddhaSmiles-Revised.pdf, courtesy Joan Wohlstetter. See also Roberta Wohlstetter, *India's Nuclear Energy Program and U.S. Policies Today*, final report prepared for the Defense Nuclear Agency, in partial fulfillment of DNA-79-C-0067, Marina del Rey, CA: Pan Heuristics, revised February 1980, courtesy Gregory S. Jones.

15. *Agreement on the Canada-India Colombo Plan Atomic Reactor Project*, New Delhi, India, April 28, 1956, available from www.nci.org/06nci/04/Canada-India%20CIRUS%20agreement.htm; and *U.S.-India CIRUS Agreement*, March 16, 1956, available from www.nci.org/06nci/04/US-India%20CIRUS%20agreement.htm.

16. It is worth observing that, prior to 2002 or 2003, no major book on neoconservatism had identified Albert Wohlstetter as a "neoconservative": e.g., Peter Steinfels, *Neoconservatives: The Men Who Are Changing America's Politics*, New York: Simon and Schuster, 1979; John Ehrman, *The Rise of Neoconservatism: Intellectuals and Foreign Affairs, 1945-1994*, New Haven, CT: Yale University Press, 1995; Mark Gerson, *The Neoconservative Vision: From the Cold War to the Culture Wars*, Lanham, MD: Madison Books, 1996; and Shadia Drury, *Leo Strauss and the American Right*, New York: St. Martin's Press, 1997. Nor had any major essay or news article on neoconservatism identified Wohlstetter as a "neoconservative": e.g., Joshua Epstein, "The New Conservatives: Intellectuals in Retreat," *Dissent*, Vol. 20, No. 2, Spring 1973, pp. 151-162; Michael Harrington, "The Welfare State and Its Neoconservative Critics," *Dissent*, Vol. 20, No. 4, Fall 1973, pp. 435-454; Bernard Weinraub, "Reagan's Brain Trust: Font of Varied Ideas," *The New York Times*, December 1, 1980; Bernard Weinraub, "Neoconservatives Today, They Explain All Their Yesterdays,"

The New York Times, December 28, 1980; David Shribman, "Neoconservatives and Reagan: Uneasy Coalition," *The New York Times*, September 28, 1981; David Shribman, "Group Goes From Exile to Influence," *The New York Times*, November 23, 1981; and Brent Staples, "Undemocratic Vistas: The Sinister Vogue of Leo Strauss," *The New York Times*, November 28, 1994.

17. Howard, "Brodie, Wohlstetter, and American Nuclear Strategy," p. 108.

18. See C. L. Sulzberger, "A New Kind of Policy Adviser," *The New York Times*, April 25, 1955, p. 22; "Valuable Batch of Brains: An Odd Little Company Called RAND Plays Big Role in U.S. Defense," *Life*, Vol. 46, No. 19, May 11, 1959, pp. 101-107; and Sol Stern, "Who Thinks in a Think Tank," *The New York Times*, April 16, 1967, pp. 28, 110-111, 117-120.

19. Quoted by Bruce Smith, *The RAND Corporation: Case Study of a Non-Profit Research Organization*, Cambridge, MA: Harvard University Press, 1966, p. 47.

20. For more on the RAND Corporation's history, see Smith, *The RAND Corporation*, and Andrew May, *Strategic Thought at RAND*, unpublished draft manuscript, 2003. Dr. May's manuscript is based on his 1998 dissertation.

21. In this discussion of Albert and Roberta Wohlstetter's lives before RAND, I draw from research and interviews that Chicago-based independent historian James Johnson and I had conducted, as well as from the following transcripts of interviews with Albert Wohlstetter: James F. Digby and Joan Goldhamer, *An Interview with Albert Wohlstetter: The Development of Strategic Thinking at RAND, 1948-1963: A Mathematical Logician's View*, unpublished, Los Angeles, CA, July 5, 1985, courtesy James F. Digby; Martin Collins and Joseph Tatarewicz, *Smithsonian Interview with Prof. Albert Wohlstetter*, unpublished, Los Angeles, CA, July 29, 1987, final edit, September 9, 1991, courtesy Joan Wohlstetter; and Collins, Tatarewicz, and Gustave Shubert, *RAND Corporation History: Session Four* [for the Smithsonian Videohistory Program]; *Interview with Bruno Augenstein, Edward Barlow, Burton Klein, Robert Specht, Hans Speier, and Albert Wohlstetter*, Santa Monica, CA, January 27, 1989; and Allen Greb and Digby, *An Interview with Albert Wohlstetter: The Strategist Reflects on the Past and Future*

of *Nuclear Policies*, unpublished, August 2, 1990, revised July 10, 1991, in the Wohlstetter Papers, Interviews, Box 95, Folders 5-7. In addition, Stephen Prowse's 1991 biographical sketches of Albert and Roberta helped with establishing the correct chronology and dates. See Prowse, "Albert Wohlstetter: A Biographical Sketch" and "Roberta Wohlstetter: A Biographical Sketch," in Andrew W. Marshall, J. J. Martin, and Henry S. Rowen, eds., *On Not Confusing Ourselves: Essays on National Security Strategy in Honor of Albert and Roberta Wohlstetter*, Boulder, CO: Westview Press, 1991, pp. 317-320 and 321-322.

22. Albert's three older siblings were William (1902-1967), Helene (1906-1974), and Charles (1910-1995). Charles became a highly successful businessman, establishing in 1961 Continental Telephone (Contel), an independent telephone company that would be acquired by GTE in the 1990s. See John Holusha, "Charles Wohlstetter, 85, Founder of Contel, Dies," obituaries, *The New York Times*, May 25, 1995, p. B16. Helene would end up working at Contel, but would be tragically murdered in the mid-1970s during a disgruntled former Contel employee's shooting rampage. See "Obituaries," *The New York Times*, August 5, 1974, p. 26.

23. See Digby and Goldhamer, *An Interview with Albert Wohlstetter: The Development of Strategic Thinking at RAND, 1948-1963: A Mathematical Logician's View*, p. 3. Albert often cited the importance of two Peircean writings, among others: Charles S. Peirce, "The Fixation of Belief," *Popular Science Monthly*, Vol. 12, November 1877, pp. 1-15; and "How to Make Our Ideas Clear," *Popular Science Monthly*, Vol. 12, January 1878, pp. 286-302. These writings are available in Nathan Houser and Christian J. W. Kloesel, eds., *The Essential Peirce: Selected Philosophical Writings*, Vol. 1: 1867-1893, Bloomington, IN: Indiana University Press, 1992, pp. 109-123, 124-141.

24. See "City College R.O.T.C. Names 81 Officers," *The New York Times*, May 7, 1933, p. 22.

25. Roberta Mary Morgan Wohlstetter was born in Duluth, MN, on August 22, 1912. She earned a Bachelor of Arts degree from Vassar College in 1933, a Master of Arts degree in psychology from Columbia University in 1936, and a Master of Art's degree

in literature from Radcliffe College in 1937. After marrying Albert Wohlstetter in 1939, she taught at Barnard College in the early 1940s and at Howard University in the mid-1940s before joining the RAND Corporation as a consultant in 1947.

26. Willard Van Orman Quine mentions the Wohlstetters several times in his memoir. See Quine, *The Time of My Life: An Autobiography*, Cambridge, MA: MIT Press, 2000, pp. 147, 184, 198, 217.

