GETTING MAD:
NUCLEAR MUTUAL ASSURED DESTRUCTION, ITS ORIGINS AND PRACTICE

Edited by
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PREFACE

Nearly 40 years after the concept of finite deterrence was popularized by the Johnson administration, nuclear Mutual Assured Destruction (MAD) thinking appears to be in decline. The United States has rejected the notion that threatening population centers with nuclear attacks is a legitimate way to assure deterrence. Most recently, it withdrew from the Anti-Ballistic Missile Treaty, an agreement based on MAD. American opposition to MAD also is reflected in the Bush administration's desire to develop smaller, more accurate nuclear weapons that would reduce the number of innocent civilians killed in a nuclear strike.

Still, MAD is influential in a number of ways. First, other countries, like China, have not abandoned the idea that holding their adversaries' cities at risk is necessary to assure their own strategic security. Nor have U.S. and allied security officials and experts fully abandoned the idea. At a minimum, acquiring nuclear weapons is still viewed as being sensible to face off a hostile neighbor that might strike one's own cities. Thus, our diplomats have been warning China that Japan would be under tremendous pressure to go nuclear if North Korea persisted in acquiring a few crude weapons of its own. Similarly, Israeli officials have long argued, without criticism, that they would not be second in acquiring nuclear weapons in the Middle East. Indeed, given that Israel is surrounded by enemies that would not hesitate to destroy its population if they could, Washington finds Israel's retention of a significant nuclear capability totally "understandable."

Then, there is the case of India and Pakistan, two countries allied with the United States in its war against terror. Regarding these countries' nuclear arsenals, U.S. experts argue, is to help these nations secure their nuclear capabilities against theft. To help "stabilize" the delicate nuclear balance between India and Pakistan, they argue, it might be useful for the United States to help enhance each country's nuclear command and control systems. Yet, U.S. officials have opposed these two nations' efforts to perfect their arsenals for battlefield applications and nuclear war-fighting use. Instead, U.S. officials have urged both India and Pakistan to keep their forces to the lowest possible levels and develop them only for deterrent purposes. This is understood to mean only targeting each others' major cities.

Implicit to all this talk is the assumption that a nation's security is, in fact, enhanced by acquiring a relatively modest but secure nuclear arsenal (i.e., one most likely to be used only to strike large, soft targets, such as cities). Certainly, the underlying premise of MAD thinking—that small

nuclear states can deter aggression by large nuclear states—is still popular. Iraq, we are told, might have held America off in 1991 or 2001 had it actually possessed nuclear arms. Similarly, the contrast between U.S. and allied generosity toward North Korea and the harsh treatment doled out to Saddam is usually explained by referring to the likelihood of North Korea having nuclear weapons and of Iraq clearly not.

Why should we care about such MAD-inspired notions? They make U.S. and allied efforts to prevent the spread of nuclear weapons much more difficult. If, as MAD thinking contends, nations can deter aggression by having the ability to successfully launch a nuclear attack against a significant number of innocent civilians, acquiring a nuclear arsenal will increasingly be seen as the best way for states to protect themselves. Aggravating this inclination is the relaxation of Cold War alliance constraints. Without the threat of global nuclear war and the guarantees of security from blocs of large powerful nations, traditional security alliances are weaker. As a result, the desire of nations to go their own way has increased. MAD thinking has only egged them on. As more and more nations become nuclear-ready or armed, our own leaders, finally, will want to downplay such developments insisting that a kind of mutually deterred peace among such nations is actually plausible.

The link between MAD-inspired thinking and nuclear proliferation, though, does not stop here. MAD assumptions are also at the root of what has become a nuclear technology sharing prone reading of the Nuclear Nonproliferation Treaty (NPT). Because nuclear weapons can deter aggression, nations have a right to them. It follows that nations should be compensated for not exercising this right by giving them the freest possible access to nuclear technology under occasional nuclear inspections—i.e., access to all that nations need to come within weeks of acquiring a nuclear weapons arsenal of their own.

It is this view of the NPT that President Bush's nuclear nonproliferation proposals of February 11, 2004, were intended to reverse. These proposals include freezing the export of controlled nuclear commodities to nations that have not renounced acquiring nuclear reprocessing and enrichment. Whether or not these proposals will succeed is still unclear. What will determine their fate, as much as any other factor, is whether or not the United States and its allies can convincingly repudiate the MAD assumptions that underlie the lax view of the NPT's constraints.

The aim of this volume is to assure that our policymakers have the tools to do this. At the start of the NPEC's work on this book, a review of the literature concerning nuclear planning was conducted. It highlighted the dearth of historical publications on either the origins or the practice of

MAD. Certainly, a clear account of the premises behind MAD's original argumentation and a critical assessment of the extent to which this theory was applied by nuclear weapons states are needed to develop sound alternative policies. It is hoped that this book, which details the origins and practice of MAD and highlights sounder alternatives, will fill this gap in the literature and encourage debate about how best to supplant what's MAD that remains.

HENRY D. SOKOLSKI
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INTRODUCTION

Henry S. Rowen

Nuclear weapons were introduced to the world in an era when cities were being massively bombed. That became their immediate, and has been their only, use so far. After Hiroshima and Nagasaki, they were still viewed as only for civilian destruction, a belief that was reinforced by the fact that fission weapons, with a thousand-fold release of energy compared with their conventional predecessors, were soon succeeded by thermonuclear ones capable of another thousand-fold-plus yield. Thermonuclear bombs were the ultimate in terror weapons.

The large-scale attacks on cities in Word War II, as Richard Mueller notes in Chapter 1, were accompanied by a moral numbness. There were objectors to mass killings, but they were neither numerous nor effectual. After World War II, a popular movement against nuclear weapons arose, but it did not deflect programs that moved the technology ahead, or slow weapons production in the United States and the Soviet Union, or prevent Britain and France from acquiring them.

For the United States, assigned targets in the Soviet Union were industrial or military establishments. The location of many military-industrial targets in or near cities meant the possibility of huge numbers of civilian deaths. This was due to the high yields of the weapons combined with low delivery accuracies. As in World War II, collateral damage to civilians was seen as a plus, not a minus.

As long as the United States had a monopoly on nuclear weapons, all was well, at least from an American perspective. But this monopoly lasted only 4 years. When it ended in 1949, complications arose: the Russians eventually would be able to attack our cities; it made a class of military forces, specifically those assigned to carry these bombs, highly desirable as targets. The latter possibility was first clearly identified by the RAND Corporation in the early 1950s.[1] According to a recent book by Philip Taubman, it had a galvanizing effect on defense officials in Washington.[2] It gave a big boost to reconnaissance technologies to better observe Soviet programs. Actions were also

taken to reduce the vulnerability of the U.S strategic bomber force, most obviously by immediately putting our strategic bombers on high alert. The Russians' development of a nuclear bomb created another problem—the stability of the nuclear balance. To wit, if an opponent's nuclear delivery force was vulnerable, there could be a large advantage in striking first rather than waiting to be struck. The incentives to attack preemptively increases if both sides have vulnerable strike forces. This was the famous "delicate balance of terror" first introduced to the public by Albert Wohlstetter in 1959.[3]

Starting in the mid-1950s more actions to protect our long-range forces were taken: the hardening and dispersal of land based missiles, the building of the submarine missile force, and the protection of our command and control apparatus. (The protection of command and control was harder than one might assume, both because it was not designed for survival and because of the need for concentrated control of these dangerous weapons.) Because Soviet offensive capacities were also improving rapidly, there was a continual probing to identify our vulnerabilities. Vulnerabilities emerged, especially as missile accuracies got better.

In hindsight, perhaps the most important aspect of the nuclear competition in the Cold War was the Soviet Navy's inability to locate our missile submarines along with the U.S. Navy's ability to track Soviet ones, including those carrying missiles, a topic Harvey Sapolsky details in his chapter. Eventually, the Russians quieted their subs and restricted their operations to remote so-called bastions. These steps offered them better protection, but their quiet subs were deployed in substantial numbers only in the 1980s—late in the Cold War. They also built large, protected land-based forces, including mobile intercontinental ballistic missiles (ICBMs). These actions by both countries went far in reducing the preemptive attack instability of the balance.

A widely held belief from 1949 on was that nuclear war could not happen, especially as both sides acquired large and protected forces. However, there were several arguments why it could, nevertheless, occur. One was the temptation to threaten use of nuclear weapons in support of a vulnerable position, most prominently ours in Western Europe. How could it be rational to adopt a strategy that if carried out would have resulted in vast devastation—including to

its purported beneficiary, Europe? The idea was that Soviet leaders would recognize the dangers of invading Europe, perhaps less for concern of a carefully decided American nuclear response than that an unplanned event, perhaps in the fog of war, could somehow lead to nuclear weapons being launched. Thomas Schelling labeled this phenomenon "The threat that leaves something to chance." That brinkmanship was not just an analytic artifact was illustrated by Secretary of State John Foster Dulles's doctrine of "massive retaliation." This doctrine called for an American nuclear response to a Soviet attack on Europe, and was introduced several years after the Soviet Union acquired nuclear weapons.

The situation in Europe with growing numbers of these weapons (ultimately thousands) in the West, and also many in the East, made concerns of nuclear war vivid. Conditions for a crisis were present, especially with respect to Berlin. Its protection depended on the threat of escalating violence if Western access was restricted, as it had been in 1948 and as was threatened again in the early 1960s.

We judged NATO forces to be inferior to those of the Warsaw Pact so the threat to use nuclear weapons first if Europe was in danger of being lost seemed appropriate.[4] In short, the appearance of Mutual Assured Destruction (MAD) doctrine in the 1960s notwithstanding, the United States continued to have a first-use–of-nuclear-weapons policy throughout the Cold War—a fact that rested uncomfortably alongside assertions that nuclear war was impossible. The main setting was Europe (with some consideration of nuclear weapon use in the Korean War) but the notion that such use could or should be limited to that region was never developed or advocated. Among other reasons, it would have been political poison.

Because the doctrine of MAD played a large role in the Cold War (much more on the American than on the Soviet side), it is useful to repeat a succinct definition of it: 1. Don't attack weapons, aim at people; and, 2. Don't defend against the adversary's weapons. Each of these rules had a voluntary and an existential aspect. Justification for the first proposition might be, don't attack weapons because that would be destabilizing and lead to an arms race; or, don't attack weapons because it can't be done successfully. Justification for the second might be, don't defend because it's a bad idea; or, don't

defend because, although it might be desirable, it isn't feasible. These different justifications produced some confusion.

Before MAD there was Assured Destruction (AD). This construction, detailed by Charles Fairbanks in Chapter 4, came from Secretary of Defense Robert McNamara's endeavor in the early 1960s to hold down Air Force lobbying for thousands of Minuteman missiles. His Systems Analysis Office developed a measure of population and industrial damage to the Soviet Union that was large and deemed sufficient. Allowing for estimated losses to our forces from a Soviet attack, it enabled a cap to be put on our forces well below the Air Force requests. However, AD was described as a "capability," not as a plan for operations.[5]

It was not much of an extension from AD to MAD. MAD was based on the observation that, since only a few nuclear weapons delivered on a city could produce vast damage, why buy more than the number needed to assure that result? As Sapolsky reports, this concept, dubbed "Finite Deterrence," fitted the attributes of the early sea-based ballistic missile system, the Polaris: secure (presumed, and as it turned out, actual) and inaccurate (hence not good against hardened, land-based targets).

If the Soviets saw the nuclear competition as some Americans had come to see it by the mid-1960s, they would rationally decide that building more missiles was a mug's game. Similarly, it was at best a waste—and at worst destabilizing—to make qualitative improvements, such as installing multiple, independent, reentry vehicles (MIRVs) that would enable a single missile to destroy many enemy silos. Increased missile accuracy was deplored. Also deplorable from this perspective was to try to defend against oncoming missiles. As John Battilega shows in Chapter 5, for a long time the Soviet leadership did not see things this way.

Arguably the biggest obstacle to the thorough embracing of MAD by the United States was its commitment to the defense of Europe and its understanding of what was required for Europe's defense. The nuclear link with Europe remained crucial throughout. A huge controversy occurred over the North Atlantic Treaty Organization's (NATO) stationing of Pershing missiles in the 1980s to offset the Soviet SS-20s that had already been deployed. The issue was wholly symbolic but no less important for that fact.

Aside from the escalation of a conflict in Europe, another way nuclear war might come was through a subordinate in the chain of command launching nuclear missiles on his own. The installation of locks, "permissive action links" (PALs), on weapons controlled by higher authority first proposed by Fred Ikle, went far to eliminate that danger. In due course the Russians also installed them but not completely. Long after the event, we learned that the Russian general in charge of the missiles sent to Cuba in 1962 had the authority—and apparently the means—to launch them.

What were we to do if nuclear weapons were used by an enemy? Should the United States carry out massive retaliation? Should it limit further damage through diplomacy or military action or both? Some believed that having a choice between doing nothing and initiating a huge, indiscriminate, nuclear response courted disaster. In any case, much would depend on the context and on what had happened. Our system, and as far as we can tell also the Soviet one, did not cope well with this class of situations, as explained in Tod Lindberg's chapter. Such possibilities provided a strong incentive not to rely on a quick nuclear response to signals of an attack and to have a robust command and control system.

Another response to these dangers was to negotiate limitations on types of weapons or their numbers. The treaty limiting the deployment of defenses of ballistic missiles was the most important example of a limit on types and it fitted MAD doctrine. Nonetheless, in 1967, McNamara came out in favor of a thin ballistic missile defense oriented against the small and unsophisticated Chinese ICBM force and any small, accidental missile attack. There were also advocates of building a large shield. Opponents argued the merits of not defending oneself. On the one hand, they held that ballistic missile defenses would not be technically feasible because of Russian countermeasures. So they would be a waste. On the other, if they worked, they would fuel the arms race and foster preemptive instability. The upshot was the Anti-Ballistic Missile (ABM) treaty in 1972 which severely restricted deployment of defenses and a long period of relatively low spending on research and development (R&D). It was disrupted by President Ronald Reagan's Strategic Defense Initiative in 1983 which expanded R&D on missile defenses. In 2001, President George Bush announced American withdrawal from the treaty.

The ABM treaty came out of a sequence of negotiations that included ones on offensive forces (Strategic Arms Limitation Talks [SALT] and Strategic Arms Reduction Treaty [START]). These symbolized a mutual recognition of the virtue of limiting the size of the nuclear forces, but they had little practical effect on nuclear capabilities.

Central to the MAD way of thinking was the concept of the arms race. The model was a game in which each party tried to out do the other by developing new technologies or fielding more forces. Both parties ratcheted up their capabilities but achieved nothing. If one side deceived itself by thinking it had gained a decisive advantage, it could end in a nuclear war.

Although arms race worries did involve an aspect of reality because there were always reactions and counter-reactions by the players, the model had serious limitations. As Battilega's chapter on Soviet nuclear doctrine describes it, it took a long time for the Soviet side to conclude that nuclear war was unwinnable. They went on developing new types of missiles and fielding them, making nuclear weapons and building air and civil defenses long after our way of thinking said they should not have. To our dismay, they built a missile defense system for Moscow. Although they came to see that it was not sensible to add more nuclear forces, they never accepted that it was a good thing to be vulnerable. In short, they rejected MAD as policy.

The second main defect of arms race thinking was the asymmetry in resources between the two sides. Without endorsing the view that President Reagan's arms buildup in the early 1980s and his support for "Star Wars" missile defenses decisively tipped the Soviet Union into collapse (because there are too many good candidates for this award), in fact the United States was much better able to run the "race" than the Soviet Union was.

Over time, changes in technology invalidated the original assumptions about nuclear weapons causing vast and indiscriminate damage. At first such damage was thought to be a necessary attribute of thermonuclear weapons but, as it turned out, they could be (and were) made small, light, and with low yields. Also, missiles came to be deliverable with great precision (as demonstrated in two Gulf wars). This combination created the possibility of a nuclear

conflict with low collateral damage to civilians, but it still left the considerable worry that actions taken in a conflict would cause huge civilian damage.

One might ask about the connection between the doctrinal debate over MAD and operational plans. There was little direct connection. The case for having something other than a huge Single, Integrated, Operational Plan (SIOP)—what Herman Kahn called a "Wargasm"—began to be made in the 1950s. Not much was done about it until the 1960s. In 1961, McNamara directed the Joint Strategic Targeting Staff to prepare plans that included options limited to strategic offensive forces and related air defenses and to other military targets. However, the planned attacks remained massive, not selective. McNamara also called for the study of "controlled and deliberate" use of weapons. Not much came of these initiatives. Secretary of Defense James Schlesinger tried again in the mid-1970s to create "limited" and "regional" nuclear options, but the theory and planning for them remained unsatisfactory.

The lack of American seriousness about the possibility of nuclear war is vividly described in Bill Odom's chapter on President Carter's inquiries into emergency procedures: "No president before him, it turned out, had ever practiced these emergency procedures, and therefore, no president had ever given the J-3 in the Pentagon guidance as to what the president desired."

The British and French faced many of the same problems as the two larger nuclear powers. They needed (1) to acquire long range delivery systems; (2) to be secure from nuclear attack; (3) to decide how much to invest in this category of arms; (4) to develop targeting doctrines and plans; (5) to have a public explanation for what they were doing; and (6) to work out relations with the United States on some of these matters. Bruno Tetrais, David S. Yost, and Michael Quinlan (chapters 2, 7, and 9, respectively) give excellent accounts of these programs and their rationales.

The British and French situations differed from the American by being closer to the Soviet Union and having fewer resources available. And they were far less willing than was the Soviet leadership to spend large amounts of money on resources. This, together with technical limitations, led them to adopt "counter value" targets, i.e., cities.

The British effort differed from the French in having been started as a joint effort during World War II and with much U.S.-United Kingdom (UK) cooperation. Quinlan discusses the dual nature of British planning: for a UK-only case (formulated as a "Second Centre" of decision making within the Alliance) and for participation with the United States as the other case. The "Second Centre" argument was that if the United States held back from responding in a conflict, Britain was capable of doing so independently. He also addresses British use of American weapons, notably the *Polaris* submarine missile system, and later the *Trident*.

Tetrais labels the French nuclear enterprise, "a program without a strategy." That situation, as this volume shows, was not unusual. The French motivation was to protect its sovereignty, its security, and its great power status. Nuclear weapons were seen as essential to these purposes in which history played a large role (as it also did in the Russian case). The trauma from the defeat by Germany left France determined to protect its security. Moreover, the United States was not seen as reliable.

The doctrine that emerged was essentially one of "minimum deterrence." This was the idea that a country with a small nuclear force could deter a large one from a wide range of threatening actions. The logic was no different from that of Britain or, for that matter, China. France saw minimum deterrence as requiring a mass destruction single strike; there was no room for flexibility or selectivity.

The role of the French nuclear program in the Alliance was fraught with ambiguity. While intended to protect France, it did not preclude a role in the defense of others, especially Germany, which formed a buffer between France and the Red Army. Nor did it preclude cooperation with the United States on certain nuclear contingencies.

A curiosity was the adoption of the *tous azimuts* formulation, one that could be construed as including the United States as a target. Tetrais interprets it as an expression of global ambition that was not followed up with corresponding military programs. It seems to have had no political consequences at least during the Cold War. More troubling was the notion of French actions "triggering" the use of U.S. forces in the defense of Europe. This was not argued explicitly

but was, quite naturally, met with American hostility. Again, its practical consequences were small.

Yost, in his chapter on France's nuclear strategy, emphasizes the shift to a dual approach after the collapse of the Soviet Union. One approach preserves a nuclear capability against the possibility of a new great power threat emerging at some point in the future. The other is addressed to smaller, regional countries that possess weapons of mass destruction. With regard to the latter there has been more emphasis on selectivity and discrimination in recent years along with associated military capabilities. However, the overarching rhetoric emphasizes the expected "non-use" of such weapons.

From an American perspective, the British and French nuclear forces were a complication, but not a huge one. Each was determined to have nuclear forces independent of American control. Each was faced with a formidable Soviet nuclear force and neither had the option of defending itself on the battlefield by using these weapons. In the end such defense was not seen as feasible by the Americans or the Soviets either. The main complication was the possibility of either government independently using nuclear weapons and thereby triggering a wider conflagration or disrupting an ongoing conflict. It hardly needs to be said that the likelihood of such actions was seen as quite small by everyone.

China's program under Mao, as presented by James Mulvenon in Chapter 8, was distinctive in publicly disparaging the importance of nuclear weapons. Its public face notwithstanding, the urgency with which the regime pursued their acquisition, including the prominence of nuclear weapons in the tension and ultimate break between Beijing and Moscow, shows the high importance that was attached to getting them. In any case, once possessed, Beijing's rhetoric evolved in an implicitly MAD direction. Mulvenon argues that it did not stop there and points to the growth of a stockpile of tactical weapons that look designed to be used in local conflicts. China, after all, borders on more nuclear weapon-possessing countries than any other (India, Pakistan, Russia, and presumably North Korea). Plus, it faces U.S. forces in its neighborhood. The evidence that China is investing in a full, intercontinental counterforce posture is scant; it is much more likely that it is building a nuclear war-fighting force at the regional level.

Mark T. Clark, in Chapter 10, challenges the widespread assumption that the Small Nuclear Powers will adopt mini-MAD operational doctrines. He discusses four of them: India, Pakistan, Israel, and South Africa and sees all as having considered or adopted nuclear war-fighting doctrines. But this is a heterogeneous set about which generalizations are suspect.

South Africa is a curious case because it has always been difficult for outsiders to understand the threats that pushed the regime over the brink to getting nuclear weapons. Clark offers some explanations that have varying degrees of plausibility. MAD was not one of them. Anyway, in due course South Africa disposed of its weapons.

Israel is a much more serious case. Its technologies are advanced, it has real enemies with whom it has fought three wars since 1948, and its doctrines are shrouded in secrecy and ambiguity. Clark says, plausibly, that Israeli nuclear forces were vulnerable to a Soviet nuclear attack, and that Israel wanted, and perhaps acquired, the ability to deliver nuclear weapons against it.

According to Clark, there is disagreement about Israeli concepts for use. Is use for counter value (i.e., cities) or for battlefield use? Is it to deter a large conventional attack or chemical, biological or nuclear attacks? Or should they be used to preempt enemy nuclear attack? Or is it intended to provoke U.S. intervention to prevent its use of these weapons? Perhaps it is all of the above, and more.

India, Pakistan, and China (along with China, Russia and presumably North Korea) share the distinction of having three-way nuclear-weapon borders. This pattern makes for complications that are poorly understood, certainly for outsiders and perhaps also for the participants.

Clark observes that India's public nuclear doctrine is unclear, including who is the main enemy: China, Pakistan, or the United States? Its National Security Advisory Board calls for forces designed for "punitive retaliation," a triad of aircraft, mobile land-based missiles and sea-based assets; a robust command and control system controlled by the prime minister, a no-first-use pledge, and a strong conventional force. The operational implication of these words is not clear. The development of short-range weapons also suggests a desire to be able to use them on the battlefield. This is a capability that suggests a focus on Pakistan rather than China.

For many years, the low level Indian-Pakistani conflict over Kashmir has had the potential to escalate to much higher levels of violence. Does the possession of nuclear weapons by both sides lower the odds of this, perhaps to nearly zero? It is too soon to know. What is clear is the need for protected and controlled nuclear forces on both sides.

Although there is a question about the primary orientation of India's nuclear program, this is not true of Pakistan's. It is designed to deter or defend against a stronger India. Unsurprisingly, Pakistan has not adopted a no-first-use pledge. Its doctrine might involve stages of escalation from a purely demonstrative use of nuclear weapons to battlefield use to counterforce to, as a last resort, counter value targets. If this is true, it decidedly is not a MAD one.

There are many important questions about Pakistan's nuclear program, including the control of the weapons. The military are evidently in charge of them, not prime ministers. There are also questions about the political stability of the country and who might in a period of turmoil get a hold of these weapons.

These considerations give rise to this book's last chapter by Henry Sokolski (Chapter 12). In it, Sokolski argues that any sound approach to controlling nuclear nonproliferation must eschew MAD-inspired assumptions, especially the notion that nations have a right to acquire nuclear weapons, and, therefore, should be compensated for not exercising this right. This thinking dominates the current popular reading of the Nuclear Nonproliferation Treaty (NPT). Sokolski argues that a new interpretation needs to be given to the NPT, or that the original 1958 Irish proposal for such a treaty should be revived. The Irish proposal gave no nation the "right" to atomic explosives or to be compensated for restraint with unrestricted access to so-called "peaceful" technologies (that in reality has brought many countries close to having bombs).

As part of an overall, bolder strategy for dealing with the spread of these weapons, he urges actively contesting the notion that anyone has a natural right to these weapons; i.e., no longer saying that possession is "understandable." Sokolski also suggests being much more rigorous in enforcing rules on nuclear-technology transfers, and for a larger reduction than planned in the nuclear stockpiles of the United States and its allies. He also proposes nontechnological

carrots as well as sticks for those countries that will be reluctant to go along with this strategy. He suggests, for example, in the case of Russia, that Washington remove U.S. nuclear weapons from Europe as a sweetener. He argues that the alternative for not taking such action is to continue to let the NPT be implemented in a manner that facilitates more states becoming nuclear weapons ready as North Korea has become.

That we averted disaster during the Cold War is considerable evidence in support of Mark Twain's saying that God protects fools, drunkards, and the United States of America. We—and others as well—will have to be much more serious than we have been about the dangers from nuclear weapons being in the hands of those prepared to use them.

ENDNOTES - INTRODUCTION

1. A. J. Wohlstetter, F. S. Hoffman, R. J. Lutz, and H. S. Rowen, "Selection and Use of Strategic Air Bases," RAND, R-266, April 2, 1954.

2. Philip Taubman, *Secret Empire*, New York: Simon & Schuster, 2003, p. 12.

3. Albert Wohlstetter, "The Delicate Balance of Terror," *Foreign Affairs*, January 1959.

4. This was despite work in the Pentagon in the early 1960s making the case that we either did not or need not have conventional inferiority at NATO's spending level. Army Lieutenant Colonel Jack Rogers, then in the Office of the Secretary of Defense (ISA), observed that NATO, having more soldiers and armor than the Warsaw Pact, ought to win a conventional war, contrary to the standard view. If the standard view were correct, it must be because of a defect in NATO organization. But the standard view might be wrong. The Systems Analysis Office, under the direction of Alain Enthoven, developed this insight and gave it prominence. It turned out to be convenient to various interests in the United States and Europe to stay with the position that NATO was conventionally inferior. The doctrine of first use of nuclear weapons remained.

5. As Charles Fairbanks explains in his chapter, in Ann Arbor in 1962, McNamara said,

> . . . to the extent feasible, basic military strategy in a possible general 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 major military attack on the Alliance, should be the destruction of the enemy's military forces not of his civilian population.

Robert McNamara, speech to NATO, Athens, Greece, May 5, 1962. Many European officials found this disturbing because it seemed to make nuclear war thinkable.

PART I

THE ORIGINS OF MAD THINKING

CHAPTER 1

THE ORIGINS OF MAD: A SHORT HISTORY OF CITY-BUSTING

Richard R. Muller

INTRODUCTION

The 20th century was the age of total war, and nothing symbolized that dreadful era more than the bombardment of civilian populations from the air. From its halting beginnings in the First World War, in which 1,141 Britons lost their lives, strategic bombing evolved into the mass air raids of the Second World War, in which some 52,000 British, 330,000 Japanese, and anywhere from 300,000 to 1,000,000 German civilians perished. Nations poured scarce blood and treasure into the development and manning of vast bomber fleets capable of carrying the war directly to enemy economic and population centers in the hope that this investment would prove decisive in modern warfare.[1]

The underlying rationale for strategic air warfare predates the reality of manned powered flight. Before the arrival of the machine age, wars were fought primarily between the armed forces of the belligerents. The 19th century Prussian military theorist Carl von Clausewitz noted that, while the "center of gravity . . . the hub of all power and movement" of an enemy state was normally its army, it could also be the capital, a key ally, or even public opinion.[2] National power, therefore, could not be measured solely in terms of traditional military capability. Political will, economic productivity, transportation, commerce, and communications became increasingly important factors in struggles between the great powers. The advent of the commercial, financial, and industrial revolutions brought with it the rise of the modern urban center, in which many of these elements were concentrated. The onset of total war, and improvements in the technical means of waging it, brought about a blurring of the distinction between combatants and noncombatants, and placed hitherto protected aspects of a nation's

civil and economic life in the firing line. Steam-powered warships and submarines made a sustained blockade of an enemy nation practicable. Its victims would be the entire population, not just the enemy's military force. The development of the long-range bomber meant that the vitals of an enemy nation would come under direct attack in a manner even the most sanguine 19th century statesmen and soldiers could scarcely have imagined. In the process, war against civilians returned to a level not seen since the Thirty Years' War.

This chapter will examine the evolution of the concept of aerial attacks against cities—the intellectual underpinnings of Mutual Assured Destruction (MAD). It will trace in broad outline the evolution of the theory and practice of attacking cities from the air. While a complete history of the development of air power is outside the scope of this project, this historical survey will examine the major "milestones" on the road to MAD. Included will be an examination of technology, theory, and changing military and civilian beliefs in the efficacy of targeting economic and population centers.

"Strategic bombing" is a much-used term, but in its 20th century context it generally refers to air attacks on the vital centers of an enemy state—its industries, ports, transportation networks, and other key targets often far removed from the fighting fronts. The central idea—and much of the allure—stemmed from air power's putative ability to bypass the enemy's military forces and strike directly at the sources of national power. Obviously, this new method of waging war would have a profound effect upon the civilian population. In some cases, even heavy civilian casualties were the indirect and largely unintended result of attacks on installations—or collections of targets—located in metropolitan areas. Yet there also have been direct attacks on civilians to shatter their morale, to remove skilled labor from the work force, and to compel their leaders to capitulate. These have been carried out as part of a deliberate policy. In practice, motive and effect have been very difficult to disentangle.

THE FIRST WORLD WAR, 1914-18

Any examination of the development of aerial warfare against cities must begin with the First World War. That conflict set the

pattern for industrialized total war between the great powers. Universal conscription put millions of soldiers into mass armies. Civilian economies were mobilized for war production, and national propaganda campaigns stressed that the workers (both male and female) in the factories stood shoulder to shoulder with the combat troops. War extended to the high seas as the German navy launched a U-boat campaign against British supply lines, and the British enacted a "distant blockade" of the Central Powers that ultimately caused the deaths of over one million German civilians. The 1914-18 war also extended to the third dimension. By 1918, the primitive air fleets of the great powers had evolved into modern air organizations, capable of conducting a wide range of combat roles. Airpower's unique contribution to the maturation of total war was the first strategic bombing campaigns against cities.

The first tiny step on the road to MAD occurred in August 1914, when a lone German plane (the "six o'clock *Taube* [dove]") made a series of evening visits to Paris, dropping a handful of light bombs on the City of Light. This quixotic method of attack soon gave way to a more serious and sustained campaign of deliberate attacks on urban areas, designed to shatter enemy morale and disrupt the orderly functioning of modern states.

THE ZEPPELIN RAIDS

Even prior to the First World War, the German High Command recognized the potential striking power and the morale impact of the Zeppelin airship, a remarkable and uniquely German technological innovation. There is no doubt that at the beginning of the war, the Zeppelin was the super weapon of its day, and most prewar "death from the skies" scenarios centered around fleets of airships wreaking havoc on helpless populations, sowing panic, death, and destruction.[3] These visions were not the sole property of novelists, journalists or politicians. Even expert military opinion believed that a force of as few as 20 Zeppelins could ignite thousands of fires in London. Both the Imperial Army and Navy embraced the airship, although it was to be the German Naval Airship Division that pioneered sustained strategic attack against population centers. In 1912, Grand Admiral Alfred von Tirpitz mused, "The indiscriminate

dropping of bombs is . . . repulsive when they hit and kill an old woman . . . but if one could set fire to London in thirty places, then the repulsiveness would be lost in the enormity of the effect."[4]

Tirpitz's prognostications aside, the initial use of the Zeppelin force over Britain was severely restricted on the order of the Kaiser, who had close ties with the British royal family and was sensitive to charges of unleashing "frightfulness." Under pressure from his military advisors, he gradually eased these restrictions, so that by spring 1915 the Zeppelins were free to attack targets in greater London, although the specific aiming points were to be military in nature. This was fine in theory. In practice, the Zeppelins were incapable of precision attack and carried out virtually indiscriminate raids on the British capital. This was especially the case when, in the hope of causing major fires, Zeppelin commanders augmented their high explosive bombloads with incendiaries. British reaction was predictable. There was dramatic and widely reported initial panic, followed by outrage. One British tabloid featured a lurid two-page graphic decrying the "Massacre of the Innocents by Herod, otherwise Wilhelm II, King of the Huns." British defenses soon improved, and losses among the vulnerable hydrogen-filled airships mounted. Ultimately, casualty rates in the Zeppelin division exceeded those of the U-boat arm; the Navy lost 53 of its 73 operational airships. Official German historians noted that the casualties were out of all proportion to any potential benefit, but also observed that the British were forced to retain first-line fighter squadrons, antiaircraft artillery units, and personnel to combat the Zeppelin menace, resources that were sorely needed on the Western Front.

The Zeppelin campaign was by most measures a failure, yet it established some precedents that recurred throughout the "prehistory" of MAD. Through advanced (and highly costly) technical means, a nation sought to strike directly at an enemy's commercial and population centers. What began as an attempt to strike specific military and economic objectives slowly devolved into a campaign aimed directly at the morale of the civilian population. This change was the result of a combination of technical limitations and operational realities. Results fell far short of expectations, although some ancillary benefits did accrue. All of this took place in the context of a modern total war, in which sea blockades attempted

to do much the same thing through more indirect means, and in which the actual fighting fronts were stalemated, in some cases for years. During the year of the heaviest Zeppelin attacks, the British army sustained 60,000 casualties on the first day of the Battle of the Somme, July 1, 1916, and the German and French armies were bled white at Verdun. Attempts to break the stalemate through indirect or technological means would therefore continue.

THE *GOTHA* AND GIANT RAIDS, 1917-18

Except for a few diehards within the Naval Airship Service, most analysts, both British and German, recognized the limitations of the Zeppelin as a strategic bomber. However, when the Germans began attacking London—by day and by night—with large heavier than air bombers, the concept of attacking cities gained new life. During the first 2 years of the war, the rigid airship had considerable advantages over conventional aircraft in terms of range, payload, and endurance. Spurred by the pressures of war, tremendous advances in aircraft design changed this situation. By 1917, multi-engined, long-range aircraft began entering service, and the isolated nuisance raids gave way to sustained attacks on population centers by formations of heavy bombers.

In May 1917, a special heavy bomber unit, equipped with the latest *Gotha* bombers and directly subordinated to the High Command, began conducting brazen daylight attacks against British cities. On June 13, 1917, a formation of 20 *Gothas* soared over central London and prepared to attack the Liverpool Street station. Three bombs hit the target, and the remainder fell within a one-mile radius.[5] One scored a direct hit on a school, killing or wounding 46 young children.[6] During the opening raids of the campaign, the bomber crews were assigned targets such as individual railway stations and communication centers. But, as with the Zeppelin campaign, such a level of precision was a dream. As the raids progressed, German targeting instructions became less and less specific. Ultimately the crews "were told that they were making war on 'the morale of the English people,' sapping their will to fight by showering them with high explosives."[7] As British defenses grew in effectiveness, the Germans switched to night attacks, further degrading accuracy. The

Gothas were joined by four and six-engine "Giant" bombers, some of which carried over two tons of bombs.

Actual physical damage from the series of 27 major raids was slight. Historian Robin Higham famously noted that while the German air raids destroyed some £3,000,000 worth of property, gnawing rats during the same period were accounting for £70,000,000 per year in property damage.[8] The raids did have a considerable effect on British national and political will. At the height of the raids, there were isolated instances of panic in the streets, and British authorities noted a general pattern of absenteeism and economic dislocation. A committee headed by General Jan Christian Smuts was charged with assessing the situation, and on August 17, 1917, issued the "Report on Air Organization." The Smuts committee concluded, "The day may not be far off when aerial operations with their devastation of enemy lands and destruction of industrial and population centers on a vast scale may become the principal operations of war, to which the older forms of military operations may become subordinate." The report contained a number of recommendations; chief among them was the amalgamation of the Royal Flying Corps and Royal Naval Air Service into a single Royal Air Force (RAF). This occurred on April 1, 1918. This combined force could deal with the German aerial threat in a concerted fashion, organizing an efficient home defense organization while conducting independent air operations against German targets.

THE INDEPENDENT FORCE, 1918

Even prior to the recommendations of the Smuts Committee, the Allies had conducted strategic bombardment operations against enemy targets. Efforts by the French to attack "sensitive points" such as blast furnaces in Germany began in 1916, and British naval aircraft successfully attacked Zeppelin sheds well behind the lines. Yet it was the creation of the "Independent Force" under General Hugh Trenchard in early 1918 that established the postwar model of a large, independent bombing force used to deter or attack an enemy. The Independent Force was created in part to fulfill Prime Minister David Lloyd George's promise to "bomb Germany with compound interest." Trenchard initially viewed the concept of "reprisal" raids

against German civilian targets to be counterproductive. In any case, forces for this purpose were not immediately available. Nevertheless, Trenchard bent to his task with a will, and soon became one of the pioneers of "morale bombing."

By mid-June 1918, the Independent Force was ready for action. Although the force was mainly equipped with single engine light bombers that were unsuitable for a systematic strategic campaign, it was receiving increasing numbers of huge Handley-Page 0/400 heavy bombers. These were developed under a Navy contract to produce a "bloody paralyser of an aeroplane." During the last 6 months of the war, the Force conducted scattered raids on cities in western Germany. Trenchard was fully aware that he lacked the forces to strike a truly concentrated blow, and therefore aimed for a morale effect. His civilian masters supported and encouraged this strategy. Sir William Weir, the Air Minister, told Trenchard, "I would like it very much if you were to start a really big fire in one of the German towns. The German is susceptible to bloodiness, and I would not mind a few casualties due to inaccuracy."[9] Yet the limited numbers of aircraft available, mechanical difficulty, combat attrition and bad weather all conspired to limit the effectiveness of Trenchard's offensive.

The Independent Force's actual accomplishments were meager enough, but several factors saved it from obscurity. For one thing, far more ambitious plans were in the works for 1919, including "devastating" attacks on Berlin. For another, the British Air Staff was willing to manipulate the data of the postwar bombing survey to tell a much more optimistic story of significant physical damage and even greater psychological impact. The newly formed RAF therefore could base its postwar organization on a promise of future greatness, buttressed by empirical evidence. In addition, contacts with Trenchard's officers had greatly impressed members of the fledgling U.S. Army Air Service, including General William "Billy" Mitchell and Colonel Edgar S. Gorrell. The latter heavily borrowed from British concepts in formulating an early proposal entitled "Strategical Bombardment." Gorrell argued that the armies of an enemy nation were similar to a tempered steel drill, and that air power could and should bypass the "point" and strike directly at the vulnerable "shank"—the key industries sustaining the combat

forces in the field.[10] As were the ambitious plans of the Independent Force, the so-called "Gorrell Plan" was rendered unnecessary by the November 11, 1918, Armistice.

Strategic airpower and the bombing of cities had certainly not proved decisive in the First World War, but the conflict established the future importance of air arms. No army, no matter how conservative, contemplated future operations without air superiority, tactical aviation, and aerial observation. These capabilities would continue to evolve and played a much more vital role in World War II. Yet to many airmen, the potential for war-winning independent air operations suggested by the Zeppelin and *Gotha* raids and the mounting campaign of the Independent Force were the most significant lessons. Air power offered the promise of the creation and survival of an independent service and an alternative to the bloodletting in the trenches of Flanders. It was a compelling vision.

YEARS OF FERMENT: THE INTERWAR ERA, 1919-39

The interwar period was a golden age of airpower writing, thought, and debate. Airmen attempted to discern the lessons of the First World War, while at the same time maintaining the position and prestige of the nascent air arms in the face of massive demobilization. The civilian leadership sought to devise effective and affordable defense policies, while at the same time yearning to avoid a repetition of the 1914-18 debacle. Proposals to "ban the bomber," or at least mitigate the effects of air warfare against civilian targets through international agreements such as the Hague Convention, briefly flourished. Alternatively, there were proposals (originating with the French, but also endorsed by Winston Churchill) to hand over all strategic bombers to the League of Nations or some other international body, which would then use them to punish transgressors.[11] These visions of international disarmament or regulation foundered over issues of nationalism, verification, and mistrust. At the same time, broad theoretical arguments concerning the likely employment of air power in some future war began to solidify.

It was Italian General Giulio Douhet who penned the most famous and most systematic vision of a future aerial war. Douhet was

an outspoken critic of the traditional military establishment, and his fertile and acerbic pen earned him house arrest for his intemperate criticisms.[12] Although not a pilot and ignorant of the intricacies of aviation technology, he believed that aircraft were the solution to the dilemma of positional warfare. He was profoundly affected by the futility of industrialized ground warfare and had studied, albeit selectively, the historical lessons of the Great War. The aspects he found particularly striking were the German and Italian air raids on London and Vienna, the collapse of the "home front" in both Tsarist Russia and Wilhemine Germany, and the ability of modern states to sustain "Total War" at the front lines for years. He observed:

> The outcome of the last war was only apparently brought about by military operations. In actual fact, it was decided by the breakdown of morale among the defeated peoples—a moral collapse caused by the long attrition of the people involved in the struggle. The air arm makes it possible to reach the civilian population behind the line of battle, and thus to attack their moral resistance directly. And there is nothing to prevent our thinking that some day that direct action may be on a scale to break the moral resistance of the people even while leaving intact their respective armies and navies. Was not the German Army still able to go on fighting at the time when it laid down its arms? Was not the German fleet turned over intact to the enemy when the German people felt their power of resistance weakening?[13]

Douhet reasoned that advances in aviation technology made it possible to contemplate launching massive attacks against enemy cities from the air, in the first hours of a war. His theory, laid out in a series of articles and books, including *The Command of the Air*, called for a preemptive strike against the enemy's air force. Once "the command of the air" had been achieved, fleets of self-defending "battleplanes" would launch a punishing attack on the enemy's capital and other population and commercial centers with a mixture of high explosive, incendiary, and chemical weapons. Douhet left no doubt as to the likely effect:

> At this point I want to stress one aspect of the problem—namely, that the effect of such aerial offensives upon morale may well have more influence upon the conduct of the war than their material effects. For example, take the center of a large city and imagine what would happen among the civilian population during a single attack by a single bombing

> unit . . . Here is what would be likely to happen to the center of the city within a radius of about 250 meters: Within a few minutes some 20 tons of high explosive, incendiary, and gas bombs would rain down. First would come explosions, then fires, the deadly gases floating on the surface and preventing any approach to the stricken area. As the hours passed and night advanced, the fires would spread while the poison gas paralyzed all life. By the following day the life of the city would be suspended; and if it happened to be a junction on some important artery of communication traffic would be suspended.
>
> What could happen to a single city in a single day could also happen to ten, twenty, fifty cities . . . [14]

Paradoxically, Douhet believed that such a war, however horrible for the crazed and demoralized civilian population, would actually be more humane than the last war. Douhet's wars of the future were over in days or weeks, while the First World War had dragged on for 4 years.

Douhet's later critics pointed out that the Second World War proved him wrong on virtually every count. His absolute belief in the invulnerable "battleplane," the ineffectiveness of air defenses and auxiliary aviation, and the physical and moral effects of air attack, all proved misplaced. His bombers unerringly found their targets, regardless of weather conditions, and destroyed them with geometric precision. Yet his forceful advocacy of independent air power and its potential role in future war resonated with airmen worldwide. "Douhetian" became synonymous with "terror" or "morale" bombing, and first generation nuclear theorist Bernard Brodie cited Douhet as the intellectual forebear of strategic thinking in the atomic age.[15]

While there is some debate as to Douhet's precise impact on individual air forces in the interwar period, there is no doubt regarding Air Marshal Sir Hugh Trenchard's role in the formation and evolution of the Royal Air Force. Unlike Douhet, who in the years after World War I was a semi-retired pundit, Trenchard served 10 years as Chief of Air Staff. He was thus in a position to leave his mark on the thinking, doctrine, and force structure of the RAF. Trenchard emphasized the "moral" (psychological) effect of air attack over the potential for actual physical destruction. This emphasis was a consequence of both the limited destruction actually inflicted

by air attack in World War I and a belief in its ability to terrorize the industrial work force. "At present the moral effect of bombing stands undoubtedly to the material effect in a proportion of 20 to 1," was Trenchard's oft-cited formula. This earned him the title "master of the unfounded statistic" from one historian.[16] Trenchard firmly believed that attacks on the "vital centers" of enemy war industry would cause a wholly disproportionate psychological impact upon the working population, greatly undermining the military power of a nation. While it is clear that Trenchard had objectives in large urban areas in mind when he spoke of these "vital centers," his actual targeting prescriptions, in the words of one historian, were "frustratingly vague."[17] What is evident is that Trenchard's goal was to undermine the morale of the work force. The means to achieve that goal was the destruction of the physical means of production.

Trenchard spelled out the relationship between attacks on civilians and the overall objectives of a future war. He argued in 1928, with a touch of class elitism:

> We shall attack the vital centers of transportation and seriously impede those arms and munitions reaching the battlefield and, therefore, more successfully assist the Army in its direct attack upon the enemy's Army. We shall attack the communications without which the national effort cannot be co-ordinated or directed.
>
> These are the points at which the enemy is weakest. The rifleman or the sailor is protected, armed, and disciplined, and will stand under fire. The great centers of manufacture, transport, and communications cannot be wholly protected. The personnel again who man them are not armed and cannot shoot back. They are not disciplined, and it cannot be expected of them, that they will stick stolidly to their lathes and benches under the recurring threat of air bombardment.[18]

Trenchard thereby offered a rationale for affecting the morale of an enemy population through attacks on key industrial centers. When the RAF began its second air war against Germany, these ideas faced the test of battle.

The final great strategic airpower theorist of the interwar period was Brigadier General William H. "Billy" Mitchell. Mitchell was a diligent student of the evolution of aerial combat in World War I, and was heavily influenced not only by the theories of Douhet

and Trenchard, but also by the combat experiences of the French, British, and German air services. His immediate postwar writings focused on the many ways aviation could contribute to success in battle. Accordingly, he emphasized a wide range of airpower missions, including tactical bombing, air superiority, interdiction, and observation.

Mitchell's thinking in mid-and late 1920s was inextricably bound up in his battle for the independence of the U.S. air arm. Consequently, his emphasis on airpower's potential to strike a decisive war-winning blow loomed ever larger in his writings. Mitchell clearly recognized the increased importance of cities to the functioning of a modern state. He believed, as did Trenchard, that they contained "vital centers" susceptible to destruction from the air. In one of his later works he painted a terrifying, and undeniably Douhetian, picture for a general audience:

> What will future war hold for us? Undoubtedly an attack on the great centers of population. New York, Chicago, Detroit, Pittsburgh, and Washington will be the first targets. It is unnecessary that these cities be destroyed in the sense that every house is leveled to the ground. It will be sufficient to have the civilian population driven out of them so they cannot carry on their usual vocations. A few gas bombs will do that.[19]

With the exception of Trenchard, who personally shaped the RAF for a decade, the impact of these theorists on the future of aerial warfare was indirect. Collectively, these visions of future war contributed to a belief within many of the world's air arms in the offensive potential of the bomber, and its ability to strike at the "soft underbelly" of an enemy nation. Such visions fit in nicely with most air forces' conceptions of themselves as being on the cutting edge of technology. These theories also found a measure of acceptance among civilian policymakers of the day, even as many recoiled from the implications. The air weapon seemed to offer an alternative to maintaining a massive and costly land force, a concept appealing to financially strapped governments of the Depression era.

In the military balance in Europe during the 1930s we also see a clear foreshadowing of a "deterrence regime." Dealing with minuscule interwar budgets and an uncertain national security environment, the RAF sought to create a bomber force that might

function, in concert with the Royal Navy, as a powerful deterrent to any potential adversary. This was a clear legacy of Trenchard's belief in the primacy of "attack as the best defense."[20] As many historians have noted, the interwar RAF favored building impressive numbers of aircraft, while the necessary technological supporting capabilities (target finding, long-range navigation, bad weather instrument flying, etc.) went begging. Trenchard's offensive orientation also caused a general neglect of homeland air defense. It was only the intervention of the Cabinet, aided by some farsighted officers within the Air Staff, who insisted on the creation of a workable air defense system. Their insistance was just in time for the Battle of Britain in 1940.

The German Luftwaffe also pursued a deterrent strategy, based upon an air force's putative capability to devastate enemy population centers in the first days of a war. Shortly after the Nazi seizure of power in January 1933, officers in the still-camouflaged Luftwaffe recommended the creation of a "Risk Air Force," a powerful deterrent fleet of strategic bombers. This force was intended to forestall attack on Germany while more extensive and broadly based armament proceeded apace. While the German aircraft industry proved unequal to the task of constructing the necessary strategic bombers in the mid-1930s, the medium-range, operationally oriented Luftwaffe functioned as a deterrent "shield" to Adolf Hitler's aggressive foreign policy in the late 1930s.[21] Although official German air force doctrine maintained that terror attacks on enemy civilians were to be undertaken only as a last resort, or as reprisal for similar attacks on Germany, Nazi leaders were keenly aware of the fear inspired by the Luftwaffe's putative ability to strike European population centers. Studies of Anglo-French appeasement note that inflated perceptions of German air strength played a considerable role in Allied decisionmaking during the Sudeten crisis of 1938, when the Western allies shrank from the prospect of war over Czechoslovakia.[22]

Although interwar air power theorists and practitioners did not have the experience of a full-scale war between the great industrialized air powers to validate their theorizing, there was plenty of air action, some of which seemed to confirm the beliefs of strategic airpower advocates. This included the bombing of

population centers in China and Spain, and the use of poison gas by Mussolini's *Regia Aeronautica* in Ethiopia. The effect of these experiences is difficult to assess. On one hand, horrific events, such as the Japanese terror bombing of Chinese cities or the promiscuous bombing of the Basque town of Guernica by the Condor Legion in 1937, sharpened public fears of the coming aerial apocalypse. The views of professional airmen, however, were less certain. Many pointed out that Spain, Ethiopia, and China lacked "modern" cities and fully developed air arms. This made it difficult for the RAF, Luftwaffe, or U.S. Army Air Corps to extract meaningful conclusions about the next general war from these "little wars" of the 1930s.

The U.S. Army Air Corps Tactical School at Maxwell Field, Alabama, took the general principles and assumptions of the early theorists and, through an analysis of the U.S. economy, developed a targeting philosophy that identified "key nodes" or "choke points" within modern industrial nations, known as the "Industrial Web." The idea was to develop the means (High Altitude Daylight Precision Bombing) to attack and neutralize these nodes, thereby causing cascading effects throughout the society. Attacks on civilian populations for their own sake were to be avoided, although ACTS left the door open to attacks on the "will" of an enemy populace as a last resort.[23]

Although justifiably pilloried for their "mechanistic" thinking and rejection of Clausewitzian friction,[24] the ACTS thinkers did manage to formalize the nascent "science" of attacking cities from the air. Instead of a vague belief that cities served as vital centers of industrial, political, and moral power, ACTS faculty and students identified specific key industries to be targeted by air attack. The ACTS planners had a unique opportunity to directly translate this theory into practice in the summer of 1941. Asked to develop a "requirements plan" for the looming war against Germany, four ACTS faculty members devised an ambitious air strategy embodied in Air War Plans Division (AWPD)-1, that identified the 154 key industrial targets making up Germany's industrial web. Although the bulk of the plan addressed the likely effects of destroying these precision targets, there was at least an echo of Douhetian attitude embedded within it:

> Morale. Timeliness of attack is most important in the conduct of air operations directly against civilian morale. If the morale of the people is already low because of sustained suffering and because the people are losing faith in the ability of the armed force to win a favorable decision, then heavy and sustained bombing of cities may crush that morale entirely. However, if these conditions do not exist, then area bombing of cities may actually stiffen the resistance of the population, especially if the attacks are weak and sporadic. Hence, no specific number of targets is set up for this task. Rather, it is believed that the entire bombing effort might be applied towards this purpose when it becomes apparent that the proper psychological conditions exist.[25]

ACTS bombardment doctrine, then, emphasized systematic precision attacks against carefully selected industrial targets. The USAAF, by and large, adhered to this belief in precisely targeting the "industrial web" of an enemy nation during its campaign against Germany. Yet the theory left the door open for contemplating attacking cities to strike a "knock-out blow" against enemy morale. Both of these aspects would be evident in operations against Germany, and especially in the Pacific, in 1944-45. It is also worth noting that ACTS "industrial web" targeting principles drove the first generation of nuclear strike plans against the Union of Soviet Socialist Republics (USSR) in the post-World War II period.