27. For more on the history of General Panel's "Packaged House," as well as on the roles that Albert Wohlstetter and his brother Charles played in the company, see Gilbert Herbert, *The Dream of the Factory-Made House: Walter Gropius and Konrad Wachsmann*, Cambridge, MA: MIT Press, 1984.

28. In the following discussion of Albert Wohlstetter's methodology, I benefited greatly from many hours of discussion on this subject with former businessman and Chicago-based independent historian James Johnson. As an undergraduate at the University of Chicago in the late 1960s and early 1970s, Mr. Johnson had studied under Wohlstetter and worked for him on projects relating to the use of the method of scientific investigation versus the appeal to scientific authority in debates over public policy.

29. See Albert Wohlstetter, *Theory and Opposed-System Design*, D(L)-16001-1, Santa Monica, CA: RAND Corporation, August 1967, revised January 1968, available from www.rand.org/about/history/wohlstetter/DL16001.1/DL16001.1.html. This was later published in slightly revised form as Wohlstetter, "Theory and Opposed-System Design," *Journal of Conflict Resolution*, Vol. 12, No. 3, September 1968, pp. 302-331. See also Wohlstetter, *No Highway to High Purpose*, P-2084-RC, Santa Monica, CA: RAND Corporation, June 1960, available from www.rand.org/about/history/wohlstetter/P2084/P2084.html, later published in slightly abridged form as "A Purpose Hammered Out of Reflection and Choice," *Life*, Vol. 48, No. 24, June 20, 1960, pp. 115, 126-134; "Analysis and Design of Conflict Systems," in E. S. Quade, ed., *Analysis for Military Decisions*, Chicago, IL: Rand McNally & Co., 1964, pp. 103-148, available from www.rand.org/pubs/reports/2007/R387.pdf; and "National Decisions Concerning Defense," in J. Banbury and

J. Maitland, eds., *Proceedings of the Second International Conference on Operations Research (in Aix-En-Provence, France, 1960)*, London, UK: English Universities Press, February 1961, pp. 517-522.

30. Wohlstetter, "Theory and Opposed-System Design," p. 304.

31. *Ibid.*

32. Wohlstetter, *No Highway to High Purpose*.

33. Wohlstetter, "Theory and Opposed-Systems Design," p. 312.

34. *Ibid.*, p. 303.

35. *Ibid.*

36. *Ibid.*, p. 309.

37. *Ibid.*, p. 316.

38. On this topic, see Albert Wohlstetter, "Scientists, Seers, and Strategy," *Foreign Affairs*, Vol. 41, No. 3, April 1963, pp. 466-478. See also Wohlstetter, *Scientists, Seers, and Strategy*, unpublished book-length manuscript, circa 1963, courtesy Joan Wohlstetter.

39. Wohlstetter, "Theory and Opposed-Systems Design," pp. 303-304.

40. See Albert Wohlstetter, "The Delicate Balance of Terror," *Foreign Affairs*, Vol. 37, No. 2, January 1959, pp. 211-234. For the extended version of the essay, see Wohlstetter, *The Delicate Balance of Terror*, unabridged version, P-1472, Santa Monica, CA: RAND Corporation, November 6, 1958, revised December 1958, available from www.rand.org/about/history/wohlstetter/P1472/P1472.html.

41. Marc Trachtenberg, *History and Strategy*, Princeton, NJ: Princeton University Press, 1991, p. 20.

42. As Wohlstetter recalled decades later:

[W]hat attracted me to [the problem] was that there

were forces working in opposing directions. There were some forces that would make you want to be up close, so that you could have close access to targets, be able to act quickly, get in many sorties, use shorter range weapons and so on. And on the other hand, there were some things that made you want to be [further] back because if you were close to him, why, there was just a good chance he would also be close to you, so he would be getting in a lot of whacks. . . . But then you could see that this meant you would need a larger aircraft or you would have to refuel a lot of times, and so on. And it struck me that in the *abstract* there was no way of resolving this. . . . [T]here was no way of knowing how these opposing considerations would work out in the net effect without looking at the geography.

See Digby and Goldhamer, *An Interview with Albert Wohlstetter: The Development of Strategic Thinking at RAND, 1948-1963: A Mathematical Logician's View*, pp. 35-36.

43. For a case study of the Base Study, see E. S. Quade, "The Selection and Use of Strategic Air Bases: A Case History," in Quade, ed., *Analysis for Military Decisions*, pp. 24-64. See also Memorandum from Colonel D. O. Monteith (USAF) to Colonel Watson, *A Brief Resume of RAND Report R-266, "Selection and Use of Strategic Air Bases*, Chairman of the Joint Chiefs of Staff (CJCS) reference no. 381, April 8, 1955, TOP SECRET, declassified on November 2, 1978, DDRS No. CK3100452915.

44. Here I wish to acknowledge Fred Hoffman and Harry Rowen, both longtime Wohlstetter colleagues, who had stressed to me many times the importance of understanding the politico-military historical context in which the Base Study had begun, and the need to explain the Base and Vulnerability Studies in a way that avoided historical anachronism.

45. See Quade, ed., *Analysis for Military Decisions*, p. 24. Using a "back-of-the-envelope" calculation, I crudely estimate that \$3.5 billion in FY 1952 dollars is approximately equivalent to as much as \$28.5 billion to \$30.2 billion in FY 2007 dollars.

46. Albert J. Wohlstetter, Fred S. Hoffman, Robert J. Lutz, and Henry S. Rowen, *The Selection of Strategic Air Bases*, R-244-S,

special staff report, Santa Monica, CA: RAND Corporation, March 1, 1953, TOP SECRET, declassified on July 1, 1963, available from www.albertwohlstetter.com/writings/19530301-AW-EtAI-R244S.pdf.

47. Albert J. Wohlstetter, Fred S. Hoffman, Henry S. Rowen, and Robert J. Lutz, *The Selection and Use of Strategic Air Bases*, R-266, final report, Santa Monica, CA: RAND Corporation, April 1954, TOP SECRET, declassified circa 1961, available from www.rand.org/pubs/reports/R0266/.

48. From mid-to-late 1953, the Ad Hoc Committee of the U.S. Air Force's Air Staff evaluated the Base Study, and then presented its favorable evaluation to the USAF's Air Force Council, which then debated the Study in Wohlstetter's presence. In late 1953, the Air Force Council decided to endorse key elements of the Base Study's *preferred system*, and this decision was approved by Air Force Chief of Staff General Thomas D. White and Secretary of the Air Force Harold Talbott. See Quade, ed., *Analysis for Military Decisions*, pp. 62-63; Collins and Tatarewicz, *Smithsonian Interview with Prof. Albert Wohlstetter*, pp. 15-17; and Fred Kaplan, *The Wizards of Armageddon*, New York: Simon and Schuster, 1983, pp. 97-110—esp. 105-106, as well as related endnotes on p. 402, one of which cites General Robert Burns, "Decision on AFC 22/4b: Vulnerability of the Strategic Striking Complex," November 2, 1953, in Library of Congress, *Nathan Twining Papers*, Box 103, Air Force Council Chief Staff Decisions, Vol. I, Tab 22/4b.

49. See Albert J. Wohlstetter and Fred S. Hoffman, *Defending a Strategic Force After 1960: With Notes on the Need by Both Sides for Accurate Bomb Delivery, Particularly for the Big Bombs*, D-2270, Santa Monica, CA: RAND Corporation, February 1, 1954, available from www.albertwohlstetter.com/writings/19540201-AW-FH-D2270.pdf. An implication of this finding, however, was that even modest improvements to warhead delivery accuracies could enable huge reductions in explosive yield.