THE TEST OF COMBAT: THE SECOND WORLD WAR, 1939-45

THE EARLY CAMPAIGNS

To the surprise of many military and political leaders, World War II did not begin with a series of devastating aerial attacks upon the capitals of Europe. Nevertheless, the early campaigns of the war quickly established that attacks on cities with attendant civilian casualties would be a part of it. Often air attacks were part of a combined-arms operation, and were accordingly dismissed by strategic bombing purists as mere "tactical bombing." Yet the opening rounds of the conflict accelerated the blurring of the line between combatants and civilians.

The German blitzkrieg into Poland on September 1, 1939, saw the Luftwaffe operate in near textbook fashion. Its bomber and

fighter units struck at the Polish air force, removing it as a factor in the campaign in a few short days. The Luftwaffe then turned its attention to supporting the mechanized spearheads of the German army with close air support and interdiction strikes. Yet as Warsaw continued to resist, the Luftwaffe's commanders showed themselves quite capable of advocating direct attacks upon population centers. General Wolfram von Richthofen, commanding one of the air corps in that campaign, called for "exploitation of last opportunity for large scale experiment as devastation and terror raid . . . every effort will be made to completely eradicate Warsaw, especially since it will only be a customs office at the border in the future . . . "[26] Heavy Luftwaffe raids on Warsaw, as well as artillery shelling and the advance of the German army, all helped precipitate the surrender of the Polish capital. In similar fashion, a heavy raid on Rotterdam, although part of "an attack on a defended part of the city within the front line area,"[27] killed 900 civilians, speeding the collapse of the Netherlands the following May.

In the air assault against Great Britain, the Luftwaffe was compelled to wage independent air warfare. For the first months of the Battle of Britain, the German air fleets concentrated on attacking coastal convoys, radar stations, and airfields supporting RAF Fighter Command. London and other population centers remained a prohibited zone. The battle against the RAF failed to produce decisive results, and, with good weather necessary for any invasion attempt receding, some Luftwaffe commanders argued for a massive attack against greater London as a means of drawing the remnants of the RAF up to fight. Small groups of German bombers, lost and low on fuel, had already inadvertently bombed central London, and the RAF had launched several raids against Berlin in response. Hitler lifted the prohibition against attacking London, and on September 7, 1940, the full weight of the Luftwaffe's bomber force pounded London's East End. The German success proved transitory. The shift to London removed the pressure on the RAF's airfields and the Germans now operated at a tactical disadvantage. By late September, the German assault slackened, and the Luftwaffe high command chose to execute a vague strategy of "continued military and economic pressure against Britain." While the German U-boat force increased raids on commerce, the Luftwaffe conducted

a series of night area raids against London and the industrial cities of south and central Britain, most notably Coventry, in November 1940. Although these raids were aimed at destroying military and economic targets writ large, the campaign, known to the British as the "Blitz," seemed aimed directly at civilian morale.

While the Battle of Britain and the "Blitz" of 1940-41 may justifiably be seen as a slow evolution from an air superiority strategy through "economic warfare" to a campaign of largely indiscriminate night bombing, the later German raids on Great Britain were clearly reprisal raids aimed directly at civilian morale. The 1942 "Baedeker Raids," named after the famous tourist guides, targeted British cultural centers in response to British attacks on quaint Hanseatic seaside towns in March and April of that year. Renewed and very costly attacks on London in 1943 and 1944 were a direct reply to the escalating RAF Bomber Command area attacks, in line with Hitler's policy that "Terror can only be smashed with counterterror."[28] And the V-weapons attacks of 1944 and 1945 were undoubtedly intended as pure reprisal or terror campaigns.

In the campaigns in the Balkans and the Soviet Union, the Luftwaffe was stretched thin supporting the German army, and attacks on major urban areas were few. A notable exception was the bombing of Belgrade in April 1941, aptly named "Operation PUNISHMENT," which killed 17,000 civilians. During the campaign against the USSR, the Luftwaffe diverted scarce resources from army support tasks to striking targets in greater Moscow. Although very few of the Luftwaffe's grandiose plans for strategic bombing of Soviet industry and population centers ever came to pass, proposals for "terror attacks"' against Soviet cities were frequently made by Luftwaffe commanders. The air force leadership also acquiesced to a 1941 proposal to "level Moscow and Leningrad and make them uninhabitable, so as to relieve us of the necessity of having to feed the population through the winter."[29]

The relative German lack of success in city destruction should not obscure a more fundamental point. As a recent German commentator on the Allied bombing of German cities concluded:

> Scarcely anyone can now doubt that Air Marshal Göring would have wiped out London if his technical resources had allowed him to do so. Speer describes Hitler at a dinner in the Reich Chancellery in 1940

> imagining the total destruction of the capital of the British Empire: "Have you ever seen a map of London? It is so densely built that one fire alone would be enough to destroy the whole city, just as it did over two hundred years ago. Göring will start fires all over London, fires everywhere, with countless incendiary bombs of an entirely new type. Thousands of fires. They will unite in one huge blaze over the whole area. Göring has the right idea: high explosives don't work, but we can do it with incendiaries; we can destroy London completely. What will their firemen be able to do once it's really burning?" This intoxicating vision of destruction coincides with the fact that the real pioneering achievements in bomb warfare—Guernica, Warsaw, Belgrade, Rotterdam—were the work of the Germans.[30]

Lack of means, not lack of political will, was the limiting factor in the Luftwaffe's offensives in the early part of the war. The Allied bomber fleets of 1943-45 would not be so constrained.

THE STRATEGIC AIR OFFENSIVE AGAINST GERMANY

The most sustained "laboratory" for studying the practice and effects of air warfare against cities took place during the air war in Europe, 1939-45.[31] Many historians maintain that only two "campaigns" lasted the entire duration of the war: the Battle of the Atlantic and the strategic air offensive. Both were indispensable contributors to Allied victory. The bombing war encompassed much more than attacks on cities—yet it was these attacks on the civilian populations of Germany (and later Japan) that have raised the strongest emotions and passions. The deaths of nearly one million enemy civilians, the wounding or displacement of millions more, and the devastation of cultural centers such as Nuremberg, Cologne, Dresden, and Tokyo have led many critics to question the bombing campaign's morality, while others debate its military effectiveness. This section of the chapter addresses the course, conduct, and impact of the war on the cities.

"THE BRITISH BY NIGHT . . . "

Often caricatured as a case of simple "terror bombing," in contrast to the more humane (and more effective) USAAF precision bombing effort, the Night Area Offensive of RAF Bomber Command stands

as one of the clear pre-nuclear antecedents of the concept of MAD. Recent analyses of the campaign reveal a far more complex story of political pressures, technical limitations, and increasing effectiveness and flexibility, as well as the more traditional explanations focusing on the desire to shatter the morale of German workers through a systematic "de-housing" campaign.[32] Many accounts focus on the personality and motivations of Bomber Command's controversial commander, Air Chief Marshal Sir Arthur "Bomber" Harris, although the essential elements of the "morale-busting" campaign predated his tenure.

As noted earlier, Bomber Command was built up during the 1930s as a deterrent force. It possessed a considerable number of aircraft, but soon proved ill-equipped to carry out a sustained air offensive against Germany. Although the Air Staff had produced a detailed series of contingency bombing plans aimed at attacking German industry, known as the "Western Air Plans," the Command's ability to carry them out proved meager. Bomber Command at the time was equipped with mediocre twin-engine medium bombers, described by one airman as "not the sort of vehicle in which to go pursue the King's enemies."[33] Unescorted daylight bombing resulted in prohibitive losses during the first months of the war, and the force was compelled to begin operating at night. Its forays into Germany proved woefully incapable of deterring or delaying the German blitzkrieg in Scandinavia and the West, and the commitment of bomber squadrons to desperate daylight attacks on the Meuse River crossings in May 1940 led to crippling losses.

The German conquest of France in June 1940, left Britain alone and virtually incapable of conducting offensive warfare against the Third Reich. Britain's leadership had little choice but to look to the air weapon as the means of carrying on the war. Domestic political, diplomatic and military arguments all supported launching a powerful strategic air offensive. As early as July 1940, Winston Churchill wrote to Britain's Minster of Aircraft Production:

> We have no Continental Army which can defeat German military power. The blockade is broken, and Hitler has Asia and probably Africa to draw from . . . But there is one thing that will bring him back and bring him down, and that is an absolutely devastating, exterminating attack by

> very heavy bombers from this country upon the Nazi homeland. We must be able to overwhelm him by this means; without it I do not see a way through.[34]

Throughout late 1940 and 1941, Bomber Command gamely attempted to carry the war to the German heartland, attacking key industrial and military targets. But attacking at night also greatly limited bombing accuracy, and the failure of the Command to invest in target finding capabilities prior to the war was now making itself felt. Things came to a head with the release of the Butt Report in August 1941. This report was a statistical analysis of raids into Germany during June and July of that year. Of the crews who had claimed to have actually hit their targets, it concluded that only one in three got within five miles of the aiming point. In attacks against the vital Ruhr industrial region, the ratio was closer to one in ten.[35]

Reaction within the government, the Air Staff, and Bomber Command itself was mixed. Some chose to disregard the gloomy tidings, while Churchill began to temper his earlier enthusiastic advocacy of aerial bombardment. Also evident was a gradual shift within the RAF leadership away from precision raids on specific objectives and towards more general "area" attacks on cities. In the process, there was a discernible return to Trenchardian formulas about the "morale" effect of bombing the civilian workforce. An Air Staff memorandum of September 1941 bluntly maintained,

> The ultimate aim of the attack on a town area is to break the morale of the population which occupies it. To ensure this we must achieve two things; first, we must make the town physically uninhabitable and, secondly, we must make the people conscious of constant personal danger. The immediate aim, is therefore, twofold, namely, to produce (i) destruction, and (ii) the fear of death.[36]

Other official memoranda, as well as analysis conducted by Churchill's scientific advisor, reflected and fueled this shift from an industrial targeting campaign to an area "de-housing" strategy. There is little doubt that the Command was at low ebb in early 1942, although quantitative and qualitative improvements in its training and equipment were beginning to make themselves felt. In late February, the hard-driving Harris took over RAF Bomber Command.

Harris may not have devised the area offensive, but there is no doubt that he worked to make it a reality with singleminded persistence. He set about improving the status of his command by launching heavy attacks on several German targets—including Lübeck and Rostock—while building up his forces for the "Thousand Plan," an attempt to put 1,000 heavy bombers over a target in a single night. He accomplished this over Cologne in May 1942 by stripping the training establishments of every operational aircraft. The prestige of his command rebuilt, Harris patiently modernized and built up his forces with large numbers of the new Halifax and Lancaster bombers (the latter capable of carrying some 10 tons of bombs). In March 1943, Harris launched the 4-month Battle of the Ruhr against Germany's industrial heartland. His philosophy was consistent with that of the Air Staff and the civilian leadership. The Ruhr cities housed many industries vital to the Third Reich's war effort. The attacks were aimed not at the specific factories, however, but at the city centers and workers' housing.

Harris's policy peaked in effectiveness with a 3-day series of attacks in Hamburg in July 1943. Operation GOMORRAH was unusually successful due to a combination of factors. The British neutralized the usually efficient German defenses by swamping their radar with tinfoil strips, largely blinding German night fighter and antiaircraft batteries. A severe drought in the summer of 1943 lowered water levels and rendered the old city tinderbox-dry. The city was easy to locate and Harris's bombers achieved unprecedented concentration over the target. The attacks culminated on July 27, 1943, when the already heavily damaged city endured the first "firestorm" in human history, with winds of over 150 miles per hour and temperatures of 1000 degrees Centigrade. Hamburg's police chief offered this description of the effect:

> In a built-up area the suction could not follow its shortest course, but the overhead air stormed through the streets with immense force taking with it not only sparks but burning timber and roof beams, so spreading the fire further and further, developing in a short time a fire typhoon such as was never before witnessed, against which every human resistance was quite useless.[37]

Some 40-50,000 civilians perished, although accurately estimating the total proved difficult. Rescue personnel found concrete air raid shelters filled only with fine grey ash. A stunned Luftwaffe bomber commander, noting the effectiveness of the RAF's incendiaries, noted, "For half a year we bombed London, and still London is not in ruins. For 3 days they bombed Hamburg—and Hamburg is *kaputt*!"[38] German political leaders were equally grim. Armaments Minister Albert Speer later asserted, "Hamburg put the fear of God into me," and maintained that six additional raids on that scale would "bring Germany's armaments production to a total halt."[39] Other Nazi leaders referred to the event simply as "*die Katastrophe*."

Fresh from his triumph in the Hamburg raids, Harris now turned his force against the Reich capital. He predicted, "We can wreck Berlin from end to end if the USAAF will come in on it. It will cost us between 400-500 aircraft. It will cost Germany the war." Throughout the winter of 1943-44, Bomber Command attempted to make Harris'ss prediction a reality. Yet the so-called "Battle of Berlin" proved a defeat for Harris and RAF Bomber Command. Berlin, although undoubtedly a vital target, proved difficult to damage sufficiently, and the rejuvenated German night defenses exacted a fearsome toll on Harris's squadrons.

Throughout it all, Harris's faith in the area offensive never wavered. Even as his command acquired the technical ability to hit precision targets, Harris refused to budge from his conviction that area attacks were the most effective means of breaking German powers of resistance. In October 1943, Harris, in a message to his superior, stated his position with absolute clarity:

> The aim of the Combined Bomber Offensive . . . should be unambiguously and publicly stated. That aim is the destruction of German cities, the killing of German workers and the disruption of civilised community life throughout Germany.
>
> It should be emphasized that the destruction of houses, public utilities, transport and lives, the creation of a refugee problem on an unprecedented scale, and the breakdown of morale both at home and at the battle fronts by fear of extended and intensified bombing , are accepted and intended aims of our bombing policy. They are not by-products of attempts to hit factories.[40]

He even argued, somewhat disingenuously, that his bombers were incapable of hitting small targets, which he in any case derided as "panaceas." Harris came perilously close to insubordination in his fixation on the area offensive, although it must be noted that his command did ably execute the 1944-45 campaigns against transportation and oil targets which supported the OVERLORD invasion and the Allied drive across western Europe. Yet, whenever possible, Harris continued to conduct area attacks against German cities, and would do so until the very last months of the war.

By that time Harris's Bomber Command had evolved into a very effective instrument of war. Anxious both to assist the Red Army in its advance against the tottering German army on the eastern front and to speed the German collapse, Churchill pressed the Air Staff to strike major urban targets in eastern Germany, including Berlin, Leipzig, and Dresden.[41] On the night of February 11-12, 1945, Dresden suffered one of the worst air attacks in history. Though often described as an "open" or "undefended" city, Dresden was neither. Its status, however, as an industrial target was minimal. The human cost of the raid was ghastly, and the fact that the city was filled with refugees fleeing the Red Army added to the horror. Particularly in hindsight, the raid seemed a case of promiscuous overkill, coming so close to the eventual German surrender less than three months later. It should remembered, however, that the supposedly "finished" Germans had recently shocked the Allies by launching the Ardennes offensive, and that RAF Bomber Command lost hundreds of aircraft in action after the Dresden raid. Nevertheless, Dresden was a turning point in popular perceptions about the bombing offensive.

With considerable understatement, one of the RAF Official Historians noted, "At the end of the war public opinion turned away from bombing which, especially in Britain, it had once so strongly supported."[42] Churchill was already distancing himself from the attack on Dresden within days of the raid. Harris's aircrews were denied a special campaign medal, although by most objective assessments, they certainly deserved one. Harris himself was conspicuously snubbed in the postwar Honours List. The postwar government preferred to view the area offensive as the product of an overzealous commander afflicted with tunnel vision, instead of a carefully considered, albeit harsh, wartime policy which had enjoyed broad support in government and public circles.

Assessing the effectiveness of the campaign remains a very complex task. Critics of the bombing campaign fall into two broad categories: those who believed it inefficient and ineffective, and those who saw it as immoral. It is certainly true that German morale did not "collapse" under the assault. The German civilian population suffered tremendous hardships, but "stuck stolidly to their lathes and benches." The German war economy proved robust enough to absorb even the catastrophic damage to cities such as Hamburg, while Berlin, although battered, continued to function as a center of industry and government. The investment in the bomber offensive was staggering. Estimates range as high as one-third of the entire British war effort went, directly or indirectly, to Bomber Command. The campaign cost the lives of some 50,000 Bomber Command aircrew. Some wartime critics, mostly clerics and intellectuals, criticized the offensive as brutal and lawless. One military commentator called it "the most barbaric, and unskilled, way of winning a war that the modern world has seen."[43] Max Hastings, one of the most eloquent critics of the bomber offensive, summed it up thusly: "The cost of the bomber offensive in life, treasure and moral superiority over the enemy tragically outstripped the results that it achieved."[44]

Recent analysis has focused on the tremendous indirect benefits of the bomber offensive to the Allied war effort. Dispersal of German industry sacrificed economies of scale, and millions of able-bodied Germans were engaged in air defense or rebuilding projects. By 1943-44, the combined bomber offensive seriously distorted German strategic planning, industrial production, and military force structure and deployments. For example, the need to defend German cities displaced desires to renew the offensive in the USSR or carry the fight to the enemy on the high seas.[45] The city-busting campaign sparked an almost irrational desire on the part of the Nazi leadership for revenge. The Luftwaffe squandered much of its bomber force in reprisal attacks against London, while German industrial production, scientific and technological resources were wastefully diverted to the V-weapons. The Germans manufactured an estimated 24,000 fighter aircraft. One historian concluded, "Thus, just in terms of V-weapons alone, 'area' bombing achieved an enormous dislocation of the German war effort of real consequence to the war's outcome."[46]

The RAF's bomber forces were built up in the 1930s in hopes

of deterring a future adversary. This they failed to do, and their subsequent attempt to win the ensuing war through air attacks on cities remains bedeviled by controversy.

" . . . AND THE AMERICANS BY DAY"

The U.S. Army Air Forces entered the European war with a strong belief in the efficacy of the strategic bombing concepts crafted at Maxwell Field and "operationalized" as AWPD-1, the so-called "Air Plan that Defeated Hitler." As discussed earlier, this plan called for a force of four-engined bombers sufficient to destroy 154 key targets in the German war economy. The targets would not be the large urban areas, but specific factory complexes. The American air planners believed that, once the 8th Air Force was built up in Great Britain, it would exert a significant and perhaps decisive impact on the German ability to wage war.[47] Yet the necessity of diverting resources to the Mediterranean in the fall of 1942 slowed the buildup, and it was not until the January 1943 Casablanca conference that the guiding principles for undertaking a truly "combined" bomber offensive were formulated. The USAAF successfully resisted British pressure to join in the night area offensives, and the two Allies agreed to pursue a loosely coordinated policy of "bombing around the clock."

By early 1943, General Ira Eaker's 8th Air Force was able to begin deep daylight penetration against German targets. These targets were aircraft assembly plants, ball-bearing manufacturing centers, rail yards, and ports. All were consistent with the industrial web targeting philosophy developed at ACTS. Unescorted daylight bombing of these targets proved too costly to continue. Although German fighter and ball-bearing production was disrupted, the results did not justify the heavy losses incurred. In the wake of the "Fall Crisis" culminating in the disastrous October 14, 1943, raid on the ball-bearing factories at Schweinfurt, daylight penetrations into Germany were suspended until long range fighter escort became available.

With the arrival of P-51 Mustang long-range fighters in early 1944, the American daylight bombing effort entered its most important phase. Again, the targets were key industrial complexes.

In some cases, such as the March 4, 1944, daylight raid on Berlin, the objective was to force the Luftwaffe fighters into the air so they could be engaged and destroyed by the aggressive USAAF fighter escort. The practice of using the bombers as "bait" for German fighters was controversial, but undeniably effective. The German day fighter arm was shattered in the spring of 1944, greatly assisting both the continuation of the combined bomber offensive and the success of the Normandy invasion in June 1944.[48]

The USAAF continued its precision campaign against the synthetic oil industry and transportation targets. The transportation offensive primarily targeted the important German marshalling yards. Some commentators have argued that the attacks on marshalling yards were little more than thinly-disguised area attacks.[49] Indeed, the "precise" nature of the USAAF effort in the fall of 1944 became a casualty of technical problems, European weather, and lack of current intelligence on the state of the German war economy. In short, USAAF "precision" attacks began to resemble RAF "area" attacks. And in the final months of the war, the Allied air leadership contemplated a series of raids on cities and transportation targets, known as THUNDERCLAP and CLARION respectively, that harkened back to the belief expressed in AWPD-1—that an overwhelming blow, at the right time, could shock an enemy nation into collapse.[50] THUNDERCLAP was never executed in toto, but the USAAF did participate in the Dresden raids and also launched a mass raid on Berlin on March 3, 1945.[51] Yet on balance, the USAAF attempted to adhere to its prewar philosophy of precision targeting, even if the massive urban destruction inflicted by many of these raids seemed to belie that intent. Eaker, in voicing his reservations about the CLARION proposal, stated, "We should never allow the history of this war to convict us of throwing the strategic bomber at the man in the street."[52] Historian Conrad Crane concludes, "Although theory did exceed technology, American airmen in Europe did the best with what they had."[53] Yet another historian's verdict is somewhat less generous: the USAAF leaders "judged themselves by their motives rather than their results."[54]

THE USAAF IN THE PACIFIC

Along with the RAF night area offensive, the USAAF's incendiary campaign against the Japanese home islands in 1944-45 stands as the last "milestone" in the prehistory of MAD. This series of devastating raids on Japanese industrial and population centers was perhaps the ultimate in non-nuclear urban air attack. By most accounts, the March 1945 fire raid on Tokyo was more destructive and lethal than either the Hiroshima or Nagasaki atomic strikes. USAAF strategic bomber forces in the Pacific operated under the direct control of General Henry H. "Hap" Arnold instead of the theater commanders, foreshadowing the later organization of Strategic Air Command. And the campaign ended with the first use of atomic weapons against enemy targets.

By late 1944, the war in the Pacific had progressed to the point where the Japanese home islands could come under direct air attack. A bloody amphibious invasion of the Marianas secured bomber bases on the islands of Saipan, Tinian, and Guam. Large numbers of the still untested and temperamental B-29 "Superfortress" were available to conduct the assault. By this late point in the war, a U.S. Navy submarine blockade of Japan had virtually strangled the industries of the home islands, yet, as the Allied forces approached, Japanese resistance grew ever more determined and fanatical. Amid concerns about mounting war weariness at home, American planners prepared to execute the final phases of the strategy for defeating Japan; blockade, strategic air assault, and amphibious invasion.[55]

The bombing of Japanese cities had been widely discussed by U.S. civilian and military policymakers even prior to Pearl Harbor. George C. Marshall noted in November 1941 that "if war with the Japanese does come, we'll fight mercilessly. Flying Fortresses will be dispatched immediately to set the paper cities of Japan on fire. There won't be any hesitation about bombing civilians—it will be all-out."[56] President Franklin Roosevelt was equally determined to bomb the Japanese home islands and even risked two of the U.S. Navy's precious aircraft carriers to launch the Doolittle Raid on Tokyo in April 1942.

Despite such high-level interest in carrying the war directly to the civilian population, it was not until 1944 that an actual strategic

campaign was underway. The early B-29 raids on Japan, from bases in China and, later, the Marianas, were conventional precision raids on industrial targets, primarily the aircraft industry. Yet for a variety of reasons, these attacks did not have the desired effect. The B-29 and its untested equipment and engines suffered from a host of teething troubles, and the jet stream above Japan played havoc with high altitude precision bombing.

The notoriously impatient Arnold fired several commanders, including General Haywood Hansell, one of the pioneers of daylight precision bombardment. After many failed attempts to improve precision bombing, Arnold ultimately turned to General Curtis E. LeMay. LeMay had proven to be a skilled leader and a tactical innovator during his time in the European theater and was not above jettisoning approved tactics and techniques in order to fulfill his boss's desires. Arnold and the senior AAF leadership had already concluded that area attacks would be more effective in destroying dispersed Japanese industry and killing Japanese workers.[57] LeMay decided to attack at low level at night, with a largely incendiary bombload. He eventually removed most of the guns from the B-29s so that they could carry more bombs. Adopting these tactics improved accuracy and reduced the strain on the B-29s fragile engines. Flying at night rendered Japanese air defenses less effective.

LeMay's policy proved terribly effective during Operation MEETINGHOUSE, a mass nighttime incendiary raid on Tokyo on March 9-10, 1945. LeMay's bombers stoked a conflagration that killed nearly 100,000 civilians. The B-29 wing commander leading the raid later recalled,

> I watched block after block go up in flames until the holocaust had spread into a seething, swirling ocean of fire, engulfing the city below for miles in every direction. True, there is no room for emotions in war. But the destruction I witnessed that night over Tokyo was so overwhelming that it left a tremendous and lasting impression with me.[58]

Superfortress crews never forgot the stench of burning human flesh that rose from the city below. Many resorted to wearing oxygen masks. Sixteen square miles of the city were completely burned out. Photographs taken shortly after the raid are virtually

indistinguishable from those taken at Hiroshima 5 months later. During the following months, the 20th Air Force marched methodically down its list of industrial targets in Japan, incinerating each in its turn. At the same time, B-29s augmented the submarine blockade by conducting an extensive aerial mining campaign in Japanese coastal waters, aptly code-named STARVATION.[59]

While the main goal remained the destruction of Japanese industrial potential, area incendiary raids and the massive casualties among the civilian work force that accompanied them were viewed as the appropriate means to that end. A striking graphic contained in a 1945 report prepared by Arnold for the Secretary of War consisted of a map of Japan "showing the principal industrialized cities burned out by B-29 incendiary attacks. Figures indicate what part of the city was destroyed. For comparison, each city is paired with a U.S. city of approximately the same size."[60] The map contained a grim litany of major cities reduced to ashes: Yokohama, 57.6 percent (Cleveland); Tokyo, 39.9 percent (New York); Kobe, 55.7 percent (Baltimore); Toyama, 95.6 percent (Chattanooga).

LeMay explained after the fact,

> We were going after military targets. No point in slaughtering civilians for the mere sake of slaughter. Of course, there is a pretty thin veneer in Japan, but the veneer was there. It was their system of dispersal of industry. All you had to do was visit one of those targets after we'd roasted it, and see the ruins of a multitude of tiny houses, with a drill press sticking up through the wreckage of every home. The entire population got into the act and worked to make those airplanes or munitions of war . . . men, women, children. We knew we were going to kill a lot of women and kids when we burned the town. Had to be done.[61]

So confident were the AAF leaders that this was a war-winning strategy that they believed that when the target list was finally exhausted, Japan would collapse without an invasion. Indeed, Arnold was one of the few senior commanders to oppose dropping the atomic bombs, believing a Japanese collapse was imminent.[62] The postwar Strategic Bombing Survey concurred:

> Based on a detailed investigation of al the facts, and supported by the testimony of surviving Japanese leaders, it is the Survey's opinion that certainly prior to 31 December 1945, and in all probability prior to 1

> November 1945, Japan would have surrendered even if the atomic bombs had not been dropped, even if Russia had not entered the war, and even if no invasion had been planned or contemplated.[63]

Debate continues regarding the impact of the firebombing of Japanese cities on Imperial Japan's surrender. In postwar testimony, former Premier Hideki Tojo downplayed the bombing campaign and instead cited the submarine blockade, the island-hopping campaign, and the operations of U.S. Navy carrier task forces as the key contributors to Japanese defeat.[64] Others have argued that the firebombing was an excessive and even racist policy carried out by a vengeful United States against a virtually defeated foe. Others point to the fanatical defense of Okinawa and the evidence of extensive Japanese preparations to meet the expected invasion of the home islands. One commentator noted that after Emperor Hirohito toured devastated Tokyo on March 18, 1945, "There is reason to believe that what the shaken, grim-faced monarch saw at firsthand intensified his determination to bring the war to an end as soon as possible."[65]

Some things are clear. The Japanese government did surrender, no invasion was necessary, and Japanese industrial production had all but ceased by the summer of 1945. Strategic bombing of Japanese cities certainly contributed to all of these things. Yet so did the submarine campaign, the destruction of the Japanese fleet in sea and air battle, and the amphibious campaign that both destroyed Japanese military power and secured the bases from which to launch the air assault on the home islands. As was the case with Germany, the effect of city bombing could not be assessed in a vacuum because it had not taken place in one.

CONCLUSION

Any study of the "prehistory of MAD" must consider the postwar assessment of the bombing war. Did the targeting of cities, or of specific targets located in cities, hasten the collapse of Nazi Germany and Imperial Japan? The immediate investigations, most notably the massive United States Strategic Bombing Survey (USSBS), sought to interview captured enemy economic planners and military leaders, assess physical destruction, and determine the damage to enemy

industrial output, combat power, fighting spirit, and political will. The USSBS concluded that "[Allied air power] brought home to the German people the full impact of modern war with all its horror and suffering. Its imprint on the German nation will be lasting."[66] Yet the Survey was a complex document with many parts, some of which suggested that strategic bombing in general, and attacks on civilian morale in particular, were not as effective as hoped. Needless to say, the surveys only began a debate that has continued, sometimes bitterly, to this day. Generations of postwar historians and military analysts have weighed in. Although it would be idle to suggest that a consensus has emerged, I would like to suggest some lessons from the pre-1945 experience of city busting that definitely nourished "the roots of MAD."

The U.S. Army Air Forces (soon to be the U.S. Air Force [USAF]) emerged from the World War II convinced in the efficacy of independent strategic air power. While the USAF's fixation on strategic attack has perhaps been exaggerated, there is little doubt that it was the primary concern of the newly independent service. As a result, the lessons of the World War II strategic air offensives loomed large. In the popular mind, a sharp distinction existed between USAAF "precision" bombing and RAF-style "area" bombing. The latter was seen as both morally inferior and militarily less effective than the former. Most airmen knew better than to accept this simplistic interpretation. While the targeting philosophy between RAF Bomber Command and the USAAF was different, the two air efforts could be very similar in practice. An RAF night raid in the fall of 1944, using the latest blind bombing aids, was sometimes capable of greater "precision" than a USAAF daylight raid in the bad weather conditions of central Europe during the same period. Yet even these de facto "area" attacks had devastating effects on the German war economy. As historian Alfred Mierzejewski has demonstrated, area attacks on the vital marshalling yards of the German National Railway (most of which were located in urban centers) were among the most effective of the entire war. [67] And the commanders of 20th Air Force in the Pacific clearly believed that their incendiary offensive had precipitated a Japanese surrender without a costly amphibious invasion. Even if the airmen conveniently ignored the strategic effects of other operations, they shared a general belief

in airpower's contribution to Allied victory in World War II. This belief was not unjustified.

It is ironic that the development of nuclear and thermonuclear warheads, which almost by definition were area attack weapons, essentially negated the gains in precision bombing that were made during World War II. Although first-generation Strategic Air Command planners continued to identify specific industrial targets in the USSR like the ACTS planers of old, the gap between intent and practice had widened tremendously, far beyond what Trenchard or LeMay had to contend with.

The challenge of the postwar period was to balance the perceived lessons of the late conflict, interservice rivalries, rapidly changing weapon and aviation technology, and the threat of an emerging cold war. The experience of the first half-century of powered flight contained the seeds of postwar "deterrence regimes" and the roots of MAD. The advent of nuclear weapons was seen initially as a quantitative, though not necessarily qualitative, change in the means of conducting aerial warfare. Many airmen saw no great difference between the great Tokyo fire raid of March 1945, the Dresden firestorm of February 1945, and Hiroshima/Nagasaki.

Fear of city bombing was one of the most striking cultural developments of the modern age. Industrialized nations continued to develop vast bomber and missile fleets of increasing sophistication, and at enormous cost, with the intend to deter or, if necessary, defeat, peer adversaries. Inseparable from the existence of these fleets was the specter of civilian casualties on a massive scale. The tools were new. The underlying issues predated powered flight.

ENDNOTES - CHAPTER 1

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CHAPTER 2

"DESTRUCTION ASSURÉE": THE ORIGINS AND DEVELOPMENT OF FRENCH NUCLEAR STRATEGY, 1945-1981[1]

Bruno Tertrais

INTRODUCTION: AN EVENING IN PARIS

On the evening of April 2, 1956, around 9 p.m., a short young French air force colonel with a hawkish face entered the Hôtel Lapérouse carrying about 20 kilos of secret NATO documents.[2] He was to brief a key figure of French political life, a former premier who was expected to return soon to power. The topic was the North Atlantic Treaty Organization (NATO) strategy of massive retaliation.[3] The briefing had been suggested by the colonel's boss, the deputy Supreme Allied Commander Allied Forces Europe (SACEUR), U.S. Air Force (USAF) General Lauris Norstad. General Charles de Gaulle and Colonel Pierre-Marie Gallois talked nuclear strategy for hours. At the end of the conversation, around 2 a.m., de Gaulle thanked his interlocutor and promised that he would take good care of his career. The results would go beyond what General Norstad had anticipated. France ended up setting up an independent nuclear force against the will of the United States and completely at odds with NATO strategy.

The purpose of this chapter is to analyze the origins of France's nuclear strategy and its development, particularly insofar as it relates to the concept of assured destruction. It covers the years 1945 to 1981.[4] It is useful to go as far back as the World War II to understand French thinking on nuclear policy, especially given the fact that the *Commissariat à l'énergie atomique* (CEA) was created in the immediate aftermath of the Hiroshima and Nagasaki bombings. Most of the basic concepts of French nuclear strategy emerged in the 1960s, but the strategy continued to develop in the 1970s, along with the setting up of the French triad. By the end of the 1970s, the main

concepts were fixed and would not significantly change. When the French deterrent force reached what seemed to be a certain level of comfort called sufficiency, French political leaders began referring to an assured destruction capability. More specifically, given the fact that the French president is the only relevant authority in these matters, the election of François Mitterrand in 1981, provides a convenient and symbolic endpoint.

The chapter shows that while French strategy was partly defined by experts such as Gallois, others factors were at least as important. The personal preferences of de Gaulle, the technical and financial means available to France, and the influence of U.S., United Kingdom (UK) and NATO were important factors. For these reasons, all things equal to the French version of assured destruction would end up being largely similar to that of the United States.

Section I outlines the origins of the French program and early thinking on nuclear policy. Section II describes the rationales for turning the original French nuclear effort into an operational and independent force. Sections III, IV, and V describe the basic concepts of French nuclear doctrine and their evolution. Section VI evaluates the implementation of the doctrine and its translation in operational terms in the first 2 decades that the French deterrent existed. Section VII assesses the relative importance and influence of various inputs on French strategy.

SECTION I. A PROGRAM WITHOUT A STRATEGY: DEVELOPMENT OF THE FRENCH NUCLEAR OPTION

At the time of the Gallois-de Gaulle meeting, France already had the basic tools it needed to go nuclear. The rudiments of a military nuclear program were gradually and discreetly put into place by the Fourth Republic's government, supported by a small set of highly motivated individuals.

French scientists had made key contributions to nuclear physics in the early 1930s, and had begun working on possible military applications of nuclear power in 1939.[5] While their efforts were cut short by the French 1940 defeat, they were able to work with the pioneering allied team in Canada until the signature of the 1943 Québec cooperation agreements between the UK and the

United States (perceived as "atomic isolationism" by the Gaullists[6]). Excluded from the Manhattan project, French scientists nevertheless managed to meet de Gaulle in 1944 and brief him extensively. It was with a clear view to have a military option for France that de Gaulle created the CEA in October 1945.[7]

This was no more than an option, and the CEA's goal was primarily civilian. In France, as in many other Western countries, atomic power was seen as embodying modernity.[8] Not before the early 1950s did the idea of a French bomb begin to get serious attention. Among those who supported and lobbied for it, two key figures were Colonels Gallois and Ailleret, both supporters of de Gaulle. Pierre-Marie Gallois combined important professional positions (both at Supreme Headquarters Allied Powers Europe [SHAPE] and in the French military bureaucracy), political savvy (he became a military adviser to several key officials), and talent as a writer and public speaker. Charles Ailleret was the chief advocate of the importance of nuclear weapons within the armed forces and frequently spoke on how such weapons would transform the nature of war. He gave countless seminars, training programs, and exercises, as well as lectures and articles, particularly in the *Revue de la Défense Nationale*. He established good contacts with the political leadership. Other individuals who played an important lobbying role in favour of the nuclear option include Bertrand Goldschmidt and Pierre Guillaumat at the CEA, as well as Generals Paul Bergeron, Albert Buchalet, Jean Crépin, and Paul Ely. They were supported by politicians (Gaullists and others) such as Maurice Bourgès-Maunoury, Jacques Chaban-Delmas, Michel Debré, Félix Gaillard, Pierre Koenig, Pierre Mendès-France, Guy Mollet, Gaston Palewski, Antoine Pinay, and René Pleven.

Having given speeches and conferences about the atom bomb since 1950, Ailleret was asked by Army Chief of Staff General Blanc to head a new "Special Weapons Command"—no more than a nuclear, biological, and chemcial (NBC) protection command at the beginning, but soon to become a real "nuclear think-tank." The new command was created in January 1952. Ailleret immediately asked his staff to do a feasibility study on the production of nuclear weapons.[9] That same year, London exploded its first atomic bomb, and it did not

go unnoticed. In July, a 5-year plan for the development of a French nuclear complex was passed by the Parliament. An amendment proposed by the Left to exclude any military use for the plutonium that would be created was rejected.[10] Going nuclear was then an option to be retained—no more, no less. In 1953, CEA administrator Guillaumat approached Ailleret and proposed a connection between the Commissariat and the military to prepare for the day the political authorities would decide to build a French bomb.[11]

In March of 1954, Defense Minister René Pleven, who had been made aware of the work conducted within the armed forces by Ailleret's team, stated during the annual parliamentary budget meeting that France should begin to think about having nuclear weapons, and that there was a need to train enough officers and engineers for such an endeavor. In October, a joint CEA-Ministry of Defense (MoD) committee in charge of military applications of the atom was created. In December, Premier Mendès-France held a special high-level meeting at the Quai d'Orsay on the topic; it was decided to create a true military applications division in the CEA, under the disguise of "Office of General Studies," and to fund it through the defense budget. The goal was to study the development of an atomic bomb and a nuclear-powered submarine. In May 1955, an inter-department protocol authorizing the transfer of funds from the military to the CEA was signed.

Still, no nuclear program had officially been launched. Experts estimated that the critical choices in a context of limited resources could wait until around 1958.[12] At that time, the French program was still virtual, technically comparable to those of other countries acquiring the assets necessary to cross the threshold if need be. The security rationales mattered, and many in the military were anxious to get nuclear weapons for defense purposes. But in 1954-55, international standing was a key consideration. There was a growing understanding within government circles that in the context of NATO's MC-48 strategy, which emphasized nuclear over conventional weapons, that true power, in particular within the Alliance, would only belong to those countries which possessed the bomb.[13] As Mendès-France reportedly said, "if you do not have the Bomb you are nothing in international negotiations."[14] These

ideas were supported by de Gaulle, then in political exile but closely following the French debates, and occasionally making known his support for a nuclear program.[15]

Under the leadership of Buchalet, the CEA began setting up the technical facilities needed to produce nuclear weapons. In October 1956, Premier Mollet, who also had received a Gallois briefing, signed a long-term directive on nuclear policy that included the need to develop the country's nuclear infrastructure in order to gain allied support for a military program. The CEA was ordered to produce weapon-grade highly enriched uranium (HEU) and plutonium for possible future nuclear weapons. Studies were also commissioned for the development of a long-range bomber and of ballistic missiles. In December a committee in charge of military nuclear programs was created within the MoD. In 1957, the Special Weapons Command was made a joint body, and a Joint Nuclear Experiments Group was created. Ailleret went to set up a potential testing ground in the Sahara Desert. Political support for a national deterrent was gaining ground in the aftermath of the Suez crisis and of the Budapest repression in November 1956. Early warnings about U.S. vulnerability such as the first Soviet intercontinental ballistic missile (ICBM) test in August 1957 and the Sputnik launch in October 1957, reinforced this trend. Political barriers against the French bomb were falling one after the other. On April 11, 1958, France went one step closer to the threshold when a key defender of the nuclear program, Premier Gaillard, was ordered to make the technical preparations for a series of tests. The now-official military applications division of the CEA numbered 1,800 persons.

No military nuclear program had ever been launched, but France was on the verge of becoming a nuclear power. As one scholar noted, "France under the Fourth Republic would appear to represent the most striking example of minimal political leadership and maximum technocratic direction in the orientation of atomic policy."[16]

However, on the very eve of de Gaulle's return to power, two key policy orientations had yet to be taken formally: the decision to test, build, and sustain an *operational* deterrent; and the decision to have a fully *independent* deterrent, not only in terms of use, but also in terms of procurement, planning, and operations.[17] The first decision

would be taken by de Gaulle. Without it, France might very well have remained a potential nuclear power with a recessed deterrent like India between 1974 and 1998. His role would be much more than just turning the ignition key. With de Gaulle, France's willingness to go nuclear became a goal of the State rather than the desire of a few men. The second decision was, of course, also de Gaulle's, and crystallized gradually in the years 1958-66 (see SECTION III).

SECTION II. RATIONALES FOR BUILDING AN INDEPENDENT *FORCE DE FRAPPE*

As suggested above, the original French motivations were merely the product of the dynamics of the nascent nuclear age, a time when the atom held seemingly unending benefits to a modern nation. The specificities of French nuclear policy developed only gradually, starting in the early to mid-1950s. They stemmed from a combination of strategic and political rationales fuelling each other. De Gaulle's personal contribution from May 1958 on would be to push existing rationales to their logical conclusions, and to transform existing incentives into actual policy. There would be, in the words of one historian, an "imperious convergence" between the general and the bomb: "The nuclear fire is consubstantial to State Gaullism."[18]

Although some authors explain France's program by prestige politics, there are good grounds to say that the realist explanation remains the most satisfying. It has been vindicated by recent testimonies and historical research.[19] The main reasons for developing an operational, independent deterrent or *force de frappe* were, first, to endow France with a credible security guarantee and, second, to recover France's full sovereignty.[20] However, other motives, such as regaining major power status, and ensuring control over the military, also came into play.

Endowing France with a Credible Security Guarantee.

Among European powers, few countries felt as unsafe as France at the beginning of the second part of the century. The French territory had been invaded three times in a few decades, the last one

resulting in the humiliating 1940 defeat—an event that traumatized de Gaulle to the point of saying in 1943: "We must want the existence of France. Never again will it be self-evident."[21] He also resented that France had had to "beg" for allied support between 1940 and 1944.[22] Thus in the 1950s, the perception of an emerging new major threat for the country's existence—the Soviet Western Group of Forces was stationed close to French territory—made the need for a security guarantee very pressing.

Most NATO countries viewed the U.S. nuclear guarantee as a fairly credible one. France did not. That perception emerged in the critical period 1954-57. The United States did not come to help French forces at Dien Bien Phu (1954), nor did it support the Suez operation (1956).[23] Then Moscow demonstrated its ability to strike U.S. territory with ballistic missiles (1957), contributing to a major change in U.S. and NATO nuclear strategies, whereby a massive retaliation against Soviet cities thereafter would be seen only as a last resort option. French strategists had doubts about the principle of one nuclear country protecting another one. The heralded abandonment of the massive retaliation strategy was, from their point of view, the final nail in the coffin, and France refused to subscribe to the emerging NATO strategy of flexible response. This was officially adopted only after the withdrawal of Paris from the integrated military structure. For the Gaullist government, it amounted to the disappearance of the U.S. protection not only of France, but also of Europe as a whole.[24]

De Gaulle inherited a certain distrust about the U.S. willingness to defend French territory. Sure enough, the Americans had come to defend France. But de Gaulle was inclined to see the half-empty part of the glass which was that the intervention of the United States in the two world wars had taken place only after its own interests were put at stake. Treaties providing for American and British security guarantees to France against Germany had been signed in June 1919, but were of no avail in 1939. De Gaulle remembered that, once engaged in Europe, Washington was mostly preoccupied with its own national interests. In the early days of 1945, the United States had been ready to abandon the city of Strasbourg. De Gaulle had to commit Free French forces and challenge Eisenhower to counter the U.S. decision.[25] He did not blame Washington for such an attitude. He thought that it was only natural that a country defends only

its national interests. And de Gaulle expressed an opinion shared widely in France when he stated in 1963 that "nobody in the world, in particular nobody in America, can say whether, where, how, to what extent the U.S. nuclear arms would be used to defend Europe."[26] Nuclear weapons had changed the nature of alliances. One could not expect to be protected by a state which would engage its very survival in doing so.[27] He told Eisenhower that, given the emerging U.S. vulnerability, Washington would only engage in nuclear action if its territory faced a nuclear attack.[28]

Recovering France's Full Sovereignty.

The second main rationale was to ensure full peacetime sovereignty of France. Following the 1940 defeat, the country had been occupied for 4 years. The Suez crisis had made clear that the United States, as well as the Soviet Union, would not hesitate in limiting the freedom of action of smaller powers.

This second rationale had been an important point for the Fourth Republic's politicians.[29] But nobody was as eager to emphasize sovereignty vis-à-vis the United States as de Gaulle. During the war, Washington's preferred candidate as the leader of post-victory France had been his rival, General Giraud, who was seen as more flexible and sympathetic to U.S. views. And on the eve of the June 1944 Normandy landing, de Gaulle learned from Churchill that the United States planned to place France under an Allied Military Government of Occupied Territories (AMGOT) instead of ceding its control to the government-in-exile. De Gaulle had to fight hard. For him, the bomb was an instrument of self-determination, a means "to exist by ourselves and, in case of drama, to choose our direction by ourselves."[30]

The need to be able to independently defend French interests would become particularly acute for de Gaulle as he began shaping a formidable political agenda which would transform French international identity and strategic culture. The termination of colonization was to be accompanied by the promotion of détente with the Communist world and the reconciliation of European powers "from the Atlantic to the Urals."[31] French reliance on a U.S. nuclear protection to guarantee its security was seen as potentially

limiting the full exercise of France's sovereignty. "It is obvious that, for a country, there is no independence if it does not possess nuclear weapons, for, if it does not have them, he is forced to defer to another who has them for his security and, therefore, for his policies."[32] As others before him, de Gaulle pushed this logic to the extremes, claiming that independence could not exist without nuclear weapons.[33]

That same reasoning was applied to belonging to the NATO integrated military structure. De Gaulle believed that integration limited European political sovereignty. He also thought that in the new world of the 1960s, U.S. leadership was not as justified as it might have been in 1949. European countries had recovered from the war, and were beginning to develop institutional ties among themselves. The European Community had been created in 1957, the Communist world was not as monolithic as it had been in the past, and the Soviet experiment was judged a failure. Therefore, the bipolar order and the "condominium" over Europe were deemed obsolete. Most importantly, the U.S. monopoly on nuclear weapons had disappeared and America was now vulnerable, making the U.S. guarantee less credible.[34] France would commit forces if Europe was attacked. But de Gaulle emphasized a distinction between "the alliance, which is good, and integration, which is bad."[35] For those who opposed it, integration implied not only U.S. peacetime command of some French officers and troops—a major point of contention—but also potential U.S. pressures on the management of the French armed forces and undue foreign influence on French military culture. Most importantly, it created the perception that France was a subordinate to another nation, and that it could not or would not be able to defend itself independently if need be. For de Gaulle, the existence of the French deterrent entailed new responsibilities that were not compatible with what he called dependence on the United States.[36] He also thought that NATO did not fully acknowledge France's place.[37] Could France have become an independent nuclear power and stay in the integrated structure? On paper, perhaps yes. But de Gaulle thought that the adversary had to be absolutely convinced that France would independently decide to use nuclear weapons.[38] In any case, the logic of the Gaullist stance would have led France to keep its new weapons completely out of Alliance planning, a position

which would have been inconsistent with the logic of integration.[39] Thus not only was integration no longer *necessary*, not only was the withdrawal *possible*, but it was in fact *logical* and probably *imperative* from the French point of view. De Gaulle did not believe that a NATO Multilateral force, discussed in the mid-1960s, would allow Paris to retain truly independent control over its future nuclear force.[40] The withdrawal would be effective in 1967, once the constitution of the *Mirage-IV* bomber force was achieved.

The withdrawal of the NATO integrated structure and the birth of the French nuclear force were two faces of the same coin which was the need to regain national autonomy. This was obvious as early as September 1958. General Norstad (the same officer who had asked Gallois to brief de Gaulle in 1956, and who was now Supreme Allied Commander Europe [SACEUR]) was asked by the new French president whether there were U.S. nuclear weapons in France and what their role would be in NATO targeting plans. Norstad refused to answer, provoking the ire of de Gaulle, and thereby reinforcing de Gaulle's desire for an independent French deterrent.[41] De Gaulle confirmed the authorization given by his predecessors to attribute U.S. nuclear warheads to French forces in Germany (*Honest John* missiles in 1960 or 1961, and bombs for *Mirage III* and F100 aircraft, as well as *Nike-Hercules* air defense missiles, in 1963[42]). But in 1967, these arrangements were cancelled when France withdrew from the integrated NATO structure.

De Gaulle also sought to develop other tools of national independence vis-à-vis the United States. A national ballistic missile program was launched in 1959, once it became clear that French-U.S. cooperation would be impossible. These were complemented by other efforts such as national space and computing initiatives, monetary reform allowing for the creation of a strong currency (and turning reserve U.S. dollars into gold assets), and the constitution of a national oil "major." De Gaulle was aware of the benefits of the nuclear program for the energy industry and used it as a supplementary argument.[43] More generally, he thought that the nuclear effort "helped the scientific, technical and industrial development of the nation."[44]

Regaining Full Major Power Status.

The narrower consideration of "prestige" mattered to an extent. And as stated above, like the United Kingdom, France needed a moral boost to come to terms with the end of colonial imperialism. It can be argued that France did not need the bomb to be acknowledged as a significant world player. Its permanent membership in the UN Security Council, and its particular position in NATO, would have been enough to ensure that the voice of Paris would be heard. But then again, the 1967 withdrawal was made possible only because France had become a nuclear power.

De Gaulle's France quickly reaped the political benefits of resisting U.S. power and promoting an alternative universal model of democracy and self-determination. The independent French nuclear weapons program was perceived in the developing world as a symbol and an instrument of challenge to U.S. "hegemony."[45]

However, what really mattered for de Gaulle was to play a center stage part in the Cold War, that of European security. Here, it was not a matter of prestige, but of regaining full major power status in order to participate again in great power politics. He resented that France had not participated in the Yalta and Potsdam conferences.[46] De Gaulle could not stand the idea that the fate of the continent would be determined by Washington and Moscow. When he returned to power in 1958, he considered the bomb "a political means to allow him to sit at the Greats [powers'] table."[47] For him, the Great Powers were the Soviet Union, the United States, and the United Kingdom. He wanted above all an equal role with his UK and U.S. partners in the Atlantic Alliance, and an end to the discrimination towards France imposed by the Québec agreements and the 1946 MacMahon Act (amended in 1958 to allow for U.S.-UK cooperation). This discrimination was for him was particularly unacceptable, given France's centrality in Alliance planning.[48] Breaking the Anglo-Saxon monopoly on nuclear weapons had been an obsession since the beginning.[49] It was inconceivable that France did not possess "the most powerful weapons of the day" and have mastery of a key scientific and industrial field.[50]

Ensuring Control Over the Military.

A fourth and arguably less important factor was to ensure control over the military. This came more as an added benefit than as an initial incentive. As soon as he returned to power in 1958, de Gaulle made clear that the armed forces were to be entirely subordinated to the political authorities.[51] But his relationship with the military took a turn for the worse. In 1961, a coup was averted. In 1962, the armed forces were ordered to withdraw from Algeria. Many in the armed forces would see de Gaulle as no less than a traitor. The *Organisation de l'Armée Secrète* (OAS) was at that time conducting a terrorism campaign that would target de Gaulle himself (the assassination attempt at Petit-Clamart). Revamping French strategy around the backbone of putting nuclear weapons under tight civilian control helped to ensure control of the military. This strategy was followed by China and later by India. This reaffirmation of *arma cedant togae* was symbolized by the facts that the President could directly order the engagement of nuclear forces and that, until 1981, he was reportedly the only person holding the authorization codes.[52]

The armed forces themselves had little interest in an independent French deterrent. As an institution, the French armed forces were rather conservative, as military institutions often are. Most of the officers who wanted nuclear weapons wanted them simply because they were the most modern, up-to-date weapons in store—and they might as well be *American* nuclear weapons. Indeed, for the French commanders in the Western European Union (WEU) staff in the late 1940s, one of the primary rationales for creating a NATO integrated military structure was the prospect of availability of U.S. nuclear weapons.[53] From the onset, the French military had been among the most vocal proponents of the full nuclearization of the Alliance's defense strategy, and Paris argued strongly in favour of nuclear sharing.[54] There was a lot of frustration in national military circles about nuclear matters, which reportedly were managed within NATO "among Americans, with the British being treated as privileged allies."[55] Many supported the need to equalize the allies through the procurement of nuclear weapons. To be considered "militarily adult," France needed to procure such weapons.[56] Given

the evolution of NATO strategy, the possession of nuclear weapons was seen as imperative by the chiefs of staff.[57] However, for most of the French high command, an independent nuclear program meant diverting resources reducing conventional budgets and forces.[58] That was all the more true by the late 1950s. "What would the atom bomb bring us to pacify Algeria?," asked a skeptic General Jouhaud in 1958.[59] But de Gaulle imposed on them both the withdrawal from Algeria and the bomb.[60] As a commentator put it, "France is the only nuclear power where the civilians have imposed the nuclear [choice] to the military."[61] At the extreme, if there was to be an independent nuclear program, it would need to be integrated within the Alliance.[62] Later, when the military realized that getting the bomb and leaving the NATO integrated military structure—an unthinkable option for any self-respecting French officer at that time—were part of the same deal, their hostility would be even more acute.