50. Bernard Brodie "Implications for Military Policy," in Brodie, ed., *The Absolute Weapons*, New York, NY: Harcourt, Brace & Co., 1946, pp. 99, 88.

51. For example, see Albert Wohlstetter, "'Lesser' Excluded Cases," opinion, *The New York Times*, February 14, 1979, p. A25.

52. Albert J. Wohlstetter, Fred S. Hoffman, and Henry S. Rowen, *Protecting U.S. Power to Strike Back in the 1950s and 1960s*, R-290, staff report, Santa Monica, CA: RAND Corporation, September 1, 1956, TOP SECRET, declassified circa 1960s, available from www.albertwohlstetter.com/writings/19560901-AW-EtAl-R290.pdf

53. *Ibid.*, pp. 40-41, emphasis added.

54. *Ibid.*, p. 6.

55. *Ibid.*, pp. 2-3.

56. *Ibid.*, p. 5.

57. In R-290, the Wohlstetter team wrote: “We would like this course of Soviet action [i.e., a preclusive nuclear first strike] to be a worse alternative to almost any other they might contemplate—including, for example, the acceptance of defeat in some limited or peripheral war.” *Ibid.*, p. 41.

58. For the full description of R-290’s recommendations, see Wohlstetter *et al.*, *Protecting U.S. Power to Strike Back in the 1950s and 1960s*, pp. 43-94.

59. Memorandum from Colonel Jack W. Hayes (USAF), Joint Strategic Plans Group, to the Chairman of the Joint Chiefs of Staff, *NSC Briefing on the Vulnerability of SAC*, JCS 2250, July 31, 1956, TOP SECRET, declassified on November 16, 1978, DDRS No. CK3100434873; and Memorandum, *Program Objectives Related to SAC Operational Capability*, AFOPD-PL-SS/Col Sutterlin/mfm/5503, November 17, 1956, TOP SECRET, declassified on January 30, 1980, DNSA No. 01323.

60. For more on the events that led to SAC’s adoption of Fail-Safe in Spring 1958, see Albert Wohlstetter, “SAC Test 1957 of Alert Bomber Response—Only Fail-Unsafe,” April 29, 1985, Wohlstetter Papers, Notes, Box 102, Folder 6, TAB H. See also Memorandum CSAFM-72-58 from the USAF Chief of Staff to the Joint Chiefs of Staff, *Launching of the Strategic Air Command Alert Force*, JCS 1899/398, March 10, 1958, TOP SECRET, declassified circa 1981, DDRS No. CK3100437133; “Launching of SAC Alert Forces (‘Fail Safe’),” in Memorandum, *Discussion at the 361st Meeting of the National Security Council, Thursday, April 3, 1958*,

April 4, 1958, TOP SECRET, declassified on July 18, 1989, DDRS No. CK3100278691, pp. 7-8; Note by the Secretariat of the Joint Chiefs of Staff on *Decision on Report by the Joint Strategic Plans Committee (In Collaboration with the Joint Intelligence Committee) on 'Positive Control' Presentation to NSC, JCS 1899/402*, with report attached, May 13, 1958, TOP SECRET, declassified on July 18, 1979, DDRS No. CK3100169750; and Benjamin Welles, "U.S. Bombers in Spain Poised to Take to Air in 15 Minutes: Specially Trained Crews Kept on Alert for Orders from Main Omaha Base – Each Jet Has Assigned Target," *The New York Times*, September 6, 1958, p. 2.

61. See Wohlstetter, Hoffman, and Rowen, *Protecting U.S. Power to Strike Back in the 1950s and 1960s*, pp. 76-77.

62. See Fred C. Iklé, Gerald J. Aronson, and Albert Madansky, *On the Risk of an Accidental or Unauthorized Nuclear Detonation*, RM-2251, Santa Monica, CA: RAND Corporation, October 15, 1958, esp. pp. 100-101 and 154, available from www.rand.org/pubs/research_memoranda/RM2251/.

63. Background on Baran's work on survivable and distributed communication networks is available from rand.org/about/history/baran.html. See also Virginia Campbell, "How RAND Invented the Postwar World," *Invention & Technology*, Summer 2004, esp. pp. 57-58, available from www.rand.org/about/history/Rand.IT.Summer04.pdf.

64. Citations in this section refer not to the abridged *Foreign Affairs* version of the article, but rather to the extended version: Wohlstetter, *The Delicate Balance of Terror*, unabridged.

65. To Wohlstetter, a prototypical *automatic deterrer* was Nobel prize-winning physicist Patrick Maynard Stuart Blackett, who had written: "If it is in fact true, as most current opinion holds, that strategic air power has abolished global war, then an urgent problem for the West is to assess how little effort must be put into it to keep global war abolished." See Blackett, *Atomic Weapons and East-West Relations*, Cambridge, UK: Cambridge University Press, 1956, p. 32. Quoted by Wohlstetter, *The Delicate Balance of Terror*, unabridged.

66. In Wohlstetter's view, General Pierre Gallois of France, who had claimed that "a small number of bombs and a small number of carriers suffice for a threatened power to protect itself against atomic destruction," represented well the school of *minimum deterrence*. See Gallois, "A French General Analyzes Nuclear-Age Strategy," *Réalités*, November 1958, p. 71. Quoted by Wohlstetter, *The Delicate Balance of Terror*, unabridged. See also *1970 Without Arms Control*, Special Committee Report, Washington, DC: National Planning Association, 1958, and P. H. Backus, "Finite Deterrence, Controlled Retaliation," *U.S. Naval Institute Proceedings*, Vol. 84, No. 3, March, 1959, both of which advocate for an essentially "minimum deterrent" approach.

67. Wohlstetter, *The Delicate Balance of Terror*, unabridged.

68. *Ibid.*

69. During a private, high-level dinner at the Council on Foreign Relations in New York City in 1960, Wohlstetter elaborated further on the distinction between automatic deterrers and minimum deterrers:

Attitudes vary towards the problem of avoiding deliberate attack and towards the problem of avoiding accidental war. This variation, too, qualifies the apparently general agreement on the importance of reducing the likelihood of central war. Those who have held the theory of the automatic balance of terror worry about the accident problem, but not the problem of deliberate attack. Holders of the theory of minimum deterrence think it important to deter deliberate attack, but underestimate its difficulty, because they neglect the accident problem. . . .

Quoted by William C. Staley, Jr., Rapporteur, *Study Group Reports: Strategy and Foreign Policy*, First Meeting, unpublished, Council on Foreign Relations, New York, NY, March 16, 1960, p. 14. Meeting attendees included: James A. Perkins, Wohlstetter, Staley, Frank Altschul, Robert Amory, Jr., Major General C. H. Bonesteel, III (Army), Melvin Conant, Russell H. Fifield, George S. Franklin, Jr., Caryl P. Haskins, William W. Kaufmann, Major General Glen Martin, Oskar Morgenstern, Philip E. Mosely, Garrison Norton, Philip W. Quigg, Dean Rusk, Joseph E. Slater, and Henry M. Wriston.