Thus a paradox of French nuclear strategy is that it was, to a large extent, forged by a small coterie of military individuals against the will of the military as an institution.

SECTION III. FORGING THE DOCTRINE: "TEARING AN ARM OFF THE AGGRESSOR"[63]

The Key Actors.

The key concepts underlying French nuclear doctrine developed during the 10 years from 1958-68. The early 1960s were especially important as the United States and NATO were moving towards flexible response. The intellectual breeding ground for French strategy was almost exclusively military, with one exception. Pierre-Marie Gallois and Charles Ailleret played critical roles because they combined technical expertise, strong determination, access to political authorities, and ability to write for both the military community and the public. Two other significant players were Generals André Beaufre, a respected high-ranking officer and retired analyst; and Lucien Poirier, a young colonel who later became a prolific writer with intellectual ambitions. The exception was Raymond Aron, a political scientist of the realist school and a

key intellectual figure in French security debates, particularly on the subject of nuclear policy. All continued to be influential throughout the 1970s, and both Gallois and Poirier were still writing in the late 1990s.[64]

Others played significant roles in the construction of French nuclear culture, although they did not appear frequently in public debates, or appear close to political authorities. One name must be mentioned first: Admiral Raoul Castex, who as early as October 1945 published a seminal article which was the French equivalent of Bernard Brodie's *The Absolute Weapon*. This article may have influenced de Gaulle's decision to create the CEA.[65] The list also includes general officers Billotte, Buchalet, Catroux, Chassin, Crépin, Gerardot, Koenig, Philippon, Stehlin, and Valluy. These people worked inside the bureaucracy or through publications, though not all of them supported the Gaullist independent stance.

The French doctrine as it coalesced in the 1960s involved a concept of deterrence "of the strong by the weak." The doctrine was based on the logic of "proportionality to the stake of the conflict." Nuclear reprisals would take the form of massive retaliation, and were theoretically geared *"tous azimuts."*

The Key Concepts.

Deterrence of the Strong by the Weak. The logical foundation of French Cold War nuclear strategy was the concept of "deterrence of the strong by the weak" (*dissuasion du faible au fort*).[66] The idea was that deterrence was possible where one of the two parties is much smaller and less powerful than the other because of the equalizing power of the atom (*pouvoir égalisateur de l'atome*). Asymmetrical size and power did not matter. It was possible to deter a major country with much smaller nuclear forces than the adversary's. As de Gaulle stated in 1964:

> Of course, the megatons that we could launch would not equal in number those that the Americans and Russians are able to unleash. But once unleashing a certain nuclear capability and as far as one's own defense is concerned, the proportion of respective means has no absolute value. In fact, since a man and a country can only die but once, deterrence exists as soon as one can mortally wound the potential aggressor and is fully resolved to do so, and [the aggressor] is well convinced of it.[67]

This idea was included in the 1972 *White Paper*, which described nuclear weapons as an imperative for a small, low-populated country like France. At the same time, being only a medium power, it did not need an arsenal as big as those of major powers.[68]

Gallois is often credited with inventing the concepts of "weak to strong" and "equalizing power." He developed them in *Stratégie de l'âge nucléaire*,[69] but the intellectual background for these concepts clearly preceded him. Background materials are contained in the 1945 Castex article, in early UK writings about nuclear strategy, and in the dossier presented to the French political authorities in December 1954.[70] Ailleret alluded to these ideas in his seminal 1959 conferences.[71] The contribution of Gallois (who was familiar with these sources and even says that reading the Castex article had been an epiphany for him) was to popularize the concepts in France, in particular in his late 1950s articles and his 1960 book.

Proportionality to the Stake of the Conflict. Another key concept in French thinking is "proportionality" which meant that deterrence of the strong by the weak can be assured as long as the weak can inflict on the aggressor damages that would be at least equivalent to the stake of the conflict. This was expressed in the phrase "proportionate deterrence."[72] Gallois theorized and developed it in his 1960 book.[73] De Gaulle endorsed the concept. In 1963, de Gaulle stated that deterrence was achieved as soon as the nuclear capability made an adversary realize that aggression was not worthwhile.[74] The next year, he confirmed that "deterrence is proportional to the stake."[75]

A consensus emerged among experts that, to achieve deterrence, the damage should actually be *superior* to the stake. As early as 1959, Aron mentioned "risks out of proportion with the benefits."[76] Gallois, for his part, said in 1960: "The 'quantity of destruction' that the reprisal force represents when it reaches its objectives must at least cancel the benefits that the aggressor expected from his attack."[77] The next year, he used an expression which became commonly used in French strategic language: "incommensurable." It referred to the lack of comparison between widespread destruction by atomic weapons to what could be feared with conventional weapons.[78] In 1963, Beaufre suggested that the losses to be suffered by Moscow had to be "disproportionate with the possible gains" of the Soviet Union.[79]

De Gaulle would sanction this adjustment in 1964 by mentioning "risks incommensurable with the benefit of conquering our soil."[80] The *White Paper* stated that deterrence only applies if there is for the adversary "an immediate risk out of proportions with the stake of the conflict."[81] Thus proportionate deterrence had become, in fact, *dis*proportionate deterrence, an idea that is very close to John Foster Dulles's original expression of massive retaliation.[82] It remained a basic tenet of French strategy.[83]

A Mass Destruction Single Strike. The idea of threatening mass destruction in order to deter aggression came early in the development of French strategy. This seems to be the result of French exposure to U.S., UK, and NATO strategy in the 1950s, and that, as a small country, France could not afford limited war or flexible response-type strategies. As Gallois put it later, "France has nothing to cede that would not be herself."[84] Once a nuclear nation, France held firmly to the strategy of massive retaliation and, while still in the integrated structure (1964-67), strongly opposed emerging steps within NATO away from that direction. The expression "massive retaliation" was frequently used in 1970s French rhetoric.[85] Apart from the fact that a single strike seemed consistent with a pure anti-cities concept, an additional justification for maintaining rigid strategic targeting plans was given by Poirier. For a small power, the "threat can only have deterrent value if the threatened party knows that he would experience the effects of one blow, without his losses being spaced out over time."[86] If strategic nuclear war was to be managed, the weaker party would be at a disadvantage. The possibility that a massive strike on the Soviet Union would elicit an equally massive—and thus deadly—response on the national territory was considered and accepted. It was, however, also pointed out that Moscow might refrain from doing so on the grounds that "one does not destroy the prize."[87]

Any *nuclear* aggression on France would be considered strategic in nature simply because of the small size of the country, therefore implying a massive nuclear response.[88] This would be the case, in particular, if the adversary destroyed the intermediate range ballistic missiles (IRBMs) deployed on the Plateau d'Albion in South-Eastern France. Though located in a low population area, their neutralization

would entail such a massive strike that it would necessarily have a strategic effect on France. This theory sometimes known as the "attached goat" was developed *a posteriori*, since the IRBMs were initially developed as an interim measure before the introduction of fleet ballistic missile submarines [SSBNs].[89]

But would it be the same in case of strictly conventional aggression? France's version of massive retaliation initially seemed to mirror NATO's MC-48 strategy, as reflected in the 1964 Ailleret articles and in de Gaulle's instructions to the Defense Council the same year. An aggression would elicit "immediate" retaliation on Soviet soil, as well as in Germany "time permitting."[90] But in private, de Gaulle refrained from assuring that conventional aggression against France would be met in the same way a nuclear one would.[91] The solution to this classical deterrence problem was found through the development of a specific tactical nuclear weapons doctrine, which helped France to implement a strategic concept located somewhere between massive retaliation and flexible response. In 1969, Chief of Staff Fourquet confirmed that France rejected an "all or nothing" vision.[92] That said, the concept *at the strategic level* was and would remain inflexible.

An All-Azimuths Strategy. A third important concept is *tous azimuts*, an artillery term expressing the idea that the nuclear force was not directed at any adversary in particular, but should be able to strike anywhere in the world.

Tous azimuts was a matter of principle based on the idea that, since nuclear systems were to have a long service life, it was impossible to determine who would be the adversary 20 years ahead, especially with the risks of further proliferation.[93] This idea has been long credited to Ailleret, but it is now known that de Gaulle himself was the originator of the concept.[94] As early as 1959, he told the French military cadets that "since it is theoretically possible for France to be destroyed from any point of the world, our force must be made to act anywhere on Earth."[95] He used the expression *tous azimuts* at least as early as 1962 in private conversations and even toyed with the idea of using the bomb against Tunisia.[96] In 1965, he mentioned the ability "to launch projectiles . . . in any region of the world . . . and to do it, if need be, against any region of the world."[97] In January 1967, he

wrote a personal instruction stating that by 1980 France should have a full-fledged intercontinental triad (including seven to eight SSBNs) armed with thermonuclear weapons and be able to strike any major power.[98] In July, he told the Council of Ministers: "Let's prepare ourselves for striking in any direction (*tirer dans tous les azimuts*) if France's life is at stake."[99]

Ailleret was more than a mere spokesman. He elaborated on this concept in an interesting discourse on what would be termed today the "globalization of strategy." Nuclear proliferation, the possibility of rapid horizontal escalation of modern conflict, and the range of ballistic missiles justified a new approach. With de Gaulle's approval, Ailleret's article suggested that France needed "megaton-yield ballistic devices of global range," and to ultimately become a "space force."[100]

For de Gaulle, *tous azimuts* also served broader political purposes. First, as he said at least once in private, nuclear force was useful "as much to deter an aggressor . . . as to deter an abusive protector."[101] Second, *tous azimuts* may have been a way to emphasize *différence* vis-à-vis the United Kingdom and to avoid reducing the French force to a mere complement of the U.S. arsenal. Third, it was a concrete application of the Gaullist drive for going beyond the East/West face-off and promoting *détente*. Finally, it was meant to open the eyes of the armed forces to the fundamental novelty of nuclear weapons.[102]

In any case, even if taken at face value, the concept was meant as a goal, not as an immediate force sizing criterion. It was a paradigm in the original sense of the term. As a part of French official policy, it was fairly short-lived. An ICBM program was judged too costly. And after de Gaulle, with the French nuclear program well-established, the need for strong national rhetoric to support an independent force was not as strong. Nevertheless, the leadership continued to pay tribute to this concept. The Warsaw Pact was rarely mentioned as the prime adversary in official public documents, and then, only implicitly.[103] As late as 1977, France still claimed that its SLBMs were capable of "covering the whole world."[104]

SECTION IV: FORGING THE DOCTRINE: BALANCING INDEPENDENCE AND SOLIDARITY

The Debate on the Role of the French Deterrent in the Alliance.

The insertion of the French nuclear contribution in the Atlantic Alliance had a fuzzier approach. The nuclear force was to be a national one, but also one that protected European neighbours. The employment decision was to be strictly under Paris's control, but French authorities sought consultation and coordination with allies. Some considered the French force as a "trigger" that would force U.S. intervention. Most believed that the French force was contributing to the security of the West.

A National Deterrent. De Gaulle initially told the United States that he would be glad to buy U.S. nuclear weapons, provided that the weapons were solely under French control.[105] It is hard to tell whether de Gaulle was serious. It is possible that he did not believe that such an option was realistic if only because maintenance would have required U.S. assistance. In any case, deterrence was to be strictly national in terms of employment, along with the rest of France's defense policy. One of de Gaulle's most often quoted statements was in 1959: "The defense of France must be French."[106] In his colorful vocabulary, he stated that he wanted to be "unbearable on [his] own."[107] This expressed a consensus in France. Along with de Gaulle, Gallois thought that any deterrent which was not strictly national could not be credible: "Democracies can really practice the deterrence strategy only at the service of an absolutely vital cause."[108] Neither the nuclear risk, nor the nuclear decision, could be shared in any way.[109] For most French thinkers, extending U.S. and U.K. deterrence forces to their allies did not make sense, period. In addition, de Gaulle and Gallois did not believe that the U.S.-proposed Multilateral Force was compatible with an effective national nuclear deterrent.

A Force to Defend "Vital Interests"—Including Europe? Official policy was not as rigid as it seemed. The French force was designed to defend what was called the vital interests of France. This expression first appeared in Gallois's work and was sometimes used by de Gaulle.[110] Vital interests included, but were not limited to, the metropolitan

territory, i.e., French territory in Europe. For political reasons, de Gaulle first publicly emphasized the purely national dimension of the French deterrent. But he and his successors made clear that the *force de frappe* was protecting Europe as well, and French nuclear weapons might be automatically used if Germany was threatened.[111] De Gaulle had argued to Kennedy that since "the Rhine [was] narrower than the Atlantic," France felt "more intimately linked to the defense of Germany than America to [France's defense]."[112] His secret instructions to the military chiefs in 1964 were clear: "France should feel threatened as soon as the territories of Federal Germany and Benelux would be violated."[113] The reasons were, first, that Europe was a small territory where the fate of countries were intertwined. Second, optimal military efficiency implied committing French forces far away from the French-German border. Prime Minister Pompidou told the Parliament that the French force "plays a full and automatic role for the benefit of Europe, the defense of which is inseparable from her own."[114] Chief of Defense Fourquet publicly stated that the French battle corps would normally have to be engaged as far as possible from the national borders, in close coordination with the Allies.[115] The "approaches" of the country would be explicitly considered part of France's vital interests, as stated in the 1972 *White Paper*.[116] The exact scope of these interests was unclear. It was recognized that uncertainty on the nuclear threshold was a critical component of deterrence. Third, from the onset French leaders asserted that the country's national deterrent helped the construction of Europe and, beyond that, was, in fact, a building block of a future European nuclear force.[117]

The Possibility of Consultation and Coordination with Allies. Contrary to some popular perceptions of French strategy, the use of the force in conjunction with allied nuclear assets was an option. As early as 1954, the government suggested that Alliance employment of nuclear weapons should be made at least "at Three" (Washington, London, Paris) if lack of time made NATO consultations impossible.[118] De Gaulle went further by suggesting in his famous 1958 memorandum a tripartite directorate where the nuclear powers collectively ruled the Alliance, with a coordinated nuclear planning and decisionmaking mechanism.[119] He discussed such options with Presidents Dwight Eisenhower and John Kennedy. The mechanism

de Gaulle envisioned would be created outside NATO and allow for consultations on nuclear use "anywhere in the world."[120] De Gaulle knew he was "asking for the moon" in 1958, but nevertheless later confirmed in private that he was ready to "combine" French and allied strategies once his country had an operational deterrent.[121] In the first multiyear defense plan, nuclear weapons were presented as a way for French forces to "cooperate more efficiently siding with allied forces, for the defense of the free world."[122] They would be built and used nationally, but "of course, without refusing cooperation, technical or strategic, if wished by our allies."[123] It was thus possible to "conjugate the employment of these weapons with that of our allies' same weapons in the framework of the common effort."[124] Since French forces were still integrated, such options were perfectly feasible.[125] In 1964, Beaufre conceptualized this approach. He described a common nuclear planning mechanism, a coordinated "deterrent manoeuvre" in crisis time, and, if war broke out, a coordinated employment of nuclear forces.[126] The idea appeared less frequently after 1966, but resurfaced around 1968 at a time when the French force was indisputable and the affirmation of *différence* less politically necessary.[127]

A Contribution to the Overall Security of the West. Beyond the defense of European neighbours, the *force de frappe* was seen in France as an asset for the broader transatlantic community. Beaufre and Aron defended the idea of the national deterrent as a contribution to the overall security of the West. Due to the importance of French military forces for the defense of NATO, a France endowed with independently employed nuclear weapons implied an increased risk of nuclear escalation and thus a better overall Alliance deterrent (a "multilateral deterrent"). Also, according to Beaufre, the threat of early French use "benefited the West by bringing an element of doubt into enemy calculations rather than letting them rest solely on the 'reasonable' attitude of the United States."[128] Beaufre, like Gallois, challenged U.S. Secretary of Defense Robert MacNamara's arguments against European national nuclear forces, but in a positive and constructive way: "It is because the French force blurs the American game that it gives back the American game the atom of credibility that it lacked."[129] For Beaufre, an alliance of nuclear

powers brought more deterrence power than a nuclear protectorate or even a "multilateral force."[130]

While dismissing the value of the Alliance per se, Gallois used similar arguments. He argued that, in a situation of approximate parity, the main adversary had to take into account the existence of a third nuclear power which created an "imbalance" detrimental to the management of the main adversarial relationship, since the smaller power could cripple the bigger one.[131]

De Gaulle adopted this logic.[132] With Eisenhower he emphasized that an "additional deterrent" posed a problem for the Union of Soviet Socialist Republics (USSR).[133] He thought that the mere possibility that France would open nuclear fire to protect Germany could not fail but be taken into account by Moscow.[134] French nuclear weapons "introduce[d] in a dangerous world a new and powerful element of wisdom and circumspection."[135] This was acknowledged by the 1972 *White Paper*: "Western Europe . . . cannot but indirectly benefit from French strategy which constitutes a stable and determining factor of security in Europe . . . national as it is, our nuclear deterrent force is an element that cannot but matter to the prevention of a crisis in Europe."[136] Likewise, Chirac said in 1975 that the existence of French tactical nuclear weapons was a contribution to the security of Europe.[137]

A "Trigger" to Force U.S. Intervention? One of the most original and hotly debated features of French nuclear thinking was the idea that France would be a possible detonator or trigger (*détonateur*, or sometimes *gâchette*) for the use of U.S. nuclear forces in defense of Europe if deterrence failed. Consistent with French strategy, the logic was that the United States would delay, if not refuse, the use of nuclear forces in case of a Soviet invasion. Initial nuclear use by France, however, would project the conflict into the nuclear realm. France's deterrent force was thus equivalent to the primary stage of a thermonuclear weapon. As National Assembly member Alexandre Sanguinetti colorfully put it, this was about "forbidding to the Great [Powers] the delights of classical war on the European territory."[138]

This concept has been the subject of many misunderstandings and errors of interpretation that began with the origin of the concept. Many, including Gallois, have attributed the concept to Aron and Beaufre. Indeed, Aron described it in his 1964 book.[139] But he sees its

origins in U.S. perceptions. In fact, the idea was already present in the transatlantic debates of the late 1950s, and some Fourth Republic politicians toyed with it.[140] Gallois himself, who was one of the most vocal opponent of this idea, had discussed it at length in his 1960 *Stratégie de l'âge nucléaire*, suggesting that it justified the British program, thus not rejecting it entirely.[141] At the time, Gavois was still a friend of Aron, who claimed later that he never embraced it.[142] As per Beaufre, he completely repudiated the concept.[143]

This misunderstanding stems partly from the fact that there are two possible interpretations of the concept. Aron and Beaufre did not see the *employment* of French nuclear weapons as a means to force the United States into using nuclear weapons for the defense of Europe. They saw the *existence* of French nuclear weapons as a contribution to overall Western deterrence, akin to the UK "second center of decision" theory. Beaufre also thought that "in crisis time, the existence of the third partner allows its powerful ally to intervene only in second position."[144] Thus their perspectives were the reverse of the "hard" trigger interpretation, it was *a priori* (deterrence) as opposed to *a posteriori* (use), and in some circumstances it was supposed to give the United States *more* freedom of action, not *less*.[145] Beaufre mentions one hypothetical situation that entails a less benign version of the concept. In a crisis between the weak and the strong, in a situation of strategic balance, the "powerful ally" would *have* to intervene in the crisis.[146]

Another misunderstanding is about how far French policymakers actually embraced the concept. Prime Minister Debré, for instance, denied that it had any official value.[147] This must be strongly qualified. First, French leaders believed in the "soft" or Aron/Beaufre interpretation.[148] Second, testimonies have revealed that de Gaulle *did* subscribe to the "hard" interpretation of the concept, and referred to it many times in private.[149] "The Alliance does not oblige [the United States] to be at our sides immediately, with all their might and all their weapons. That is why our atomic force is necessary. It is a triggering and driving force. It's the starter."[150] He once used words nearly identical to those of Gallois: "They have understood that we now have the finger on the trigger . . . We are becoming as redoubtable as a man walking in an ammunitions depot with a lighter. . . . Of course, if he lights it up, he'll be the first to blow. But

he will also blow all those around."[151] Giscard referred at least twice to de Gaulle's belief in the trigger concept.[152]

De Gaulle also specifically justified the existence of tactical nuclear weapons by this function.[153] The views expressed by Chief of Defense Fourquet in 1969, are in tune with this interpretation and refer to the "driving effect" (*effet d'entraînement*) on the Alliance that the massive use of French tactical nuclear weapons (TNW) would have close to the battle lines.[154] They were reaffirmed by the Army Chief of Staff in 1975, when he stated that the role of TNW was not only to pose a problem to the adversary but also to force the Allies to renounce flexible response, to the goal of true deterrence: massive retaliation.[155]

Differences between the French and British Approaches.

Overall, this contribution to the security of Europe and the Atlantic Alliance may sound close to the UK position. There are many similarities between the French and UK nuclear philosophies. The importance of nuclear weapons for international prestige and the fear of being relegated to second-rank allies if London did not have its own nuclear weapons were discussed in UK government circles after the war. The need to be a major power again after the trauma of Suez, was present in the UK debates of the 1950s.[156] Common doctrinal tenets include the "proportionality" and "intolerable damage" concepts. Lesser known is the UK's endorsement of its potential ability to do enough damage to the Soviet Union to create an imbalance in the U.S.-Soviet face-off, which would be a factor in deterrence.[157]

However, at least three features distinguished France's nuclear program as it developed after 1958, from that of the United Kingdom. Where the British emphasized Alliance security and solidarity, the French emphasized national independence. De Gaulle rarely justified the French bomb with the "second center of decision" argument. As stated above, he did not view the emerging *force de frappe* as having an exclusively national focus. He could foresee, like some of his predecessors, a situation where French nuclear forces would be combined with those of the United Kingdom and the United States. On this point, he was in tune with the views of Beaufre, who was

enthusiastic about the "second center" argument.[158] But for French political leaders in the 1960s and 1970s, Alliance solidarity was never a prime rationale for the French bomb, in their public discourse, or policymaking. UK forces were "by default" integrated in a NATO context, and, conceptually, a strictly national use would have been an exception. By contrast, the default position of the French forces was a national use, and only if necessary and feasible would coordination have taken place. A paradox here is that the "second center" argument was more valid for France, a country probably deemed by the Soviet leadership to be more independent than the United Kingdom.

Where the British emphasized independence of the authority to use the weapons, the French emphasized independence *in toto*, including operations and procurement once it was evident that no U.S.-French cooperation was possible in mutually acceptable terms.[159] In the absence of Alliance reform post-1967, it was inconceivable that French nuclear weapons would be formally coordinated with U.S. and UK weapons through formal NATO procedures. De Gaulle thought that the British model did not allow for a truly independent use of nuclear weapons.[160] Sir Michael Quinlan argued that there are two forms of independence in the nuclear arena. One is the British model, based on independent authority of use. The other is the French model, based on maximal independence in all dimensions from procurement to operations. In this respect, independence is not unlike the two traditional designs of classical gardens; *à la française* and *à l'anglaise*.

Finally, where the British emphasized the importance of being a nuclear power in order to influence U.S. policy, the French emphasized the importance of being a nuclear power to *avoid* being influenced by U.S. policy. Thus, while adopting the same basic rationale that going nuclear would change each country's relationship with the United States, the political justifications offered by the two European countries were exact opposites.

Evolutions of Official Thinking after the Gaullist Years.

In the 1970s, things evolved somewhat differently from what early French thinkers and officials envisioned. *Tous azimuts* was less

frequently mentioned in official statements.[161] The trigger concept in its pure form fell from grace. While consultation was not excluded, the coordination option was discarded and engulfed by the U.S.-French rift of the mid-1960s.[162] French leaders consistently referred to the "independence of decision" insofar as the employment of strategic nuclear forces was concerned. Consultation and perhaps coordination for the employment of *tactical* nuclear forces in Europe was still an option, but one that was rarely mentioned publicly.[163] However, three features remained.

One was the idea that French nuclear forces protected more than the national territory. This concept was further expounded by Prime Minister Chirac in 1975 ("We cannot content ourselves with 'sanctuarizing' our own territory."[164]) Under Giscard, the idea of participating directly to the forward defense of Europe was clearly accepted, and in 1976, Chief of Defense Staff Méry went as far as using the expression "enlarged sanctuarization," which was the closest France ever came to declaring an explicit extended deterrent posture, with the exception of the 1963 offer.[165] In 1977, Prime Minister Barre explained, as de Gaulle and Pompidou had before him, that due to France's geographical position, the fate of nearby countries would immediately affect her in case of war. According to him, France would be directly affected by aggression in Europe. Therefore, her vital interests had to include "neighboring and allied territories."[166] In 1980, Giscard confirmed that if the time came to think about the employment of tactical nuclear weapons, France would take into account the fact that it was "directly concerned with the security of neighboring European States."[167] And Barre stated even more clearly that aggression against "our vital interests in Europe" would trigger massive retaliation.[168]

The second feature that remained was the idea that French nuclear forces made a significant contribution to the overall security of NATO, notably by adding a margin of uncertainty in the eyes of Soviet planners. As is well-known, this was recognized at the 1974 Ottawa North Atlantic Council meeting, where 16 allies declared that the French and UK independent nuclear forces contributed to the "overall strengthening of the deterrence of the Alliance."[169]

The third feature was the related idea that the existence of French nuclear forces was enough to create an imbalance detrimental to the bipolar order, but beneficial to overall deterrence. Méry said in 1977

that the "damage that we could cause to either superpower would immediately place it in such a situation of imbalance regarding the other superpower that it is doubtful that either could afford to tolerate suffering that damage at any time."[170] Barre said at the same time that "the amount of damage we can cause is . . . sufficient in itself and even more, concerning the great nuclear powers, because of the decisive imbalance that it could introduce in their contest among equals (*duel paritaire*)."[171]

SECTION V: FORGING THE DOCTRINE: TACTICAL NUCLEAR WEAPONS OR THE CRUX OF THE MATTER

As in the United States and the United Kingdom, in France the role of TNW was the object of much controversy during the Cold War, and their official function evolved significantly over the years. In fact, as in the NATO context, the role of TNW was at the core of the French nuclear strategy debate, both in terms of how the use of nuclear weapons was conceived, and in terms of their role for the security of Europe.