70. Wohlstetter, *The Delicate Balance of Terror*, unabridged.

71. In a May 1959 internal RAND report, Albert Wohlstetter and Henry Rowen wrote that it is important to view efforts to deter a preclusive nuclear first strike through the “broad” concept of a system of strategic nuclear forces composed of many elements:

[Deterrence] will require the ability to maintain under conditions of attack a functioning system of elements, including besides the mobile or hardened delivery vehicles with the capacity to reach and penetrate the active and passive enemy defenses, the preservation of centers of responsible decision and control, and a network permitting a protected flow of information to and from these decision centers. The Air Force, which pioneered the weapons systems idea, needs to emphasize a still broader systems concept. With the widespread multiplication and dispersal of weapons, positive signals are essential to avoid war by accident or miscalculation. To deter a deliberate attack, the system of control must be able to survive the attack which we aim to deter. . . . [We need] a broadened systems concept emphasizing the ability to keep a network of elements alive and in communication for the duration of the enemy’s and our own attacks — for days, not hours or minutes.

See Wohlstetter and Rowen, “Objectives of the United States Military Posture,” RM-2373, Santa Monica, CA: RAND Corporation, May 1, 1959, available from www.rand.org/about/history/wohlstetter/RM2373/RM2373.html.

72. For example, see Albert and Roberta Wohlstetter, *Notes on the Cuban Crisis: On the Importance of Overseas Bases in the 1960’s, Offense-Defense Semantics, Keeping Open Possible Aid to Cuban Resistance*, D(L)-10647-ISA, Santa Monica, CA: RAND Corporation, October 28, 1962, available from www.rand.org/about/history/wohlstetter/DL10647/DL10647.html; *Studies for a Post-Communist Cuba*, D(L)-11060-ISA, Santa Monica, CA: RAND Corporation, February 25, 1963, available from www.rand.org/about/history/wohlstetter/DL11060/DL11060.html; *On Dealing with Castro’s Cuba, Part I*, D-17906-ISA, Santa Monica, CA: RAND Corporation, January 16, 1965, available from www.rand.org/about/

history/wohlstetter/D17906/D17906.html; and *Controlling the Risks in Cuba*, Adelphi Papers No. 17, London, UK: Institute for Strategic Studies, April 1965. See also Roberta Wohlstetter, "Cuba and Pearl Harbor: Hindsight and Foresight," *Foreign Affairs*, Vol. 43, No. 4, July 1965, pp. 691-707.

73. P.M.S. Blackett, *Studies of War: Nuclear and Conventional*, Edinburgh, UK: Oliver and Boyd, Ltd., 1962, pp. 131, 136.

74. See Robert J. C. Butow, *Tojo and the Coming of the War*, Princeton, NJ: Princeton University Press, 1961, p. 255. Quoted by Rosecrance, "Albert Wohlstetter," p. 61.

75. See O'Dowd Gallagher, *Action in the East*, Garden City, NY: Doubleday, 1942, p. 94. Quoted by Wohlstetter, *The Delicate Balance of Terror*, unabridged, fn. 6.

76. Elsewhere in "The Delicate Balance of Terror," Wohlstetter again elaborates:

The most important thing to say perhaps is that it doesn't make much sense to talk about whether general war is likely or not unless we specify a good deal else about the range of circumstances in which the choice of surprise attack might present itself. . . . Deterrence is a matter of comparative risks. How much the Soviets will risk in surprise attack will depend *in part* on the vulnerability of our future posture. . . . [T]he risks of not striking might at some juncture appear very great to the Soviets, involving, for example, disastrous defeat in peripheral war, loss of key satellites with danger of revolt spreading—possibly to Russia itself—or fear of an attack by ourselves. Then, striking first, by surprise, would be the sensible choice for them, and from their point of view the smaller risk.

Wohlstetter, *The Delicate Balance of Terror* (unabridged), emphasis added.

77. Quoted by Staley, *Study Group Reports: Strategy and Foreign Policy*, p. 16, emphasis added.

78. Roberta Wohlstetter, *Pearl Harbor: Warning and Decision*, Stanford, CA: Stanford University Press, 1962, pp. 400-401.

79. Wohlstetter, *The Delicate Balance of Terror* (unabridged).

80. Albert Wohlstetter, "Some General Comments on Senator [John F.] Kennedy's National Security Speeches," circa 1960, Wohlstetter Papers, Writings, Box 148, Folder 10.

81. See *The North Atlantic Nations: Tasks for the 1960s*, a report to the Secretary of State, August 1, 1960, SECRET, declassified on January 9, 1986, DDRS No. CK3100227683. Known as "the Bowie Report," the study was authored by Robert A. Bowie, who served as Director of the Department of State's Policy Planning Staff from 1953 to 1957.

82. See *A Review of North Atlantic Problems for the Future*, the Committee on U.S. Political, Economic and Military Policy in Europe's Policy Guidance to the National Security Council, March 1961, SECRET, declassified on December 30, 1996, DNSA No. NH01131, esp. pp. 7-11.

83. See *Comparison of "A Review of North Atlantic Problems for the Future" with Existing National Security Council Policy*, National Security Council memorandum, March 28, 1961, SECRET, declassified on May 20, 1994, DDRS No. CK3100055224; and *Policy Directive Regarding NATO and the Atlantic Nations*, National Security [Action] Memorandum No. 40, April 24, 1961, CONFIDENTIAL, declassified on May 4, 1977, DNSA No. BC02034.

84. Albert Wohlstetter, "Nuclear Sharing: NATO and the N+1 Country," *Foreign Affairs*, Vol. 39, No. 3, April 1961, pp. 355-387

85. Pierre Gallois, *The Balance of Terror: Strategy for the Nuclear Age*, trans. Richard Howard, Boston, MA: Houghton Mifflin, 1961, p. 130. Originally published as Gallois, *Stratégie de l'âge Nucléaire*, Paris, France: Calmann-Lévy, 1960.

86. *Ibid.*, p. 109.

87. *Ibid.*, p. 57. By the 1980s, however, General Gallois would reverse some of his minimum deterrence views. See Gallois and John Train, "When a Nuclear Strike is Thinkable," *Wall Street Journal*, March 22, 1984, p. 30.

88. Wohlstetter, *The Delicate Balance of Terror*.

89. Wohlstetter, "Nuclear Sharing: NATO and the N+1 Country," p. 363.

90. *Ibid.*, p. 385.

91. *Ibid.*, pp. 385-386.

92. See Henry A. Kissinger, *Memorandum of Conversation in Paris on February 5, 1962*, Department of State, February 9, 1962, CONFIDENTIAL, declassified on March 2, 1997, DDRS No. CK3100108824, p. 2.

93. For one version of the U.S. Government's history of these negotiations, see U.S. Arms Control and Disarmament Agency, *International Negotiations on the Treaty on the Nonproliferation of Nuclear Weapons*, Washington, DC: U.S. Government Printing Office, 1969. In 1967, as the negotiations for what would eventually become the NPT were coming to an end, Richard T. Cooper of the *Chicago Sun-Times* profiled Wohlstetter's views on proliferation. Wrote Cooper: "A carefully drafted treaty banning the spread of nuclear weapons can be moderately useful for maintaining world order, but no treaty can by itself eliminate the problem, Albert Wohlstetter, an expert on nuclear weapons problems, cautioned." See Cooper, "A Treaty—How Useful?" *Chicago Sun-Times*, February 19, 1967, pp. 1-2.

94. Hans J. Morgenthau was a noted "realist" scholar of international relations, and professor of political science at the University of Chicago. Private correspondence detailing Morgenthau's role in helping Albert Wohlstetter to get an appointment to the University of Chicago is available in the Morgenthau Papers at the Library of Congress.

95. For example, see Albert Wohlstetter, *Strength, Interest, and New Technologies*, opening address before *The Implications of Military Technology in the 1970s*, the Institute for Strategic Studies' ninth annual conference, Elsinore, Denmark, September 28 to October 1, 1967, D(L)-16624-PR, Santa Monica, CA: RAND Corporation, January 24, 1968, available from www.rand.org/about/

history/wohlstetter/DL16624/DL16624.html. The address was also published as Wohlstetter, *Strength, Interest and New Technologies*, in *The Implications of Military Technology in the 1970s*, Adelphi Papers No. 46, London, UK: Institute for Strategic Studies, March 1968. See also Wohlstetter, "Perspective on Nuclear Energy," Speech Before the University of Chicago's Twenty-Fifth Anniversary Observance of the First Controlled Self-Sustaining Nuclear Reaction, December 2, 1967, in *Bulletin of the Atomic Scientists*, Vol. 24, No. 4, April 1968, pp. 2-5.

96. See Albert Wohlstetter *et al.*, *Moving Toward Life in a Nuclear Armed Crowd?* ACDA Report No. PH-76-04-389-14, December 4, 1975, revised April 22, 1976. This 1975 ACDA report was published in revised form 4 years later as *Swords from Plowshares: The Military Potential of Civilian Nuclear Energy*, Chicago, IL: University of Chicago Press, 1979. His coauthors were Thomas A. Brown, Gregory S. Jones, David McGarvey, Henry S. Rowen, Vince Taylor, and Roberta Wohlstetter.

97. Roberta Wohlstetter examined how American policies unwittingly assisted Indian efforts to build a nuclear explosive in *The Buddha Smiles: Absent-Minded Peaceful Aid and the Indian Bomb*. For an abridged version of this report, see Roberta Wohlstetter, "The Buddha Smiles: U.S. Peaceful Aid and the Indian Bomb," in Albert Wohlstetter, Victor Gilinsky *et al.*, eds., *Nuclear Policies: Fuel without the Bomb*, Cambridge, MA: Ballinger Publishing, 1979, pp. 57-72.

98. Wohlstetter *et al.*, *Swords from Plowshares*, pp. 24-25.

99. *Ibid.*, p. 45.

100. *Ibid.*, p. 15.

101. *Ibid.*, p. 14, emphasis added.

102. *Ibid.*, p. 127.

103. *Ibid.*, p. 14.

104. See Albert and Roberta Wohlstetter, Gregory S. Jones, and Henry S. Rowen, *Towards a New Consensus on Nuclear Technology*, Vol. 1 of 2, report prepared for the Arms Control Disarmament

Agency in fulfillment of AC7NC106, PH-78-04-832-33, Los Angeles, CA: Pan Heuristics, July 6, 1979, available from www.npec-web.org/Essays/19790706-TowardsANewConsensus-Vol01.pdf; and Arthur Steiner, "Article IV and the 'Straightforward Bargain,'" PAN Paper 78-832-08, in Wohlstetter *et al.*, *Towards a New Consensus on Nuclear Technology*, Vol. 2: *Supporting Papers*, ACDA Report No. PH-78-04-832-33, Marina del Rey, CA: Pan Heuristics, July 6, 1979, available from www.npec-web.org/Essays/19790706-Steiner-ArticleIV-StraightforwardBargain.pdf. For a more recent analysis of the relationship between IAEA safeguarding effectiveness and legal interpretations of the Nuclear Nonproliferation Treaty, see Robert Zarate, "The NPT, IAEA Safeguards, and Peaceful Nuclear Energy: An 'Inalienable Right,' But Precisely To What?" in Henry Sokolski, ed., *Falling Behind: International Scrutiny of the Peaceful Atom*, Carlisle, PA: Strategic Studies Institute, 2008, pp. 221-290, available from www.strategicstudiesinstitute.army.mil/pubs/display.cfm?PubID=841.

105. For example, see Albert Wohlstetter, "Spreading the Bomb Without Quite Breaking the Rules," *Foreign Policy*, No. 25, Winter 1976-1977, pp. 88-96, 145-179; Wohlstetter, Thomas Brown, Gregory Jones, David McGarvey, Henry S. Rowen, Vincent Taylor, and Roberta Wohlstetter, "The Military Potential of Civilian Nuclear Energy," *Minerva*, Vol. 15, Nos. 3-4, Autumn-Winter 1977, pp. 387-538; Albert Wohlstetter, Victor Gilinsky, Robert Gillette, and Roberta Wohlstetter, eds., *Nuclear Policies: Fuel without the Bomb*, Cambridge, MA: Ballinger, 1978; Wohlstetter *et al.*, *Nuclear Alternatives and Proliferation Risks*, DOE EN-77-C-01-2643, Los Angeles, CA: Pan Heuristics, July 27, 1978; Wohlstetter *et al.*, *Towards a New Consensus on Nuclear Technology*; and Wohlstetter and Henry S. Rowen, *U.S. Non-Proliferation Strategy Reformulated*, Report Prepared for the National Security Council and DOE, August 29, 1979.

106. President Gerald Ford, "Statement of the President on Nuclear Policy," Office of the White House Press Secretary, October 28, 1976.

107. See Henry Sokolski, "The Washington Post Bombs Nuclear History," *The Weekly Standard*, March 28, 2005, available from www.weeklystandard.com/Content/Public/Articles/000/000/005/417gusvl.asp.

108. President Jimmy Carter, "Statement of the President on Nuclear Power Policy," Office of the White House Press Secretary, April 7, 1977.

109. U.S. Congress, *The Nuclear Non-Proliferation Act of 1978*, Public Law 95-242.

110. Carl Walske, "Nuclear Power and Nuclear Proliferation," Speech Delivered to the *International Conference on Nuclear Power and the Public—A European-American Dialogue*, Geneva, Switzerland, September 27, 1977.

111. For key hearings on the ABM before the Senate Committee on Armed Services held on April 22 and 23, 1969, see *Authorization for Military Procurement, Research and Development, Fiscal Year 1970*, and *Reserve Strength*, hearings before the U.S. Senate's Committee on Armed Services, 1st session, part 2 of 2, Washington, DC: U.S. Government Printing Office, 1969, pp. 1109-1456a.

112. As Dr. George Rathjens stated before the Senate Armed Services Committee:

Yet even if the Soviet SS-9 missile force were to grow as rapidly as the Defense Department's most worrisome projections, even if the Soviet Union were to develop and employ MIRV's with those missiles and even if they achieved accuracies as good as we apparently expect with our MIRV forces (according to figures released in late 1967 by former Deputy Secretary of Defense [Paul] Nitze), a quarter of our MINUTEMAN force could be expected to survive a Soviet preemptive SS-9 attack. That quarter would alone be more than enough to inflict unacceptable damage on the U.S.S.R.

See Rathjens, "Statement before Senate Committee on Armed Services," excerpt April 23, 1968, in *Programming-Budgeting: Defense Analysis: Two Examples*, reprint by the U.S. Senate's Subcommittee on National Security and International Operations, Committee on Government Operations, of testimony before the U.S. Senate's Committee on Armed Services, Washington, DC: U.S. Government Printing Office, September 10, 1969, p. 2.