A War-Fighting Tool?

De Gaulle's initial views on TNW appeared simple. In 1961, he wanted France "to get atomic projectiles, strategic and tactical." A decision in principle for the procurement of TNW was made in 1963.[172] In 1964, he made it clear to his military staff that the French counteroffensive in a European war would be "all means included, with all classical and atomic fire support."[173] TNW were apparently a war-fighting tool, a bonus with no particular importance (although he thought that the use of TNW in Europe would necessarily lead to a strategic exchange, and envisioned the concept of a nuclear "warning shot" as early as 1964[174]). After the withdrawal from the NATO integrated structure, many in the French leadership saw the procurement of tactical nuclear weaponry as a necessity, in order to replace U.S. weapons previously at the disposal of French ground and air forces and to avoid lacking a military tool that all other European armies had.[175] The armed forces were, of course, interested.[176] While mindful of the fact that France's fissile material stocks were limited,

de Gaulle agreed to the development of a significant TNW program. He was keen to give a boost to the post-Algeria Army's morale.[177] But for him, true deterrence resided in strategic weapons, and at that time he did not think that TNW reinforced deterrence.[178]

Meanwhile, the government defended the idea that TNW were a complement to strategic deterrence and were not to be seen as a war-fighting device. One rationale was to deter the possibility of an attack designed to annihilate the French battle corps.[179]

De Gaulle's last statements on the subject show that he attached considerably greater importance to these weapons, perhaps because of NATO's adoption of flexible response in 1968. Privately he went as far as telling General de Boissieu, soon to be Army Chief of Staff, and also his stepson:

> For, from the time when the 1st Army and the tactical air forces will have tactical atomic [weaponry], the Alliance will not be able to envision our manoeuvre forces only with their conventional means. You will have to let [them] know that you envision counterattacking with the support of our tactical nuclear forces. Thus if the allied high command needs this only strategic reserve in Europe, it will have to decide employing its nuclear fires beforehand or at the same time. Believe me, tactical atomic [weaponry] is an essential component of our defense system. If one day you have to choose, due to lack of credits, between strategic and tactical atomic [weaponry], choose the latter, for it is better to perfect what is happening before the Apocalypse than the Apocalypse itself.[180]

The emphasis on the "trigger" function is certainly one of the reasons why he attached great importance to the political control of TNW use.[181] Such statements confirm that France was not necessarily ready to conduct immediate strategic reprisals in case of Soviet aggression in Europe, and that the first French use of nuclear weapons would have been with *tactical*, not strategic. Of course, one cannot exclude the possibility that de Gaulle was trying to please the Army by overstating the role of these weapons. But then again, since these views were translated into operational guidance, they represented official policy.

Attempts to Define a Specific TNW Doctrine.

The emerging TNW doctrine was fuzzy, to say the least. In 1968, Defense Minister Messmer emphasized their nuclear nature but also

stated that, since classical forces would be equipped with them, there would be less and less difference between conventional and nuclear weapons.[182] In the planning staff, Poirier described the *endowment* of the First Army (the bulk of the French land forces) with TNW as a tool to "test" the enemy's intentions, forcing the enemy to increase the means he engaged in battle. He also discussed their *use* as a possible "warning shot" to the attacking Soviet forces if Moscow attacked French lines and approached the national borders.[183] However, in a famous 1969 speech, Chief of Defense Staff Fourquet distanced himself from the Poirier concept. He emphasized the importance of TNW to fight the Soviet armies. Their use would be a *second* test of enemy intentions, conducted with "maximum efficiency," and manifest France's will to resist. In contrast, Poirier wanted a strictly political use of these weapons to avoid a conventional battle.[184] The *White Paper* was in-between these two approaches. It referred to the original test concept, that TNW would be used if the enemy could not be "contained," thus letting him "know that if his military pressure were to continue, the recourse to strategic nuclear weapons would be ineluctable."[185]

After de Gaulle, the doctrine zigzagged for several years. Confusion reigned. Emphasis on war-fighting, then gave way to the primacy of the political function of TNW. In the early 1970s, there was a flexible response temptation. Pompidou hinted at least once to TNW giving France the means of a "flexible response (*réponse flexible*)."[186] Also, Giscard and Chirac emphasized the specific deterrent role of TNW for contingencies where the threat of a strategic response was not credible, and the "more nuanced" strategy that would result from the possession of these weapons, which helped avoiding the "all or nothing" dilemma.[187]

In the mid-1970s, French political leaders consistently referred to a dual role of "deterrence" and "war-fighting" (*bataille*).[188] Deterrence encapsulated the test function. In 1975, Chirac described at length the Poirier test function. The endowment of the French 1st Army (the bulk of France's land defense forces, based on conscription) with *Pluton* missiles was meant to dissipate all ambiguities in the adversary's mind if he underestimated Paris's resolve. The message to Soviet forces approaching the 1st Army lines was both "you are entering the domain of nuclear combat" and "you are not going to

fight French forces: you are going to fight a country." It was meant to make it clear that engaging the 1st Army meant engaging a nuclear France. But the *Pluton* was also described as a war-fighting weapon. This marked a departure from the Poirier warning shot.[189] Giscard emphasized the term "battle" in his defense policy speeches, and referred to nuclear weapons as the "most advanced" weapons. He once said the employment of TNW was akin to that of—*horresco referens*—an "artillery."[190] He clearly separated TNW from strategic deterrence and referred to them as a means of "protection."[191] At that time the warning shot concept was twisted in a way that gave the impression that it had as much military as political value. Fourquet's successor, General Maurin, mentioned the use of TNW as a "halting strike" (*coup d'arrêt*). Halting provided a pause in the enemy's aggression and gave him a chance to reconsider his plans, a concept close to NATO's guidelines for initial nuclear use.[192] Meanwhile, the trigger concept had not disappeared. A few days after leaving his Army Chief of Staff post, Boissieu, faithful to the memory of his stepfather, reiterated publicly and forcefully the role of TNW as a trigger of Alliance nuclear escalation, and as a way to force NATO into going back to "real" deterrence.[193]

The 5-year defense plan adopted in 1976 contained these ambiguities and did not clarify them, saying that the presence of TNW in the battle corps added to both their deterrence and warfighting abilities. But the plan also stated that the use of TNW would set the record straight vis-à-vis an adversary who had misjudged the frontier of French vital interests or its determination to defend them.[194]

A Political Tool: Emergence of the "Final Warning" Concept.

Beginning in 1976 the political function of TNW and its link with strategic weapons was increasingly emphasized, especially with the emergence of the concept of "final warning." In 1976 Méry said that TNW would be used *primarily* to indicate a change in nature of the conflict.[195] In 1977 Barre referred to TNW as being first, weapons of deterrence, and if deterrence failed, being secondarily weapons that provided a "last and solemn appropriate warning, before the

Apocalypse."[196] Elements of war-fighting had disappeared from the doctrine, and the nuclear nature of TNW was increasingly emphasized over its tactical character. The "final warning" would be the defining rationale for French TNW. This was not exactly the warning shot envisioned by Poirier because the policy continued to emphasize the need for a significant military effect of TNW use. Nor was it a mere imitation of NATO doctrine. There could only be *one* warning, and the idea of "restoring deterrence" was, at the time, emphatically rejected in the official rhetoric.[197]

SECTION VI: OUTCOME: ASSURED DESTRUCTION *A LA FRANÇAISE*

How far were these concepts translated into actual nuclear force posture and targeting? The first French nuclear test, dubbed *Gerboise Bleue* and supervised by General Ailleret, was a success.[198] In December 1960, a plan to develop a bomber and submarine force armed with fission and thermonuclear weapons was voted by the Parliament. A 36 *Mirage-IV* nuclear bomber force was set up between 1964 and 1966. The production of ballistic missiles went fast. Based on preliminary studies and tests conducted during the Fourth Republic, the space and ballistic program initiated in 1960 came to fruition in 1964. After some difficulties, the first thermonuclear test was done in 1968. Initially just an interim solution before the sea-based leg matured, 18 ground-based missiles were deployed in 1971-72.[199] The first fleet ballistic missile submarine (SSBN) went on alert in 1972. Thus less than 15 years after de Gaulle's return to power, France became the third country to develop an operational triad of strategic nuclear forces.

The Definition and Evolution of French Targeting Doctrine.

As a nuclear power, France came of age later than its Anglo-Saxon allies. Its initial reflections about targeting were less influenced by air power debates and the experience of World War II than these reflections had been in the United Kingdom.[200]

The French debate on the best way to implement "proportionality to the stake of the conflict" targeting had two starting points. First

was the consensus on targeting cities. For many such as Gallois, the anti-cities strategy was deterrence in its purest form. Flexibility and counterforce were degradations of the very essence of deterrence, and the art of military operations was meaningless when applied to nuclear weapons.[201] Gallois also used classical arguments such as the mobility of adverse forces, and the risk of striking empty silos.[202] Most experts believed that targeting cities was the only way to ensure damage of sufficient scope to deter the adversary. The U.S. debates on the credibility of massive countercities strikes were deemed not applicable to small European countries whose very survival were at stake in an East-West conflict.[203] In the United Kingdom, such arguments were apparently not as powerful. Early UK targeting debates, within Royal Air Force circles, focused on targeting Soviet air bases.[204]

The second starting point was the so-called "equivalence" concept. In a war with the Soviet Union, the stake would be no less than the existence of France itself. So, the damage sought had to be *equivalent to the destruction of France* in demographic, economic, or even geographic terms. The genesis of this idea is hard to retrace. Some early French works on nuclear strategy mentioned it.[205] De Gaulle endorsed it. He told the Council of Ministers in January 1963 that the nuclear force made it possible "to kill as many Russians as there are French" thus bringing the "certainty that they would not attack."[206] The *White Paper* alluded to it indirectly when it suggested that France, being only a medium power, did not need an arsenal equivalent to that of the great powers. The concept continued to appear episodically over the years, in particular in the writings of Gallois[207] and was mentioned by Giscard after leaving office: "French nuclear forces have been calculated to permit reaching a population of the adversary of the same order as that of our own country. If France were destroyed, our adversary would lose the equivalent of France."[208]

However, public discourse and expert analysis on targeting strategies remained rather vague, if not confusing. Populations *per se*, cities, Soviet "potential," "economic function," "resources," "vital centers," or "vital works" were referred to alternatively.[209] One reason was that many in France placed a higher value on the psychological than on the physical underpinnings of deterrence. De Gaulle said

at the end of his 1956 meeting with Gallois that a French deterrent only needed to "tear an arm" of the aggressor.[210] He enjoyed such vague expressions as "frightful destructions," "deadly wound," "destructions beyond repair" or "frightful wounds."[211] In his 1960 book, Gallois emphasized the need to target the "demographic system" of the adversary but also interchangeably referred to population and cities' targeting as the most potent and cost-effective deterrent and suggested "frightful reprisals."[212] For him, the goal was to "break the political and social structure" of the adverse country.[213]

Two points are clear. First, historical evidence shows that, contrary to popular beliefs, French leaders, from the onset, were interested in targeting the Soviet economy as much as its population. In 1961, de Gaulle mentioned the planned French ability to threaten "about 65 percent of the Soviet potential" by 1965.[214] His instructions given in December of that year were to "inflict to the Soviet Union a notable reduction, that is, about 50 percent, of its economic function."[215] In private conversations, he also alluded to the fact that a French strike would destroy many "kombinats, dams, and power plants."[216] In 1962, he said that France would soon be able to kill "20 million" and mentioned the goal of threatening 25-50 percent of the adversary's population.[217] The next year, he referred to the potential of killing "40 to 50 million" by 1971.[218] These were private statements. Publicly, he just mentioned the "sombre and terrible capacity [of the French force] to destroy in a few instants millions and millions of people."[219] For his part, Prime minister Messmer referred to cities as being both "demographic and industrial targets."[220] A decade later, Prime minister Barre referred to "the major urban concentrations of an adverse nation, where the greatest share of its demographic and economic power is concentrated."[221]

Second, it is possible to say that the original targeting guidance focused on 20-40 cities. "It is probable that a few tens of projectiles or thermonuclear warheads" would be enough, said Gallois.[222] He regularly mentioned about 30 cities as targets.[223] In 1961, de Gaulle mentioned the planned French ability to "destroy 20 Russian cities" by 1962.[224] Such a number corresponded to early U.S. and UK strategic planning.[225] But it may also have been derived from a calculation

based on the "equivalence" concept, since it was predicted that about 30 thermonuclear weapons could destroy France.[226] De Gaulle referred several times to Moscow, Leningrad, Odessa, and Kiev as prime targets.[227] An example of early French nuclear planning might include six to seven bombs on Moscow, two to three on each major city, and one on a dozen other significant Western Soviet cities.

By the mid-1970s, under Valéry Giscard d'Estaing, the first post-Gaullist President, some attention was apparently given to a diversification of targets. As a result, targeting policy may have become "less demographic, more economic." The 1977-82 Defense Plan contained no explicit reference to cities. Strategic targeting was described as "the annihilation of vital targets."[228] Open sources offered a variety of rationales for a shift in targeting. One was the fear that Moscow would develop large-scale civil defense and anti-ballistic programs to ensure, directly or indirectly, the protection of the Soviet population. In March 1977, Chief of Staff Méry remarked that some key economic assets were located in low-population zones, which implied that alternative targeting policies were possible.[229] This was not an isolated trial balloon. Other MoD officials publicly hinted at such a shift for the same reason, and emphasized the difference between anti-cities and anti-demographic targeting.[230] A major parliamentary report issued in 1980 suggested the same rationale, and added others: the fact that the Soviet leadership would not necessarily be deterred by threats against its population, and the bonus added by a strategy that made economic recovery difficult.[231] Clearly such ideas were being widely debated in policy circles. A final rationale—stated *a posteriori*—was based on ethical grounds. Giscard said that, when in office, he refused to give targeting instructions in the form of a percentage of the Soviet population. His guidance was "the destruction of 40 percent of Soviet economic capabilities before the Urals, and the disorganization of the country's leadership apparatus."[232]

There is little evidence of the extent to which this orientation translated into operational planning. In fact, Giscard continued to refer to demographic targeting after he left office. One unconfirmed source said he asked the Joint Staff in March 1980 to "submit to his approval diversified objectives that would not exclusively concern big agglomerations, but be directed at targets such as

military installations, centers of economic activity, and perhaps secondary cities."[233] One thing is clear. By 1980, official references to demographic targeting per se had disappeared, replaced by the mention of "cities" and "the economy" of the aggressor.[234]

All in all, the best overall characterization of French targeting philosophy at that time might be "no-counterforce," since the option to target Soviet nuclear forces was consistently opposed by French officials. Such an option was judged not efficient (the Gallois arguments), not faithful to the principles of deterrence (a "warfighting strategy" according to Barre) or inapplicable to France because, for geographical reasons, any major war in Europe engaged its vital interests.[235]

Thermonuclear Weapons, Multiple Independent Reentry Vehicles (MIRV), and the Road to "Sufficiency."

In the mid-1970s, megaton-yield warheads were introduced simultaneously on the ground leg (the S3 IRBM) and on the sea leg (the M20 sea launched ballistic missiles [SLBM]) of the French triad. This change, combined with the entry into service of additional SSBNs, led to a dramatic increase in France's total explosive nuclear yield (20 Mt in 1974, 84 Mt in 1981). There were hints at a threshold being crossed.[236]

France had sought thermonuclear warheads since 1960, in particular to have the same means as its allies. But the deployment of the new systems was also part of an acquisition strategy designed to evade Soviet defenses, notably through hardening and penetration aids. The TN61 warhead deployed in the late 1970s was the first French warhead that fully took into account Soviet defenses. The need to penetrate such defenses was a prime rationale for the development of MIRV loading, with a considerable increase of the number of warheads.[237]

The MIRV program may be evidence that Moscow was a key objective. Being both the capital and the most populated of Soviet cities, it was a lucrative target. One boatload of 96 MIRVed warheads was judged sufficient to degrade Soviet defenses.[238] However, what the UK called the "Moscow criterion" may not have been as central for Paris as it was for London. France had a larger force than its

neighbor, and its "mini-triad" symbolized that it considered itself a "mini-superpower." Remaining the third nuclear power was important for political leaders in the 1970s. France was able to inflict massive damage to the adversary, not necessarily focusing on the capital as the United Kingdom might have done in its national targeting plans. And the efforts to evade defenses may have been designed to counter possible future Soviet defenses beyond the Moscow region.

The notion of "unbearable" or "intolerable" damage to the Soviet Union, out of proportion with the stake of a conflict, became the main factor in defining the level of the French nuclear arsenal. The idea of bringing destruction that was considered unbearable by the adversary was already present in the 1960s speeches of political leaders.[239] Poirier introduced the expression "intolerable damage" in France in 1972.[240] In 1981, the expression became "unbearable damage."[241]

The required quantity and quality of weaponry for such a goal would be called "sufficiency." This captured two ideas. One was a rejection of overkill. It was a Gallic version of finite or minimum deterrence. As stated above, de Gaulle said that "since a man and a country can only die but once, deterrence exists as soon as one can mortally wound the potential aggressor."[242] The other idea was a rejection of parity.[243] This, too, was linked with the notion of proportionality but in a different way. Parity was rejected on several accounts. France had no counterforce strategy and thus did not need to take into account the force levels of the adversary. It was not a major power and thus did not need parity for political reasons. Finally, it did not have the means to develop an arsenal as important as the U.S. or Soviet ones.[244] As de Gaulle had stated in 1962: "We do not have the ambition to make a force as powerful as those of the Americans or the Soviets, but a force proportionate to our means, our needs, and our size." A few months later, he said: "The question is not to raise ourselves at the same level as the others. The question is to represent a reprisals capability sufficient to have [the adversary] renounce to his aggression."[245] Such a vocabulary was widely used in the early 1970s. Poirier referred to a "necessary but sufficient" level of weaponry.[246] President Pompidou used a similar vocabulary.[247] "Sufficiency" came into use later in the decade.[248]

"Unbearable" Damage?

Was the strategy credible? A firm answer to this question would require a thorough historical research of Soviet perceptions of French Cold War policies. One thing that can be tested, however, is the coherence of intentions and capabilities.

Platforms	Nominal payload	System range	Total operationally available warheads (max.) / Yield[249]	Total yield
1967				
36 Mirage-IVA	1x AN21 bomb	~3,000 km[250]	36 AN21 (60 kt)	2.16 Mt
36			*36*	*2.16 Mt*
1974				
36 Mirage-IVA 18 IRBM silos 2-3 SSBNs	1x AN22 bomb 1x S2 IRBM 16x M1/M2 SLBM	~3,000 km 3,000 km 2,500/3,000 km	36 AN22 (60 kt) 18 MR31 (150 kt) 32 MR41 (500 kt)	2.16 Mt 2.7 Mt 16 Mt
56-57			*86*	*20.86 Mt*
1981				
36 Mirage-IVA 18 IRBM silos 4-5 SSBNs	1x AN22 bomb 1x S3 IRBM 16x M20 SLBM	~3,000 km 3,500 km 3,000+ km	36 AN22 (60 kt) 18 TN61 (1 Mt) 64 TN60/61 (1Mt)	2.16 Mt 18 Mt 64 Mt
58-59			*118*	*84.16 Mt*

Table 1. Evolution of French Strategic Nuclear Forces.

Calculating the exact effects of a massive nuclear strike is no small feat, and involves many debatable assumptions. For U.S. Defense Secretary MacNamara's team, destroying only 30 percent of the Soviet population and 75 percent of its industry required no less than about 400 megaton-equivalent (MTE).[251] And in 1966, to destroy 22.5 percent of the Soviet population and 52.4 percent of its industrial production reportedly meant destroying 100 cities.[252] France at that time, with its 36 *Mirage-4s* armed with *circa.* 60-kt weapons, was obviously unable of producing such results. Assuming about 30 aircraft dropped their bombs, they would inflict damage on up to 30 cities. By 1970, according to Poirier, France had the capacity of killing

only 14-18 millions Soviets with a 50 percent probability of success.[253] However, additional data and more optimistic calculations provided in 1974 by a U.S. analyst allows for a different perspective.[254]

Number of cities Needed	Population	Percent of Total Population	Percent of Urban Population	Percent of Industry	Number of 1-Megaton Warheads
10 main	21 million	8.8%	15.7%	25%	31
30 main-Western part	33 million	13.8%	24.5%	25-40%	57
30 main	37 million	15.4%	27.3%	25-40%	~60
50 main	46 million	19.1%	33.8%	40-50%	85

Table 2.

From these numbers several conclusions can be inferred. First, whatever the deterrent power of French nuclear weapons up until the late 1970s, they did *not* fulfill the objectives stated by the political authorities. Second, by 1980-81, with 82 one-megaton warheads on line (plus 36 bombs), the situation changed dramatically. By that time, France was *fulfilling the "equivalence" criterion* and was able to threaten the rough equivalent of its population. This met de Gaulle's 1961-62 criteria of being able to target half of the Russian population.[256] In fact, the French came very close to meeting MacNamara's assured destruction criteria in their latest and least ambitious variant, assuming it was able to target the 50 main Soviet cities.[257] This last point warrants further historical research. It may be just a coincidence, it may also be a direct imitation of U.S. strategy, or it may be the product of identical judgements made by France and the United States on what would have been "unacceptable" to the Soviet Union whatever the stake of the conflict.

SECTION VII: ASSESSMENT: THE ORIGINS OF FRENCH NUCLEAR STRATEGY

The five experts identified above played a role in forging the French strategy, but their reputation in France and abroad is overvalued. In contrast, the importance of other inputs (U.S. and

UK in particular), is underestimated. Other key factors in designing French strategy include de Gaulle's personal preferences and the financial and technical resources available.

The Diverse Impact of French Thinkers.

The Overvalued Role of Gallois. Pierre-Marie Gallois (the only air force officer among the group) was, of course, a key element. He had numerous personal meetings with many top French officials, including de Gaulle and Premiers Mendès-France and Mollet.[258] He undoubtedly made an impact on political decisionmaking by helping to build a consensus on developing nuclear weapons. Also, some concepts that can be attributed to Gallois made their way into the French strategic culture. One is the idea that deterrence should and could only be national. As stated in the 1972 *White Paper*, "the nuclear risk cannot be shared."[259] Another is the more elaborate concept which states that the existence of a small nuclear force could create a situation detrimental to the Soviet Union in its face-off with the United States. Gallois may also have been the first author to introduce the expressions "vital interests" and "sanctuary." While the latter faded from the official vocabulary, the former became a central feature of the doctrine.[260]

But Gallois does not deserve his reputation as the father of French nuclear doctrine. *Stratégie de l'âge nucléaire*, published in 1960, has often been considered the textbook of French strategy. While this book was important in popularizing the emerging nuclear policy debates, only a few lines in it are devoted to the possibility of an independent French bomb. Although de Gaulle reportedly read and approved many of his publications, the two generals, who were of different generations, never developed a close personal relationship.[261]

Gallois' ideas were, in fact, a caricature of French thinking. Whereas de Gaulle thought that nuclear weapons and integration were incompatible, Gallois suggested that nuclear weapons and alliances were incompatible. MacNamara thought that small independent nuclear forces were "prone to obsolescence, and lacking in credibility."[262] Gallois, in essence, reversed the argument, saying that nuclear weapons made alliances obsolete and not credible in

a time of mutual vulnerability.[263] He derided the planned NATO Multilateral Force by calling it the "multilateral farce." He carried all his arguments to the extreme. For him, the concept of "imbalance" was a possible justification of nuclear proliferation. An early proponent of the "more may be better" thesis, he was invited to Baghdad to give lectures.[264] Whereas Ailleret thought that flexible response was not applicable to the European continent, Gallois was of the opinion that the doctrine just did not make sense.[265] Whereas de Gaulle left himself a margin of manoeuvre in case of a strictly conventional attack, Gallois thought that massive reprisals should be automatic. For him, there was no flexibility, refinement, or significant role for conventional forces: "all or nothing."[266] Deterrence was a pure contest of wills between two nations, the ultimate exercise in brinkmanship. For him, what mattered the most in the deterrence calculus was that even though the probability of massive retaliation by the weak might be small, the penalty was so huge that this small probability was enough to guarantee that the strong would not attack. As one commentator later put it, "Gallois preferred retaliation so automatic that no unfriendly nation would dare be provocative, but even a small risk of retaliation might be sufficient."[267]

It should thus come as no surprise that Gallois ended up disagreeing strongly with many features of French strategy as it developed and matured. These included the "trigger" concept, the notion that the French force could protect more than just the national territory, and the development of a specific tactical nuclear weapons doctrine. Thus the only concepts that are truly original in French nuclear thinking were precisely the ones that were the most adamantly opposed by Gallois.

*The Underappreciated Contribution of Beaufre***.** What of the other four major intellectual players—Ailleret, Poirier, Aron and Beaufre? Charles Ailleret played a very important role. He was a key lobbyist for the French nuclear program. He clearly understood the value of nuclear weapons for strategic bombing, for operations on the battlefield, and for deterrence. He was among those who persuaded de Gaulle to build tactical nuclear weapons. He was also a key operator in the nuclear program, from his days as head of the Army's Special Weapons Command, to his responsibilities for the preparation of the first nuclear tests and his tenure of head of the

armed forces after 1962. But he did not have any significant input in the definition of the key concepts of French strategic nuclear doctrine apart, perhaps, for his early use of the expression "vital works" of the aggressor as prime targets.

Lucien Poirier was a significant operator and particularly valuable in the internal formalization of French doctrine through his writings. Many of his articles were co-authored with Ministry of Defense (MoD) colleagues between 1966 and 1968.[268] The conclusions of these documents were reportedly approved by de Gaulle.[269] His "test" and "warning shot" dual rationale for tactical nuclear weapons were included in the 1972 *White Paper*. But the "warning shot" had been envisioned by de Gaulle at least as early as 1964, and the French TNW doctrine evolved in a way that Poirier did not approve, in that it eventually emphasized the need to achieve effective military results. More generally, his influence was a bit overvalued because of his prolific and intellectually ambitious writings.[270]

Raymond Aron was of two minds concerning France's nuclear effort. He saw it as a means to force the United States into sharing nuclear technology and having a meaningful dialogue with them on strategic issues. He viewed it as a possible prelude to a European deterrent, as well as an insurance policy against "the imprevisibility of the diplomatic future."[271] He also recognized that it could be in some respects a contribution to Alliance security. But he became the most vocal opponent of the emerging French doctrine. Originally a close friend of Gallois, he later called him the "world champion of dogmatism" and his theses a "logical delirium."[272] Opposing the withdrawal from the integrated military structure, he argued that a small deterrent force such as France's was vulnerable, and would not be able to inflict sufficient damage to be credible.[273] He derided other arguments, such as political influence, in favour of a French bomb.[274] Aron had a critical role in intellectual and political debates, and contributed immensely to the formation of French strategic culture. He brought to the table his excellent knowledge and understanding of the U.S. strategic concepts. But he did not play an important part in constituting French official doctrine.