113. Jerome Wiesner, in Wiesner, George McGovern, Donald Brennan, and Leon Johnson, *Anti-Ballistic Missile: Yes or No?* New York: Hill and Wang, 1969, pp. 13-14.

114. Quoted by Meg Greenfield, "The Ragged Non-Debate on the ABM," opinion, *Washington Post*, p. A22.

115. According to ABM opponent Ralph E. Lapp, Senator Symington had also broached the possible utility of launch-on-warning:

Senator Stuart Symington of Missouri, a former Secretary of the Air Force, raised the issue of U.S. policy in the event that radar revealed a massive first strike aimed at Minuteman bases. Would the Minutemen be fired before Soviet warheads began digging into the U.S. soil? If so, Soviet missiles would be hitting empty holes. (As Senator Fulbright pointed out, empty holes may be our most powerful deterrent weapon.)

See Lapp, "A Biography of the ABM: From Nike to Safeguard," *The New York Times*, May 4, 1969, p. SM 129.

116. Albert Wohlstetter, "The Case for Strategic Force Defense," in Johan Jørgen Holst and William Schneider, Jr., eds., *Why ABM? Policy Issues in the Missile Defense Controversy*, New York: Pergamon Press, 1969, pp. 119-142.

117. See "Appendix III: Treatment of Operations-Research Questions in the 1969 Debate," *Operations Research: The Journal of the Operations Research Society of America*, Vol. 19, No. 5, September 1971, pp. 1175-1237.

118. See *ibid.*, p. 1176. On December 22, 1969, George Rathjens, Steven Weinberg, and Jerome Wiesner sent a letter to Thomas Caywood, president of the Operations Research Society of America (ORSA), questioning "both the wisdom of an inquiry and the standing and capacity of the Operations Research Society of America to carry it out." See "Appendix IV: Correspondence and Comments," in *ibid.*, pp. 1250-1251.

119. During the Senate committee hearing, Albert Wohlstetter asserted:

The budget for strategic offense and defense forces in fiscal 1962 was 11.3 billion dollars. The proposed fiscal 1970 budget, as of June, comes to about 8 billion dollars. Adjusted for price changes, the 1962 figure was well over fifty per cent higher than that for 1970, perhaps even as much as two-thirds higher.

See Wohlstetter, "The Case for Strategic Force Defense," p. 120.

120. *Ibid.*, p. 122.

121. *Ibid.*, italics added.

122. Wohlstetter *et al.*, *Protecting U.S. Power to Strike Back in the 1950s and 1960s*, pp. 76-77.

123. Wohlstetter, "The Case for Strategic Force Defense," p. 123, italics added.

124. *Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems*, May 26, 1972, entered into force on October 3, 1972.

125. For example, see John W. Finney, "Safeguard ABM System to Shut Down," *The New York Times*, November 25, 1975, pp. 1 and 74.

126. Albert Wohlstetter, "Is There a Strategic Arms Race?" *Foreign Policy*, No. 15, Summer 1974, p. 3. This essay was part one in Wohlstetter's two-part series on the strategic competition in *Foreign Policy*. For part two, see Wohlstetter, "Rivals, But No 'Race'," *Foreign Policy*, No. 16, Fall 1974, pp. 48-81. Subsequent reports expanded this two-part series to include the data from which Wohlstetter made his key inferences: See Wohlstetter, *Legends of the Strategic Arms Race*, USSI Report 75-1, Washington, DC: United States Strategic Institute, September 1974, p. 5, available from www.albertwohlstetter.com; and Wohlstetter, Thomas Brown, Gregory Jones, David McGarvey, Robert Raab, Arthur Steiner, Roberta Wohlstetter, and Zivia Wurtele, *The Strategic Competition: Perceptions and Response*, final report for the Director of Defense

Research and Engineering (Net Technical Assessment), DAHC 15-73-C-0137, Los Angeles, CA: Pan Heuristics, January 14, 1975. Wohlstetter's two-part essay generated considerable comment and criticism in *Foreign Policy*. Comments in general agreement included: Paul H. Nitze, "Comments," *Foreign Policy*, No. 16, Fall 1974, pp. 82-83; and Johan Jørgen Holst, "What is Really Going On?" *Foreign Policy*, No. 19, Summer 1975, pp. 155-163. Moderately critical responses included: Joseph Alsop, "Comments," *Foreign Policy*, No. 16, Fall 1974, pp. 83-88. Extremely critical responses included: Morton H. Halperin and Jeremy J. Stone, "Comments," *Foreign Policy*, No. 16, Fall 1974, pp. 88-92; Paul C. Warnke, "Apes on a Treadmill," *Foreign Policy*, No. 18, Spring 1975, pp. 12-29; and Michael L. Nacht, "The Delicate Balance of Error," *Foreign Policy*, No. 19, Summer 1975, pp. 163-177. Wohlstetter responded to these comments and criticisms in "Optimal Ways to Confuse Ourselves," *Foreign Policy*, No. 20, Fall 1975, pp. 170-198. A considerably expanded version of this essay is available as: Albert Wohlstetter, Thomas Brown, Gregory Jones, David McGarvey, Robert Raab, Arthur Steiner, Roberta Wohlstetter and Zivia Wurtele, *Methods That Obscure and Methods That Clarify the Strategic Competition*, DAHC 15-73-C-0074, Los Angeles, CA: Pan Heuristics, June 30, 1975, available from www.albertwohlstetter.com.

127. Wohlstetter, "Is There a Strategic Arms Race?" p. 10.

128. *Ibid.*, p. 4.

129. *Ibid.*, pp. 10-18.

130. Wohlstetter, "Rivals, But No 'Race'," p. 66.

131. *Ibid.*, pp. 71-79.

132. Albert Wohlstetter, "Racing Forward? Or Ambling Back?" *Survey*, Vol. 22. Nos. 3/4, Summer 1976, p. 216.

133. *Ibid.*

134. *Ibid.* In a 1987 profile of Albert Wohlstetter in the *Wall Street Journal*, John J. Fialka wrote:

In Mr. Wohlstetter's world, arms-control enthusiasts are looked upon with the same deep suspicion he reserves

for generals and admirals who measure success by simply adding up megatonnage. He regards the political hoopla surrounding arms-control talks as "a very dangerous game" because it heightens people's hopes for easy solutions. . . . The kinds of agreements that might be enforced, he believes, are those that give each side the freedom to innovate defenses.

See Fialka, "Veteran 'Lone Ranger' Strategist Packs Firepower with Cold-Eyed Outlook on Soviet Nuclear Policy," p. 56.

135. Albert Wohlstetter and Brian G. Chow, "Arms Control That Could Work," opinion, *Wall Street Journal*, July 17, 1985, p. 28; and *Self-Defense Zones in Space*, study for Integrated Long-Term Defense Strategy in partial fulfillment of MDA903-84-C-0325, Marina del Rey, CA: Pan Heuristics, July 1986, available from www.albertwohlstetter.com.

136. See *Report on the Origin, Procedures, and Status of the Experiment in Competitive Analysis on National Intelligence Issues*, memorandum, White House, December 13, 1976, SECRET, declassified on October 17, 1996, DDRS No. CK3100092315. The name of this memo's author has been removed.

137. *Ibid.*, p. 2.

138. *Ibid.*, p. 3.

139. *Intelligence Community Experiment in Competitive Analysis: Soviet Strategic Objectives An Alternative View*, Report of Team "B," December 1976, TOP SECRET, declassified on December 16, 1992, DNSA No. SE00501. The "B" team's leader was Dr. Richard Pipes; its associate members were Dr. William Van Cleave, Lieutenant General Daniel Graham, U.S. Army (Ret.), Dr. Thomas Wolfe of the RAND Corporation, and General John Vogt, U.S. Air Force (Ret.); advisory panel members were Amb. Foy Kohler, Paul Nitze, Amb. Seymour Weiss, Maj. General Jasper Welch, U.S. Air Force, and Dr. Paul Wolfowitz, then a member of the U.S. Arms Control and Disarmament Agency.

140. See "The Book by Albert Wohlstetter," in Albert and Roberta Wohlstetter, *Proposal to the Ford Foundation*, unpublished, June 30, 1989, p. 13, courtesy of Joan Wohlstetter. Although he

began writing this memoir, he never completed it. Drafts of the first chapter are available at the Wohlstetter Papers, housed at the Hoover Institution's archives.

141. Albert Wohlstetter, Letter to the Editor, *Washington Post*, January 15, 1977, p. A18.

142. For a critique of "mirror-imaging," see Andrew W. Marshall, *Bureaucratic Behavior and the Strategic Arms Competition*, Santa Monica, CA: Southern California Seminar on Arms Control and Foreign Policy, 1971, esp. pp. 3-6.

143. At a Senate Appropriations Subcommittee hearing that same year, Secretary of Defense Brown made a similar statement: "The Soviets have really been quite single-minded. They increased their defense expenditures as we increased ours. And they increased their defense expenditures as we decreased ours." See Secretary of Defense Harold Brown, testimony, January 31, 1979, in *Department of Defense Appropriations for Fiscal Year 1980*, hearings before a Subcommittee on Appropriations, U.S. Senate, 96th Congress, 1st session, Washington, DC: U.S. Government Printing Office, 1979, p. 278

144. Thomas C. Schelling and Morton H. Halperin (with research assistance by Donald Brennan), *Strategy and Arms Control*, New York: Twentieth Century Fund, 1961, p. 2. Schelling, Halperin, and Brennan continue:

The essential feature of arms control is the recognition of the common interest, of the possibility of reciprocation and cooperation even between potential enemies with respect to their military establishments. Whether the most promising areas of arms control involve reductions of certain kinds of military force, increases in certain kinds of military force, qualitative changes in weaponry, different modes of deployment, or arrangements superimposed on existing military systems, *we prefer to treat as an open question* (emphasis added).

145. Alain C. Enthoven, "1963 Nuclear Strategy Revisited," in Harold P. Ford and Francis X. Winters, S.J., eds., *Ethics and Nuclear Strategy?* Maryknoll, NY: Orbis Books, 1977, pp. 76-77. See also Charles Fairbanks, "MAD and U.S. Strategy," in Henry Sokolski,

ed., *Getting MAD: Nuclear Mutual Assured Destruction, Its Origins and Practice*, Carlisle, PA: Strategic Studies Institute, November 2004, pp. 137-147.

146. Alain C. Enthoven and K. Wayne Smith, *How Much Is Enough? Shaping the Defense Program, 1961-1969*, New York: Harper & Row, 1971, p. 195, italics added. As Enthoven later wrote, the assured destruction metric:

. . . was a criterion for adequacy of our deterrent; *it was not a declaration of how the forces would actually be used in case of war*. Since the amount of forces we needed to achieve the assured destruction mission were not very sensitive to the size of the Soviet offensive forces, this policy appeared to put a ceiling on U.S. offensive force requirements [emphasis in original].

See Enthoven, "1963 Nuclear Strategy Revisited," pp. 76-77.

147. President John F. Kennedy, "State of the Union Address," January 11, 1962.

148. Quoted by William W. Kaufmann, *The McNamara Strategy*, New York: Harper & Row, 1971, p. 116.

149. As I researched the history of the Long Range Research and Development Planning Program, I learned a great deal from conversations with Dr. Stephen Lukasik, the former Advanced Research Projects Agency director who had co-initiated the study in the early 1970s. I also gained considerable historical background from the following paper: Andrew May and Bartlett Bulkley, *The Pre-History of the Revolution in Military Affairs*, unclassified draft report for Hicks & Associates' Strategic Assessment Center, McLean, VA: SAIC, February 2004, available from www.albertwohlstetter.com/writings/SovietRMA.

150. Colonel General N. A. Lomov, ed., *Scientific-Technical Progress and the Revolution in Military Affairs (A Soviet View)*, translated and published under the auspices of the U.S. Air Force, Washington, DC: U.S. Government Printing Office, 1973. available from www.albertwohlstetter.com/writings/SovietRMA.

151. D. A. Paolucci, *Summary Report of the Long Range Research and Development Planning Program*, Draft, February 7, 1975, TOP SECRET, declassified on December 31, 1983, pp. 6-7, available from www.albertwohlstetter.com/writings/LRRDPP. Copy of report courtesy of Andrew May.

152. *Ibid.*, p. 7.

153. *Ibid.*, pp. 29-42.

154. *Ibid.*, pp. 21-28.

155. *Ibid.*, pp. 17-20.

156. *Ibid.*, pp. 23-24.

157. Albert Wohlstetter and Henry S. Rowen, "Objectives of the United States Military Posture."

158. See Wohlstetter, *Strength, Interest, and New Technologies*.

159. For example, see Albert Wohlstetter and Henry S. Rowen, "Objectives of the United States Military Posture"; Wohlstetter, "Arms Debate: Letter in Response to 'The Megadeath Intellectuals,'" *New York Review of Books*, Vol. 1, No. 9, December 26, 1963; and "Sin and Games in America," in Martin Shubik, ed., *Game Theory and Related Approaches to Social Behavior*, New York: John Wiley & Sons, Inc., 1964, pp. 209-225.

160. For example, see Albert Wohlstetter *et al.*, "The Debate on Military Policy: How Much is Enough? How Mad is MAD?" in Fred Warner Neal and Mary Kersey Harvey, eds., *Pacem in Terris III*, Vol. 2 of 4, Washington, DC: Center for the Study of Democratic Institutions, 1974, pp. 37-43; Wohlstetter, "Threats and Promises of Peace: Europe and America in the New Era," *Orbis*, Vol. 17, No. 4, Winter 1974, pp. 1107-1144; "Varying Response with Circumstance in Europe," in Johan Jørgen Holst and Uwe Nerlich, eds., *Beyond Nuclear Deterrence: New Aims, New Arms*, New York: Crane Russak, 1977, pp. 225-238; "Bishops, Statesmen, and Other Strategists on the Bombing of Innocents," *Commentary*, Vol. 75, No. 6, June 1983, pp. 15-35; "Between an Unfree World and None: Increasing Our Choices," *Foreign Affairs*, Vol. 63, No. 5, Summer 1985, pp. 962-994.

161. *Discriminate Deterrence*, report of the Commission on Integrated Long-Term Strategy, Washington, DC: U.S. Government Printing Office, January 1988, p. 64, emphasis added, available from [www.albertwohlstetter.com/writings/Discriminate Deterrence](http://www.albertwohlstetter.com/writings/DiscriminateDeterrence). For a critical review, see, e.g., Paul Kennedy, "Not So Grand Strategy," *New York Review of Books*, Vol. 35, No. 8. May 12, 1988, pp. 5-8. For Albert's reaction to such critical reviews, see Wohlstetter, "Overseas Reactions to *Discriminate Deterrence*," *Atlantic Community Quarterly*, Vol. 26, No. 3, Fall-Winter 1988, pp. 234-269.