Finally, André Beaufre may be the most under-appreciated intellectual contributor to the formation of the doctrine. He was initially isolated from the Gaullist camp represented by Ailleret.

During the war, he was the main military aide to General Giraud, de Gaulle's rival. Later he was the herald of the pro-NATO faction in the armed forces, along with other generals such as Valluy and Stehlin. Thus, his vision was much closer to that of Aron, though the two never collaborated directly. But his views on several issues, such as the potential of tactical nuclear weapons and the contribution of French nuclear weapons to Alliance security, provided a strong intellectual backbone to de Gaulle's policy. As head of an inter-allied tactical studies group (a competitor to Gallois's New Approach Group [NAG]), he gave a key briefing to the French Chiefs of Staff in November 1954.[275] He emphasized the importance of the link between tactical and strategic nuclear forces, and how the link served to avoid a situation where neutralization at the strategic level made conventional conflict possible. "It is indispensable that [the classical] level be made inseparable (*complètement solidaire*) from the nuclear level through the threat of tactical atomic weapons use. It is only at that price that nuclear deterrence can be fully efficient on the classical level." [276] The primacy he gave to the hypothesis of "multilateral deterrence"—the idea that French doctrine was credible only in the context of a broader Alliance vs. USSR context—was shared by political leaders. Authors such as Poirier and officials such as Méry agreed that in a hypothetical bilateral face-off with Moscow, the *dissuasion du faible au fort* might not be operative.[277] As a NATO staff officer, a member of the MoD's Policy planning staff, and later as the founder of the first French military think tank (the French Institute for Strategic Studies), he had the opportunity to weigh in on the formation of the national doctrine.[278] And, as a master of formal models and conceptualization, he was an inspiration for later experts such as Poirier.

The Importance of U.S., UK, and NATO Inputs.

There was undoubtedly "something French" in the nature of the strategy constructed in the early 1960s. The strategy's logical consistency, simplicity, conceptual elegance, and its refusal to focus on technicalities reflected the French character.[279] However, the French nuclear mythology does not do justice to the importance of

UK and U.S. inputs to the origins of French strategy. Indeed, it can be said that the French massive retaliation doctrine was to a large extent inherited from Allied thinking.

This should not come as a surprise. The UK government's adoption of a national massive retaliation strategy attracted attention in the early years of the French program.[280] In *Stratégie de l'âge nucléaire,* Gallois describes at length the British deterrent and implicitly tells his French readers that Paris could adopt the same posture. In 1963 he acknowledged that the UK example was a "model" for France.[281] Indeed, deterrence of the strong by the weak and its logical implications were implicit in UK doctrine as early as 1957-1958.[282]

Most importantly, the French military thinkers all had NATO experience and numerous interactions with allied experts, in particular with the RAND Corporation, then the intellectual breeding ground of U.S. nuclear strategy. Beaufre held several NATO positions, including deputy-Chief of Staff at Supreme Headquarters Allied Powers Europe (SHAPE), and French representative to NATO's Standing Group. In 1952-53, he pioneered studies about early and massive use of tactical nuclear weapons.[283] Gallois was one of the authors of MC-48. As one of the four so-called "hot colonels" forming the NAG, he helped design NATO's version of massive retaliation in 1953-54.[284] The French liked the 1950s NATO strategy so much that they stuck to it, at least in spirit. The *dis*proportionate deterrence concept was probably a direct import from U.S. strategy as described in John Foster Dulles's seminal 1954 article. Ten years later in 1964, as NATO rethought its strategy under U.S. pressure, Ailleret published two articles of quasi-official value. These articles emphasized early strategic and tactical use of nuclear weapons, akin to the "sword and shield" NATO conception which had been abandoned.[285]

Other allied inputs to French strategy included the concept of "unbearable" or "unacceptable" damage. The former expression was included in the UK *White Paper* of 1962, and the later was used by the U.S. Government in the early 1960s.[286] Another borrowed concept was "sufficiency." The rejection of superiority was mentioned in UK documents from 1952 onwards.[287] The term sufficiency was introduced by the Nixon administration in 1969. As mentioned above,

there is a troubling coincidence between the French "sufficiency" level and the U.S. criteria for "assured destruction" (a term later used by French leaders). Finally, one suspects that the later French debates about the diversification of strategic targets were influenced by the same debates that took place under the Nixon and Ford administrations.

U.S., UK, and NATO inputs to French nuclear culture have yet to be fully acknowledged by experts and policymakers on both sides of the Atlantic, especially in Paris where they remain today, to a large extent, the repressed memories of the French nuclear education.

The Importance of De Gaulle's Personal Preferences and Pragmatism.

French strategy was, above all, de Gaulle's strategy. The General was an important provider of ideas, such as *tous azimuts*. On the French contribution to the security of NATO and Europe, his personal positions were radically different from those of Gallois. A strong believer in the value of the Atlantic Alliance, he was ready to coordinate the use of "his" forces with those of London and Washington, and thought that "American nuclear weapons . . . remain the essential guarantee of world peace."[288] The Gallois and Poirier conceptions of a pure national deterrent were not his, neither would they be his successors."[289] Until at least the mid-1960s, he mused about a strategy of graduated strategic response.[290] He approved the development of TNW as a tool for a more flexible strategy than the one described in 1964 by Ailleret (who was ready to renounce such weapons in order to build ICBMs[291]). He rarely used the word "sanctuary," with its rigid connotations.

As an analyst put it: "[Gallois's] 'absolutist' thinking should not be confounded with de Gaulle's, more pragmatic, more flexible, more ambiguous too. De Gaulle did not refute solidarity with the members of the Atlantic Alliance, nor conventional forces, supported by tactical nuclear weaponry, nor the notion of battle."[292] In fact, one could say that de Gaulle made a *synthesis* between the Gallois-Poirier "pure-national deterrence" model and the Beaufre-Aron "flexible-transatlantic deterrence" model, while at the same time adding his own ideas such as *tous azimuts*.

De Gaulle's pragmatism and open-mindedness is also reflected in the fact that he did not seem to mind French strategy being determined to a large extent by the means available. What mattered to him was that the basic tools were there, and that there was a political will to use them.[293] Doctrinal and technical refinements were of secondary importance. In the words of a leading French historian, "De Gaulle was only distantly interested in the theoretical aspects of deterrence strategy. A pragmatic before all, he considered in any case that a strategic doctrine could only be built from means. . . ."[294] In 1960, he told the Defense Council: "the force de frappe is a political weapon, technical precision is not essential."[295] This was in line with his thinking on military strategy. As early as 1944, he said: "May French military thought resist the old attraction of preconceived thinking, of absolutism and dogmatism!"[296] The "thank you" notes he wrote to the experts who respectfully sent their works to the Elysée were particularly revealing. To Aron he wrote: "I know that there is no respite for theologians." To Beaufre he wrote a more serious and less dismissive formula: "[I]n these matters, there is no worthwhile practice other than to depend on men and on circumstances."[297] This did not mean that he was a supporter of "existential deterrence." His insistence on the ability to threaten a given portion of the Soviet State or population gives little room for such an interpretation. Nevertheless, the political dimension of deterrence was always given primacy over the operational dimension. As he half-jokingly said once about the upcoming *Mirage-IV* force, "[W]e don't have fighter aircraft, we have fear-inducing aircraft."[298] He believed that as soon as it existed, the French bomb, despite its limited destructive power, would have *some* impact on the adversary's intentions.[299]

The Importance of Resources.

This therefore implied that the strategy would be strongly influenced by the financial and technical means available. Although naturally inclined to define specific concepts, those de Gaulle called the theologians did not necessarily mind this constraint. Gallois referred often to the importance of the "strategy of the means."[300] After all, small countries such as the UK or France *had* to have the most cost-effective strategy.[301] But many French experts, especially

after de Gaulle, sought to enshrine the national nuclear doctrine in a rigid and elaborate theoretical framework, an approach not in line with the way the founder of the Fifth Republic thought about policies in general, and about nuclear policy in particular.

The targeting debate and the evolution of French forces is particularly telling about the relationship between concepts and resources, and reveals the importance of the "strategy of the means" as a driving factor in French Cold War nuclear strategy.

The Western or European part of the USSR comprised most of Soviet demographic, economic and political power. The 3,000 km range of France's aircraft and missiles was adapted to this fact. However, the development of longer-range systems were also much costlier. Notwithstanding the fact that *tous azimuts* was perhaps as much a political point as a well-thought strategy, its actual implementation would have been very difficult. The 8,000 km ICBM program that was considered and defended by Ailleret as the true *tous azimuts* weapon was judged too expensive, especially in the post-May 1968 budgetary situation.[302]

Likewise, lack of intelligence, low accuracy, and the relative paucity of fissile materials drove France, as other nuclear powers before and after her, towards what was viewed as the most cost-efficient targeting strategy. In 1963, Messmer said that targeting cities was the only option that made sense given France's means.[303] Barre referred to the French strategy 14 years later as being, *inter alia,* "the less costly" option.[304] In 1980, he stated that even if it wished to have a counterforce strategy, "France, a medium-sized nation with limited resources, cannot pretend seeking parity with the two great nuclear powers. The only way which is opened to us is that of the current strategy."[305]

Nuclear weapons soon became a justification for avoiding major expenses in other fields, such as classical forces and defenses. France, like other European allies, refused to augment classical forces to a point where they could resist a conventional invasion of Europe.[306] France never considered missile defense for herself. Such refusal was consistent with its strong rejection of civil defenses, to which the French were adamantly opposed. They thought such defenses might be seen in the eyes of the adversary as a "weak" posture signalling

a lack of faith by French leaders in the validity of their deterrent. However, the rejection of defenses can also be partially explained by France's inability, from a budgetary point of view, to modernize its nuclear forces, build an antiballistic missile (ABM) system, and build numerous fallout shelters. Since there was a strong belief among French elites in the value and efficiency of nuclear deterrence, budgetary concerns were probably not a dominant factor, but they no doubt played a part.[307]

Is the same logic applicable to the possible shift in targeting policy described above? In the late 1970s, the introduction of MIRVed systems was planned and scheduled for circa 1985. French thinkers and officials knew that the foreseeable increase in the number of warheads, as well as perhaps a better CEP, gave additional flexibility in targeting. Moreover, it was clear from U.S. calculations that an increase in warheads was better spent on industrial than on population targets; the efficiency curve was much steeper. Giscard claimed that the range of the future M4 missile was defined because of his new targeting instructions, but also that the new targeting guidance had been "proposed" to him by the military staff.[308] One source says that he "notified" the Joint Staff in March 1980 to have new plans prepared that would be adapted to the introduction of MIRV.[309] This point thus remains unclear.

CONCLUSIONS:
FRENCH STRATEGY IN A HISTORICAL PERSPECTIVE

A Resilient but Adaptable Doctrine.

Up to 1981, French nuclear doctrine remained remarkably faithful to its basic tenets as defined by de Gaulle: a small, "sufficient" deterrent force independently operated and targeted, which would only defend France's vital interests. The concept was that, if Moscow unmistakably signalled its intention to conquer France, struck the country with nuclear weapons, or crippled the French State as an organized entity, Paris would launch a single massive retaliatory strike on key Soviet cities, causing superior damage to the stake that it represented.

This resiliency stemmed from several factors. One was the simplicity and logical consistency of the French strategy. Another was certainly the relative paucity of means available, which to a large extent saved France from debates such as counterforce vs. countervalue, or offense vs. defense. A third was probably the hesitation of French presidents to fundamentally alter the heritage of de Gaulle, who remained an inescapable reference for most French politicians.

At the same time, by 1981 the doctrine had become was more focused than the Gaullist approach (by getting rid of *tous azimuts*), and more flexible than what the leading French strategists wanted (by suggesting that it would contribute to the overall security of Europe, by introducing TNW as a tool of deterrence, and by broadening the range of targets). Also, the numbers and explosive power of the force had dramatically increased, making it more credible than in 1967.

France adopted many allied concepts, but also developed some of its own. There were always two distinct dynamics in this regard. One was a process of *imitation* of allied concepts, either through the introduction of exogenous ideas or through a logical process identical to evolutions in other countries' thinking (including the adaptation of strategies to means available). Another, which came along with France's more autonomous stance and the Alliance's own evolution, was "dissociation." Dissociation applied to the maintenance of a strategy discarded by NATO, to the apparent abandonment of the "consultation-coordination" option, and to the affirmation of some original concepts (*tous azimuts, détonateur, chèvre au piquet, ultime avertissement*).

Can it be said, as some have argued, that opposition to flexible response had only a political purpose, and that in fact France ended up having a strategy very close to that of the Alliance?[310] This seems an exaggeration. There were sound conceptual bases for the country to endorse a massive retaliation strategy. Although French strategy was more flexible than it was in the beginning, there remained irreconcilable differences with U.S. and NATO concepts. France refused to consider strategic counterforce options, the massive use of tactical nuclear weapons in a "direct defense" scenario, or any kind of follow-one use of TNW. The "final warning" concept exemplified a compromise between massive retaliation and flexible response.

A "Minimum Assured Destruction" Capability.

How relevant is the French example to the history of MAD? The expression "mutual assured destruction" was never part of French official nuclear rhetoric.[311] The "mutual" part was, of course, not relevant to a "deterrence of the strong by the weak" posture. And, in practice, there was no conceivable contingency where France would be alone in facing the Soviet Union with the rest of the Alliance as spectators. But France's nuclear history nevertheless brings interesting insights for the broader history of the massive retaliation and assured destruction concepts. As seen above, far from being a truly original creation, the initial French doctrine was largely inherited from U.S., UK, and NATO doctrines of the 1950s, including the Dulles 1954 concept. Later, the expression "massive retaliation" itself was occasionally used.

Interestingly, France also seems to have been inspired later by MacNamara's brief flirtation with a pure assured destruction strategy, and it is possible that U.S. calculations on the requirements of such a strategy had an impact on French debates on "sufficiency." French experts and leaders were quite conscious of the importance of a second-strike asset, and a SSBN program had been in the works since 1960. Given the small size of the French territory, other options had too many drawbacks.[312] In 1973, President Pompidou referred to the emerging "assured second strike" capability of France.[313] By the late 1970s political and military leaders hinted in public speeches that a threshold was being crossed. In 1980, Barre stated explicitly that France had reached "a deterrence capability making it able to prevent major aggression."[314] Indeed, in 1981 the fifth SSBN entered service, which allowed up to three boats to be on patrol at all times. It also allowed launching on generated alert, in a second-strike situation, up to 64 warheads (four loads of single-warhead missiles).[315] At the same time, the French deterrent's total yield was considerably increased with the introduction of thermonuclear weapons of megaton yield. Such capabilities allowed for the targeting of about 50 cities, representing about 20 percent of Soviet population (46 million people, the rough equivalent of France), and 40-50 percent of Soviet industry. These percentages were similar to MacNamara's

1968 criteria for assured destruction. That may be what allowed Prime Minister Barre to state that "France has achieved a deterrence capability allowing her to prevent a major aggression," which he described as the ability to threaten the adversary with "the assured destruction of a notable part of his cities and his economy."[316] In other words, France had achieved what could be called a "minimum assured destruction" capability.

ENDNOTES - CHAPTER 2

1. Some of the most thorough analyses of French strategy have been conducted by foreign experts such as Philip Gordon, Beatrice Heuser, Lothar Ruehl, Diego Ruiz Palmer, and David Yost. On the early French nuclear program, the works of Wilfrid Kohl and Lawrence Scheinman, as well as the Norris, Burrows & Fieldhouse Nuclear Weapons Databook Vol. V, are useful sources. Since the late 1980s, important scholarly work has been conducted in France on the nation's defense policy and nuclear program, in particular by Frédéric Bozo, Samy Cohen, Marcel Duval, Dominique Mongin, Georges-Henri Soutou, and Maurice Vaïsse. Also, new insights on Gaullist thinking have been provided by the writings of Jean Lacouture and Alain Peyrefitte. The works of these authors were particularly useful in researching for this chapter. The author would also like to thank Sir Michael Quinlan and Dr. David Yost for their thoughtful comments on an earlier draft of this chapter.

2. See Université de Franche-Comté/Institut Charles de Gaulle, *L'aventure de la bombe*: *De Gaulle et la dissuasion nucléaire 1958-1969*, Paris: Plon, 1985; Pierre-Marie Gallois, *Le sablier du siècle: mémoires*, Lausanne: L'Âge d'homme, 1999, pp. 370-373; and Dominique Mongin, *La bombe atomique française 1945-1958*, Brussels: Bruylant, 1997, p. 418.

3. The MC-48 document, committing NATO to the defense of Europe through the early and massive use of nuclear weapons, had been endorsed by the North Atlantic Council (NAC) on December 17, 1954.

4. For a broader perspective, see Chapter 7 by David Yost in this volume.

5. Artificial radioactivity was discovered by Frédéric and Irène Joliot-Curie in 1934. The possibility of atomic reaction was demonstrated by Frédéric Joliot-Curie and his staff in 1939.

6. Geoffroy de Courcel in *L'aventure de la bombe*, p. 16.

7. See Alain Peyrefitte, *C'était de Gaulle,* Paris: Gallimard, 2002, p. 1,313.

8. On this point, see Mongin. The idea of nuclear power as embodying modernity would remain present in Gaullist French rhetoric; even by 1976, President Giscard d'Estaing would refer to the need for France to always have the "most advanced" weapons, hinting that it was one of the prime rationales for the

French bomb. See Valéry Giscard d'Estaing, speech to the IHEDN, June 1, 1976, text reproduced in *Revue de la défense nationale* [hereafter: RDN], July 1976, p. 12.

9. Charles Ailleret, *L'aventure atomique française*, C*omment naquit la force de frappe*, Paris: Grasset, 1968, pp. 96.

10. Some argued against what amounted for them to unilateral disarmament, others did not want France to give up nuclear weapons at the time others were building the bomb. The amendment was defeated 518/100.

11. Ailleret, *L'aventure atomique française*, pp. 124-141.

12. See Marcel Duval and Dominique Mongin, *Histoire des forces nucléaires françaises depuis 1945*, Paris: Presses Universitaires de France, 1993, p. 32.

13. An August 1954 note by the Head of the "Services des Pactes" of the Ministry of Foreign Affairs stated that: "The direction of strategy will from now on, increasingly, belong to the powers possessing the atomic weapon. . . . It is essential that France undertakes an atomic military program. Otherwise, its security will be entirely assured by the Anglo-Saxons," quoted in Georges-Henri Soutou, "La politique nucléaire de Mendès-France," *Relations Internationales*, Vol. 59, Fall 1989, p. 320. In September 1954, General Georges Catroux told the Defense Council: "There will be States which have the atomic bomb, which won't use it among themselves. There will be States which do not have the atomic bomb and they will be the nuclear battlefield," quoted in Soutou, p. 321. A note in the dossier presented to the December 1954 Cabinet meeting stated that "no country will . . . be able, in the near future, to claim true political independence if it does not possess atomic weapons," quoted in Soutou, p. 326.

14. As reported by Bertrand Goldschmidt in Mongin, p. 333.

15. "By lack of atomic weaponry, of which we have left the monopoly to others, our forces, expensive as they are, do not constitute a [coherent] whole, and as a result they are relegated to being mere auxiliaries. . . . France too needs to be an atomic power," Press conference, April 7, 1954, in Charles de Gaulle, *Discours & Messages*, Vol. II, Paris: Plon, 1970, p. 607.

16. Lawrence Scheinman, *Atomic Energy Policy in France Under The Fourth Republic*, Princeton: Princeton University Press, 1965, p. 213.

17. In a December 1954 note, the Political Director of the Ministry of Foreign Affairs made clear that the French preference at that time for the use of nuclear weapons in the defense of Europe would have been a joint decision "at Three" for a collective use of American, British, and French arsenals. See Soutou, p. 322. Note also that there was talk in government circles of a European nuclear force as early as 1954, and that there was a plan in 1957 to jointly develop nuclear weapons with Italy and Germany (the so-called "FIG" project). Also, for some such as Premier Pleven, a national nuclear force might have been a compensation for the integration of French forces into the planned European Defense Community (EDC).

18. Jean Lacouture, *De Gaulle, III: Le souverain, 1959-1970*, Paris: Seuil, 1986, p. 452.

19. Scott Sagan has used the French experience as exemplifying his "norms" model, making the French program essentially a product of symbolic politics and a quest for "grandeur." Scott D. Sagan, "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb," *International Security*, Vol. 21, No. 3, Winter 1996-1997, pp. 76-80. However, his dismissal of the security arguments is not convincing. In support of his thesis, Sagan argues first that France made "the two most critical decisions initiating the weapons program" before the Suez crisis. But the decisions taken before the end of 1956 had not put France on an irreversible course towards an operational nuclear weapons program. Second, Sagan uses the British example to argue that the outcome of the Suez crisis would have been the same for a nuclear France. But the UK nuclear force was still in its infancy, about 15 bombs, and was closely integrated to that of the United States. And Suez just confirmed the doubts many had about the U.S. alliance, which would be reinforced by the 1957 events. Third, Sagan dismisses French belief that the U.S. guarantee was unreliable on the grounds that other European nations gave up the nuclear option, and that the United States had come to save France in 1944. This argument is curious in that it discusses perceptions, which are not challengeable provided that they are documented. Also, while Sagan emphasizes the United States entering the war in 1941, the French view was that the country had been defeated and occupied for 3 years, and that only when Washington saw that its own interests were at stake, did it decide to go to war. Finally, among the countries which had been occupied in the Second World War, only France had the budgetary and technical means to embark in a nuclear program.

20. This expression *force de frappe* was used until 1960, when Prime minister Debré made *force de dissuasion* the official expression. Lacouture, p. 465.

21. De Gaulle to Maurice Schumann, quoted in Pierre Messmer & Alain Larcan, *Les écrits militaires du général de Gaulle*, Paris: Presses Universitaires de France, 1985, p. 201. The 1940 trauma was also a significant motivation for the Fourth Republic's politicians. See André Bendjebbar, *Histoire secrète de la bombe atomique française*, Paris: Le Cherche-Midi éditeur, 2000, p. 182; and Mongin, p. 410. Felix Gaillard's first reaction when hearing the news about the first test was that France had finally "overcome" the 1940 defeat, quoted in Bendjebbar, p. 290; de Gaulle himself, attending a test in the Pacific, also used the word "resurrection," as reported by Peyrefitte, pp. 1,352-1,353.

22. Lacouture, p. 466. De Gaulle would emphasize the fact that twice in the past decades, "the Americans have waited 3 years before deciding to land [in Europe]," quoted in Lacouture, p. 707. This point would be reiterated to Eisenhower in 1959. See Charles de Gaulle, *Mémoires d'espoir. Le Renouveau*, Paris: Gallimard, 2000, p. 1,068.

23. On the impact of Suez, see Bendjebbar, pp. 224, 228.

24. On this point, see Frédéric Bozo, *Deux stratégies pour l'Europe*; *De Gaulle,*

les Etats-Unis et l'Alliance atlantique, 1958-1969, Paris: Plon/Fondation Charles de Gaulle, 1996, pp. 124-127.

25. See Peyrefitte, p. 349.

26. Press conference at the Elysée Palace, January 14, 1963, in Charles de Gaulle, *Discours & Messages*, Vol. IV, Paris: Plon, 1970, p. 73.

27. As reported by Peyrefitte, p. 707.

> You see, for a long time, one could count on the automaticity of alliances, because they were totally committing the existence of a nation. Today, atomic warfare puts all commitments into question. Can you imagine a U.S. President taking the risk of condemning to death tens of millions of Americans in application of an alliance treaty?

28. See Lacouture, pp. 352-353.

29. See Bendjebbar; and Mongin. Some in the government community also developed the interesting argument according to which the possession of nuclear weapons would deter foreign intervention in French overseas possessions, see Mongin, p. 416.

30. As reported by Peyrefitte, p. 1,408.

31. The exact causal relationship here is complex. To some extent, for instance, the decolonization of Algeria made the bomb possible by freeing additional defense resources.

32. Speech at the Ecole militaire, February 15, 1963, in de Gaulle, *Discours & Messages*, Vol. IV, p. 85. He also referred twice to the "strategic, and therefore political, dependence" of European non-nuclear nations vis-à-vis the United States in his press conference at the Elysée Palace on July 23, 1964, in *ibid*., p. 231.

33. On this point, see Philip Gordon, *A Certain Idea of France. French Security Policy and the Gaullist Legacy*, Princeton: Princeton University Press, 1993, p. 42.

34. Press conference at the Elysée Palace, July 29, 1963, in de Gaulle, *Discours & Messages*, Vol. IV, p. 124.

35. Quoted in Bendjebbar, p. 302.

36. Press conference at the Elysée Palace, July 23, 1964, in de Gaulle, *Discours & Messages*, Vol. IV, pp. 226-227.

37. De Gaulle, *Mémoires d'espoir*, p. 1,063.

38. *Ibid*., p. 1,067.

39. "We were part [of the Alliance], of course, as long as we did not have our bombs. But from the time we have them, and they are not part of NATO, we are essentially no longer in NATO," as reported by Peyrefitte, p. 648. Also: ". . . one does not integrate atomic forces," *ibid*., p. 1,397.

40. See Peyrefitte, pp. 389-390.

41. This infuriated de Gaulle to the point of telling Norstad, who was personally sympathetic to French views: "Please tell your government that it is the last time that France accepts such an answer on this subject!" See Lacouture, p. 465; and Duval, p. 69.

42. There was reportedly a French right of veto on the use of these warheads, Duval, p. 70.

43. Speech in Lyon, September 28, 1963, in de Gaulle, *Discours & Messages*, Vol. IV, p. 137; and Peyrefitte, p. 715.

44. Press conference at the Elysée Palace, July 23, 1964, in de Gaulle, *Discours & Messages*, Vol. IV, p. 229. This idea inherited from the 1950s still imprinted Gaullist thinking.