162. See Andrew May and Bartlett Bulkley, *The Pre-History of the Revolution in Military Affairs*.

163. On November 5, 1985, President Reagan awarded the Medal of Freedom to Albert and Roberta Wohlstetter, as well as to Paul H. Nitze.

164. "The Book by Albert Wohlstetter," in Albert and Roberta Wohlstetter, *Proposal to the Ford Foundation*, unpublished, June 30, 1989, p. 17, courtesy of Joan Wohlstetter. He began, but never completed, this memoir. See also Wohlstetter, *The Cumulative Information Revolution and the Future Role of Discriminate Military Force in U.S. Strategy*, proposal to the Smith Richardson Foundation, revised June 12, 1991, courtesy Joan Wohlstetter.

165. Published writings by Albert Wohlstetter on the topic of Persian Gulf contingencies in the late 1970s and early 1980s include Wohlstetter, "'Lesser' Excluded Cases," opinion, *The New York Times*, February 14, 1979, p. A25; "Half Wars and Half Policies in the Persian Gulf," in W. Scott Thompson, ed., *National Security in the 1980s: From Weakness to Strength*, Washington, DC: Institute of Contemporary Studies, 1980; "Meeting the Threat in the Persian Gulf," *Survey*, Vol. 25, No. 2, Spring 1980, pp. 128-188; "*Les États-Unis et la Sécurité du Golfe*," *Politique Étrangère*, Vol. 46, No. 1, March 1981, pp. 75-88. For unpublished writings by Albert on Persian Gulf contingencies, some of which were commissioned by the U.S. Government, see Wohlstetter, *Interests and Power in the Persian Gulf*, Vol. 1: *Overview*, PH-80-4-113700-42C, draft final report prepared for the Director of Net Assessment (Office of Secretary of Defense), the Assistant Secretary of Defense (Program Analysis and Evaluation), and the Assistant Secretary of Defense (International Security Affairs), in partial fulfillment of DNA 001-

78-C-0353 , Marina del Rey, CA: Pan Heuristics, March 31, 1980, courtesy Joan Wohlstetter; *Protecting Persian Gulf Oil: U.S. and Alliance Military Policy*, in *Report on Persian Gulf Oil and Western Security*, Vol. III, Final Report prepared for the U.S. Department of Energy, Contract No. HN-LV-79-2, PH80-11-LV7902-60C, Marina del Rey, CA: Pan Heuristics, November 4, 1980, courtesy Gregory S. Jones; and *Interests and Power in the Persian Gulf: Executive Summary*, draft, Marina del Rey, CA: Pan Heuristics, February 1981, courtesy Gregory S. Jones; and *Interests and Power in the Persian Gulf: An Overview*, Marina del Rey, CA: Pan Heuristics, February 1981, courtesy Gregory S. Jones.

166. See Albert Wohlstetter, "Iraq: Dictatorship Is the Problem," opinion, *Washington Post*, April 24, 1991; Wohlstetter and Fred S. Hoffman, "The Bitter End," *The New Republic*, Vol. 204, No. 17, April 29, 1991, pp. 20-24; Wohlstetter, "Wide Open Secret Coup," *The National Review*, Vol. 44, No. 5, March 16, 1992, pp. 34-36; "Help Iraqi Dissidents Oust Saddam," opinion, *Wall Street Journal*, August 25, 1992; and "High Time," *National Review*, Vol. 45, No. 3, February 15, 1993, pp. 30-33.

167. See Albert Wohlstetter, "The Balkan Quagmire: Why We're in It—Still," opinion, *Wall Street Journal*, July 1, 1993, p. A14; "The Balkan Quagmire II: The Way Out," opinion, *Wall Street Journal*, July 2, 1993; "Genocide by Embargo," opinion, *Wall Street Journal*, May 9, 1994, p. A14; "Arms, Not Words, for Bosnia," opinion, *Wall Street Journal*, May 12, 1994, p. A14; "Notes to Clinton on Bosnia," opinion, *Wall Street Journal*, June 10, 1994, p. A10; "Too Many Flip-Flops," opinion, *Washington Post*, June 26, 1994; "Embargo the Aggressors, Not the Victims," opinion, *Wall Street Journal*, June 28, 1994, p. A18; "Creating a Greater Serbia: Clinton's Final Sell-Out of Bosnia," *The New Republic*, Vol. 211, No. 5, August 1, 1994, pp. 22-27; "Bosnia: Air Power, Not Peacekeepers," opinion, *Wall Street Journal*, December 9, 1994, p. A16; "Inferior U.N. or Superior Coalition Force?" opinion, *Wall Street Journal*, May 3, 1995, p. A14; "Beyond the Cold War: Foreign Policy in the 21st Century; Alternatives to Negotiating Genocide" (with Gregory S. Jones), opinion, *Wall Street Journal*, May 3, 1995, p. A14; "Chirac's Challenge on Bosnia," opinion, *Wall Street Journal*, July 20, 1995, p. A12; "Relentless Diplomacy and Mass Murder," opinion, *Wall Street Journal*, September 5, 1995, p. A14; "NATO: Precise Power, Incoherent Goals," opinion, *Wall Street Journal*, October 19, 1995, p. A22; "Magic Tricks Can't Disguise

This About Bosnia," opinion, *Wall Street Journal*, November 15, 1995, p. A20; "Since Bosnia Has Been Reduced to This...," opinion, *Wall Street Journal*, December 12, 1995, p. A20; "The Cold War is Over and Over and. . .," opinion, *Wall Street Journal*, October 1, 1996, p. A22; "A Photo-op Foreign Policy," opinion, *Wall Street Journal*, October 23, 1996, p. A22; and "Boris Yeltsin as Abraham Lincoln," in Stjepan G. Meštrovic, ed., *The Conceit of Innocence: Losing the Conscience of the West in the War Against Bosnia*, College Station, TX: Texas A&M University Press, 1997, pp. 200-207.

168. See Albert Wohlstetter and Margaret Thatcher, "What the West Must Do in Bosnia," an open letter to President William J. Clinton, opinion, *Wall Street Journal*, September 2, 1993, p. A12.

169. See Albert Wohlstetter and Gregory Jones, "'Breakthrough' in North Korea?" opinion, *The Wall Street Journal*, November 4, 1994, p. A12.

170. Quoted by Fialka, "Veteran 'Lone Ranger' Strategist Packs Firepower with Cold-Eyed Outlook on Soviet Nuclear Policy," p. 56.

171. President Ronald Reagan, "Remarks at the Presentation Ceremony for the Presidential Medal of Freedom," East Room, White House, Washington, DC, November 5, 1985, available from www.reagan.utexas.edu/archives/speeches/1985/110785a.htm.

172. Quoted by Herzog, p. 68.

173. James Digby and J. J. Martin, "On Not Confusing Ourselves: Contributions of the Wohlstetters to U.S. Strategic Thought," in Marshall, Martin, and Rowen, *On Not Confusing Ourselves: Essays on National Security Strategy in Honor of Albert and Roberta Wohlstetter*, quotes from pp. 5 and 3.

174. Roberta Wohlstetter, *Pearl Harbor: Warning and Decision*, p. 401.

175. Albert Wohlstetter, *No Highway to High Purpose*, emphasis added.