45. See Paul Balta, "Dix ans de politique etrangère," *RDN*, May 1968, p. 817.

46. See Peyrefitte, p. 1,408.

47. General Alfred Buchalet, "Les premières étapes, 1955-1960," in *L'aventure de la bombe*, p. 52.

48. See Bozo, pp. 30-31. France did get some initial help from Washington in the form of a small stock of enriched uranium for propulsion research. Reportedly, the sale was authorized in 1959 on the grounds that, according to the U.S. Navy, France was unable to build nuclear propulsion reactors anyway. See Jacques Chevallier, "La genèse de la force de dissuasion nucléaire française," in Vaïsse, ed., *Armement et Vème République*, p. 286.

49. The same reasoning would later be applied to thermonuclear weapons: de Gaulle thought it was indispensable that France had the same means as the other nuclear powers. See Peyrefitte, pp. 1,325-1,388.

50. See radio/TV speech of April 19, 1963, in De Gaulle, *Discours & Messages*, Vol. IV, p. 96; and speech in Lyon in *ibid*., p. 137.

51. Samy Cohen, *La défaite des généraux. Le pouvoir politique et l'armée sous la Vème République*, Paris: Fayard, 1994, pp. 50-51.

52. Samy Cohen, "France, Civil-Military Relations, and Nuclear Weapons," *Security Studies*, Vol. 4, No. 1, Autumn 1994, pp. 153-179, especially p. 161. De Gaulle justified the direct election of the President of the Republic by the authority to use nuclear weapons, see Peyrefitte, p. 1,359; and Pierre Messmer, "Notre politique militaire," *RDN*, May 1963, p. 760.

53. See André Beaufre, *NATO and Europe*, New York: Vintage Books, 1966, p. 25.

54. Stt Marc Trachtenberg, "La formation du système de défense occidental: les Etats-Unis, la France et MC-48," in Maurice Vaïsse, Pierre Mélandri, and Frédéric Bozo, eds., *La France et l'OTAN, 1949-1996*, Brussels: Complexe, 1996, pp. 115-127.

55. General François Valentin in *L'aventure de la bombe*, p. 270.

56. Beaufre, quoted in Mongin, p. 263. See also the 1954 testimony of General Catroux in Soutou, p. 321.

57. See Mongin, p. 251.

58. In the public debate, a rare exception was General Paul Gerardot, who argued in favour of "an efficient reprisals system specific to our country and freed from any servitude." See "Plaidoyer pour l'attaque," *RDN*, March 1956, pp. 285-305.

59. Quoted in Cohen, *La défaite des généraux*, p. 84.

60. There is another link between the two issues: the reduction in conventional forces following the withdrawal from Algeria allowed for a greater share of the defense budget to be devoted to the nuclear program.

61. Cohen, *La défaite des généraux*, p. 84.

62. See Gallois, *Le sablier du siècle*, p. 371.

63. The expression was used by de Gaulle at the end of his 1956 conversation with Gallois, see Introduction.

64. When Valéry Giscard d'Estaing was elected president in 1974, he invited Aron, Beaufre, and Gallois for lunch to inform him about nuclear strategy, Aron, *Mémoires*, pp. 566-567.

65. Raoul Castex, "Aperçus sur la bombe atomique," *RDN*, October 1945, pp. 466-473. The causal link with de Gaulle's decision is suggested by Lacouture, p. 453. The general admired and respected Castex, and the decision was taken a few days after the publication of the article.

66. France's bomb was also a means for what could be called "persuasion of the strong by the weak." "The possession of some nuclear weaponry will constitute one of the only means to have independence and sovereignty of the country respected by a stronger party," Pierre-Marie Gallois, "L'affaire de Berlin ou la peur d'une ombre," *La Nef*, No. 27, Avril 1959, p. 28. De Gaulle suggested that only after Israel got the bomb did the United States commit itself to guarantee its borders. See Peyrefitte, p. 707.

67. Press conference of July 23, 1964, at the Elysée Palace, in de Gaulle, *Discours & Messages*, Vol. IV, p. 233.

68. Ministère de la Défense, *Livre blanc sur la défense nationale*, Vol. I, 1972. Interestingly, the expression "deterrence of the strong by the weak" was not widely used by officials. A rare exception is general Fourquet in 1969.

69. See Pierre-Marie Gallois, *Stratégie de L'âge Nucléaire*, Paris: Calmann-Lévy, 1960, pp. 3-4.

70. Castex: "The weak nation, as much as the strong nation, will possess atomic weapons, in lower quantities probably, but these considerations of numbers do not matter much for weapons which have such a great individual power," p. 467. 1954 dossier: ". . . the threat of destruction that such devices entails must be enough to

deter an aggressor, even [if he is] much more powerful," quoted in Soutou, p. 24.

71. See Lucien Poirier, *Des Stratégies Nucléaires*, Brussels: Complexe, 1988, p. 298.

72. This expression originally had a slightly broader meaning. It was used by UK and U.S. authors in the 1950s to describe concepts of "flexibility" and "adaptation" of nuclear reprisals to the value of the stake defended.

73. "The force de frappe can be made proportional to the value of the stake that it represents," Gallois, *Stratégie de l'âge nucléaire*, p. 184.

74. As reported by Peyrefitte, p. 350.

75. *Ibid*., p. 368.

76. Aron, quoting his November 16, 1959, article in Raymond Aron, *Mémoires: 50 ans de réflexion politique*, Paris: Julliard, 1983, p. 429.

77. Gallois, *Stratégie de l'âge nucléaire*, p. 189.

78. Pierre-Marie Gallois, "La logique de l'ère nucléaire et ses incidences sur l'OTAN," in Claude Delmas, Maurice Faure, Général Gallois, and Général Carpentier, *L'avenir de l'alliance atlantique*, Paris: Berger-Levrault, 1961, pp. 144-145.

79. André Beaufre, *Introduction à la stratégie*, Paris: Armand Colin, 1963, chapter 3.

80. As reported by Peyrefitte, p. 710. He stated again in 1966 that "the risk that an adversary would run would be incommensurably superior to the stake that we would represent for him," *ibid*., p. 1,359. A more official statement was "damage incommensurable with the aggressor's benefits," Charles Ailleret, conference at the IHEDN, December 19, 1967, quoted in Ruehl, p. 214.

81. *Livre banc sur la défense*, Vol. I.

82. Dulles said that deterrence "requires that a potential aggressor be left in no doubt that he would be certain to suffer from damage outweighing any possible gain from aggression. . . . a potential aggressor should know in advance that he can and will be made to suffer for his aggression more than he can possibly gain by it. . . . a prospective attacker is not likely to invade if he believes the probable hurt will outbalance the probable gain," John Foster Dulles, "Policies for Security and Peace," *Foreign Affairs*, Vol. 32, No. 3, April 1954, pp. 357-359.

83. "An almost unprecedented disparity between what an aggressor stands to gain and what he risks losing as result of his aggression," Giscard d'Estaing, speech to the IHEDN, June 1, 1976, p. 13; ". . . the damage would be incommensurable with the profit the aggressor could hope from his action," Raymond Barre, speech to the IHEDN, September 11, 1980, text reproduced as "La politique de défense de la France," RDN, November 1980, p. 12.

84. Gallois, *Le sablier du siècle*, p. 402.

85. See Michel Fourquet, Conference to the IHEDN, March 1969; *Livre blanc*

sur la défense, Vol. I; and Guy Méry, "Une armée pour quoi faire et comment?" RDN, June 1976, p. 17.

86. Poirier, *Des stratégies nucléaires*, p. 192.

87. See, for instance, de Gaulle as reported by Peyrefitte, p. 710.

88. *Livre blanc sur la défense*, Vol. I; Valéry Giscard d'Estaing, press conference of June 1980 quoted in Duval, p. 60; and Barre, "La politique de défense de la France," p. 17. Giscard thought that the French deterrent applied only to threats of nuclear attacks and of invasion and was an early proponent of "negative security assurances." See his press conference of October 24, 1974, text reproduced in Assemblée nationale, Rapport d'information deposé en application de l'article 145 du Règlement par la Commission de la défense nationale et des forces armées sur l'état et la modernisation des forces nucléaires françaises, et présenté par M. Raymond Tourrain, Député, No. 1730, May 1980, p. 23. In 1977 the government confirmed that France rejected "no-first-use," Raymond Barre, "Discours prononcé au camp de Mailly le 18 juin 1977," RDN, July-August 1977, p. 9.

89. The expression "attached goat" (*chèvre au piquet*), referred to the strategy used by shepherds to attract and ambush wild animals such as wolves. The theory is described in the 1972 *White Pape*r.

90. Quoted in Bozo, p. 130.

91. See Peyrefitte, pp. 710-711.

92. ". . . one can think of a number of circumstances in which the alternative of 'all or nothing' would make our posture less realistic and less credible . . . we have already rejected the 'all or nothing' solution," Fourquet.

93. "None of the countries possessing [nuclear] weapons will give them up. On the contrary, others will get them sooner or later. The Bomb will disseminate. This is inevitable. Danger can come from anywhere. Do you hear me? Anywhere! We must get ready to strike at any point of the compass, tous azimuts," as reported by Peyrefitte, p. 708.

94. See the testimonies of General Bourgue and Alain Larcan in *L'aventure de la bombe*, pp. 201-202.

95. Conference of November 3, 1959, Untitled document, Fondation Charles de Gaulle.

96. See Peyrefitte, pp. 299-300, 708. The hypothesis of a nuclear strike against the Tunisian port of Bizerte was mentioned in 1963, *ibid*., pp. 420, 708-709. In December 1966, he said: "The Germans, the Algerians and the Tunisians need to know that if they wanted to create us trouble, we could easily crush them," *ibid*., p. 1,389. The reference to Germany may appear shocking coming from de Gaulle, who had fostered the reconciliation between the two countries; but he was in fact mindful about German national culture and said many times that Bonn should not get the bomb. See, for instance, *ibid*., p. 1,356.

97. Speech to the Coët-Quidan military school, February 16, 1965, in De Gaulle, *Discours & Messages*, Vol. IV, p. 345.

98. This important and still classified document is quoted in Lacouture, pp. 477-478.

99. Quoted in Pierre Pascallon, "La dissuasion nucléaire française à l'heure du comité stratégique et de la nouvelle loi de programmation militaire," in Pierre Pascallon, ed., *Quel avenir pour la dissuasion nucléaire française?* Brussels: Bruylant, 1996, p. 261.

100. Charles Ailleret, "Défense 'dirigée' ou défense 'tous azimuts'," RDN, December 1967, pp. 1,924-1,932.

101. As reported by Peyrefitte, p. 299.

102. See Lacouture, p. 477.

103. Such implicit references to an "enemy from the East" include the Fourquet 1969 speech and the 1977-1982 Defense Plan.

104. Barre, "Discours prononcé au camp de Mailly le 18 juin 1977," p. 12.

105. De Gaulle, *Mémoires d'espoir*, p. 1,063. In 1959, the option to acquire nuclear systems from another country was still officially considered. See Charles de Gaulle, speech at the Ecole militaire, November 3, 1959, reproduced in Dominique David, *La politique de défense de la France*, Textes et documents, Paris: FEDN, 1989, p. 73.

106. De Gaulle, speech at the Ecole militaire, November 3, 1959, p. 71.

107. Quoted in Lacouture, p. 353.

108. Gallois, *Stratégie de l'âge nucléaire*, p. 197.

109. The *White Paper* would reaffirm that flexible response was at best a second-best solution, and at worse an illusion. But this was not meant to be a criticism: it was "the natural order of things, since deterrence is exclusively national." There was, however, an element of dissociation in the *White Paper* vis-à-vis the absolutist Gallois thinking: the mention that "presently" the nuclear risk could not be shared, perhaps opening the way for a future integrated Europe. *Livre blanc sur la défense*, Vol. I.

110. "In fact, because national unanimity could only be made when facing a grave threat, the domain of efficacy of the deterrence strategy is more generally limited to the defense of the vital interests of the country that practices this strategy," Gallois, *Stratégie de l'âge nucléaire*, p. 210; also *ibid*., p. 218; for De Gaulle, see Peyrefitte, p. 618.

111. "But due to the mere fact that it is a European force, the 'French' atomic force will in any case be employed automatically for the defense of Europe, as this defense means the same as the defense of France. It could not be imagined in any way that Germany was attacked by Russia, without France being lost simultaneously," conversation with a German official, July 1964, quoted in Heuser, p. 155. He proposed to Adenauer a formal nuclear security guarantee in 1963. On this point, see, for instance, Peyrefitte, p. 710. A scholar has noted that this proposal was not mentioned in the German record of the meeting, see

Georges-Henri Soutou, *L'Alliance incertaine*, Paris: Fayard, 1996, p. 274. However, this was not mere posturing. In private, de Gaulle said: "But it will protect them automatically! In a much better way than the American force [does]! For the simple reason that we are Europeans and the Americans are not. The American interest to not let Europe be destroyed is minuscule as compared to ours. If Europe is invaded, we are toast." As reported by Peyrefitte, p. 653. See also p. 858.

112. Quoted in Vincent Jauvert, *L'Amérique contre de Gaulle. Histoire secrète, 1961-1969*, Paris: Seuil, 2000, p. 29.

113. Quoted in Jacques Isnard, "Le grand déballage nucléaire," *Le Monde*, February 4, 1997.

114. "M. Pompidou: 'La force de dissuasion française joue automatiquement au bénéfice de l'Europe'," *Le Monde*, December 3, 1964.

115. Fourquet.

116. "France lives in a web of interests which exceeds her frontiers. . . . Our vital interests are located on our territory and on its approaches," *Livre blanc sur la défense*, Vol. I.

117. See Gordon, pp. 44-47.

118. See Soutou, p. 322.

119. See the text of the September 1958 memorandum to the UK and the U.S. Governments in Bozo, pp. 262-263. According to Gallois, the Taiwan Straits crisis, where the use of nuclear weapons had been considered, was reportedly a triggering factor in de Gaulle's proposal, Gallois, *Le sablier du siècle*, p. 466.

120. Eisenhower meeting: de Gaulle, *Mémoires d'espoir*, p. 1,068. The quote is from de Gaulle's meeting with Kennedy in 1961 and is mentioned in Jauvert, pp. 30-31.

121. See Peyrefitte, p. 360.

122. Loi de programme No. 60-1305 du 8 décembre 1960 relative à certains équipements militaires, 1960-1964, text reproduced in Tourrain, p. 141.

123. Press conference at the Elysée palace, January 14, 1963, in de Gaulle, *Discours & Messages*, Vol. IV, p. 76. Coordination was welcome "in particular in wartime," Peyrefitte, p. 372.

124. Speech at the Ecole militaire, de Gaulle, *Discours & Messages*, Vol. IV, p. 83.

125. The 1965 military program law still affirmed that the action of French forces, conventional and nuclear, would be "in principle conjugated with those of our allies," quoted in Ruehl, p. 211.

126. Beaufre, *Dissuasion et stratégie*, p. 188. In his next book, he referred to an "interallied coordination of national deterrent strategies during peacetime." Beaufre, *NATO and Europe*, chapter 5, and p. 188.

127. See Bozo, pp. 201-202.

128. Beaufre, *NATO and Europe*, p. 70.

129. André Beaufre, conference to the IHEDN, 1968, reproduced in Charles Zorgbibe, *Textes de stratégie nucléaire*, Paris: Presses Universitaires de France, 1993, p. 17.

130. Beaufre, *Dissuasion et stratégie*, pp. 101, 108. He was, however, wary of nuclear proliferation. See p. 108.

131. Gallois thought that the Soviet Union would not run the risk "of losing about thirty urban concentrations, tens of ports installations and other military targets, putting itself in a position of inferiority vis-à-vis the United States or China, spectators of the conflict," in *L'aventure de la bombe*, p. 205.

132. See Peyrefitte, p. 710.

133. Quoted in Lacouture, p. 353.

134. See Peyrefitte, p. 710.

135. Press conference at the Elysée Palace, July 23, 1964, in de Gaulle, *Discours & Messages*, Vol. IV, p. 233.

136. *Livre blanc sur la défense*, Vol. I.

137. Jacques Chirac, speech at the camp de Mailly, February 10, 1975, text reproduced as "Au sujet des armes nucléaires tactiques françaises," RDN, May 1975, p. 12.

138. Debate of December 3, 1964, quoted in Ruehl, p. 193.

139. "The threat, though not explicit, of using the French atomic force as a detonator is its sole conceivable deterrence function within the framework of the present Atlantic organization." Raymond Aron, *Le grand débat. Initiation à la stratégie atomique*, Paris: Calmann-Lévy, 1963, p. 156. On Gallois' perceptions, see *Le sablier du siècle*, pp. 389-390.

140. Such as Félix Gaillard, according to Lacouture, p. 471.

141. Gallois, Stratégie de l'âge nucléaire, pp. 185-189. He writes that due to the emerging vulnerability of the U.S. territory, "It is thus not certain that the small atomic arsenal of less wealthy peoples may effectively play the role of a fuse leading to the explosion of the powder keg of the Greats"; but he also acknowledges that it could be "an 'accelerator' in the march towards the great trial."

142. "I did not really believe at that time in the idea, then common, of the 'trigger' . . .," Aron, *Mémoires*, p. 430.

143. He does so in a dismissive footnote: ". . . the simplifying theory of the 'trigger' does not even deserve a discussion. Nobody wants to trigger a nuclear conflict." André Beaufre, *Dissuasion et stratégie*, Paris: Armand Colin, 1964, p. 94.

144. Beaufre, *Dissuasion et stratégie*, p. 94.

145. In some circumstances only—for Beaufre also acknowledged that, overall,

"the existence of a third partner limits in some respects the freedom of action of the two others," Beaufre, *Dissuasion et stratégie*, p. 94.

146. *Ibid*., p. 92.

147. See Michel Debré, "La France et sa défense," RDN, January 1972, pp. 6-8. Scholars who rejected de Gaulle's belief in the concept include Lacouture, p. 471.

148. Georges Pompidou, National Assembly debate of December 2, 1964, quoted in Ruehl, p. 192.

149. See Peyrefitte, pp. 433, 638.

150. As reported by *Ibid*., p. 638.

151. *Ibid*., p. 353.

152. Giscard's testimony is slightly ambiguous, and it is difficult to tell whether it supports the "hard" or "soft" interpretation: "be useful as a trigger in case the United States hesitated in employing their own strategic nuclear means to deter the Soviets to invade Europe," Giscard d'Estaing, *Le pouvoir et la vie*, p. 192; and "be able ourselves to decide on a nuclear action that would constrain the United States if they hesitated to bring into play the superiority they had at the time vis-à-vis the USSR in nuclear matters," Interview in *Le Figaro*, December 12, 1983, p. 6. David Yost has suggested an in-between interpretation which corresponds to one of the Beaufre hypotheses: in a crisis, the threat or use of French nuclear weapons would force "a U.S. involvement bringing about termination of the conflict on terms acceptable to the West." David S. Yost, *France's Deterrent Posture and Security in Europe. Part II: Strategic and Arms Control Implications*, Adelphi Paper No. 195, London: International Institute for Strategic Studies, Winter 1984-85, p. 18.

153. He reportedly told Army Chief of Staff general de Boissieu in 1970 the following:

> From the time when the 1st Army and the tactical air forces will have tactical atomic [weaponry], the Alliance will not be able to envision our manoeuvre forces only with their conventional means. You will have to let them know that you envision to counterattack with the support of our tactical nuclear forces. Thus if the allied high command needs this only strategic reserve in Europe, it will have to decide employing its nuclear fires beforehand or at the same time.

This important statement was first publicly quoted by defense minister André Giraud in *Discours aux Assises du Mouvement européen*, October 11, 1987, text reproduced in David, p. 292.

154. Fourquet.

155. See below, part V.

156. In 1951, Lord Cherwell, adviser to Winston Churchill on nuclear matters, wrote him: "If we are unable to make bombs ourselves and have to rely entirely on the United States army for this vital weapon, we shall sink to the rank of a second-

class nation, only permitted to supply auxiliary troops, like the native levies who were allowed small arms but not artillery." Quoted in Margaret Gowing, *Independence and Deterrence. Britain and Atomic Energy 1945-1952, Vol. I: Policy-Making*, New-York: St. Martin's 1974, p. 407. On Suez, see Lawrence Freedman, "British Nuclear Targeting," in Ball & Richelson, p. 114.

157. This would be acknowledged by London in 1980, see the contribution by Michael Quinlan in this volume; and also Heuser, p. 77.

158. Beaufre, *Dissuasion et stratégie*, pp. 85-116. He justified the multiplicity of nuclear decision centers by the deterrent effect of the addition of "several methods of deterrence." André Beaufre, "The sharing of nuclear responsibilities: a problem in need of solution," *International Affairs*, Vol. 31, No. 3, July 1965, p. 416.

159. After 1957, the French position was that it would only accept U.S. ballistic missiles on the national territory if they were under a formal "dual-key" system and if Washington was willing to help Paris build its own deterrent through cooperation agreements similar to those existing with London. When he returned to power in 1958, de Gaulle sought U.S. technological help for the French nuclear efforts, and cooperation options were discussed in various forms until 1966. But French insistence on maximum national control and U.S. political or military resistances prevented the emergence of mutually acceptable solutions. In particular, in 1962, Paris refused a U.S. offer to endow France with *Polaris* SLBMs, suspecting that it was an attempt to put the nascent French force under U.S. tutelage. Paris later bought 12 KC-135 aircraft and supercomputers to the United States. Although U.S. Ambassador to France James Gavin supported it, it is not clear whether the sale of KC-135, the principle of which was discussed as early as 1962, was formally approved by the U.S. Government. Some sources say that the USAF was favourable to the sale because it allowed it to buy from Boeing the number of aircraft it had promised to buy. See Vaïsse, ed., *Armement et Vème République*, p. 222. On these issues, see in particular Bozo.

160. See Peyrefitte, pp. 428-429.

161. An exception is Barre, "Discours prononcé au camp de Mailly le 18 juin 1977," p. 11.

162. On this, see Yost, *France's Deterrent Posture*, Vol. II, pp. 15-16.

163. Here again the exception is Barre, "Discours prononcé au camp de Mailly le 18 juin 1977," p. 14. Bruno Tertrais, "La coopération militaire depuis 1969: la France, l'OTAN, et la Question Nucléaire" in Bozo, Mélandri & Vaïsse, eds., pp. 621-623.

164. Chirac, "Au sujet des armes nucléaires tactiques françaises," p. 12.

165. General Guy Méry, Conference at the IHEDN, March 15, 1976, reproduced as "Une armée pour quoi faire et comment?" RDN, June 1976, p. 15.

166. Barre, "Discours prononcé au camp de Mailly le 18 juin 1977," p. 14.

167. Valéry Giscard d'Estaing, press conference of June 26, 1980, text

reproduced in Tourrain, p. 38.

168. Barre, "La politique de défense de la France," p. 12.

169. Declaration on Atlantic Relations approved by the North Atlantic Council, June 19, 1974, para. 6.

170. Guy Méry, "Conférence," *Défense*, No. 9, May 1977, p. 19.

171. Barre, "Discours prononcé au camp de Mailly le 18 juin 1977," p. 10. See also his September 1980 speech.

172. Quoted in Cohen, *La défaite des généraux*, p. 104.

173. Testimony of General Valentin in *L'aventure de la bombe*, p. 191.

174. See his February 15, 1963, speech in p. 86. His 1964 declarations about the possibility of a warning shot are reported by Peyrefitte, p. 711.

175. This argument was used in particular by Defense Minister Messmer; see Peyrefitte, p. 1,374.

176. The 1967 Ailleret-Lemnitzer agreements included a provision for U.S. nuclear support to French conventional forces, but that applied only in case the French forces joined the common defense and the nuclear threshold had been crossed.

177. See Peyrefitte, pp. 1,376, 1,379.

178. *Ibid*., pp. 1,378-1,379.

179. Press conference by Pierre Messmer, October 24, 1966, quoted in Vaïsse, ed., *Armement & Vème République*, p. 185.

180. Jacques Chevallier, "La genèse de la force nucléaire de dissuasion française," in Vaïsse, ed., *Armement & Vème République*, p. 284. Chevallier says that the letter is dated 1968. A slightly different, but entirely consistent, version of de Gaulle's instructions was provided by Boissieu himself on 30 November 1989, referring to a meeting that took place in April 1970:

> Your priority mission is to have the [Pluton] launchers built and to put into service the tactical atomic [weaponry]. Because, from the day the land forces, that is the First Army, will have tactical atomic [weaponry] at its disposal, it is the whole First Army and FATAC apparatus . . . which will participate in the nuclear deterrent. . . . Tactical atomic [weaponry] is so essential for us French that, when we will later have to choose between perfecting tactical atomic [weaponry] or strategic atomic [weaponry], here again we will probably have to choose tactical atomic [weaponry], for what's the use of perfecting apocalypse, Vol. It is better to place efforts on what would happen beforehand . . ."

Quoted in Cohen, *La défaite des généraux*, p. 108.

181. Lacouture, p. 484.

182. Pierre Messmer, "L'atome, cause et moyen d'une politique militaire

autonome," RDN, March 1968, pp. 395-402.

183. See Poirier, "Dissuasion et puissances moyennes," pp. 107-108; and *Des stratégies nucléaires*, p. 325. This meant, for Poirier, that French forces could not be committed in significant quantities to the forward defense of Europe.

184. Fourquet.

185. *Livre blanc sur la défense*, Vol. I.

186. Press conference of September 27, 1973, text reproduced in Tourrain, p. 21. It is clear from the text that he meant escaping from an "all or nothing" dilemma rather than adopt NATO's strategy.

187. See, in particular, Chirac, "Au sujet des armes nucléaires tactiques françaises," p. 15. He also mentions that one reason why France had to have TNW is simply that others had such weapons.

188. See, in particular, Giscard d'Estaing, speech of June 1, 1976, p. 15. On these debates, see *inter alia*, Duval, pp. 74-87.

189. Chirac, "Au sujet des armes nucléaires tactiques françaises."

190. Interview on Antenne-2 TV channel, November 12, 1975, quoted in Tourrain, p. 28.

191. Interview on TF-1 TV channel, May 5, 1976, quoted in Tourrain, p. 30.

192. "Entretien avec le général Maurin, chef d'état-major des armées," RDN, Vol. 30, No. 7, July 1974, pp. 15-17.

193. "Entretien avec le général de Boissieu," RDN, July 1975, p. 26.

194. Rapport sur la programmation des dépenses militaires et des équipements des forces armées pour la période 1977-1982, text reproduced in David, p. 195.

195. Méry, "Une armée pour quoi faire et comment?," p. 17.

196. Barre, "Discours prononcé au camp de Mailly le 18 juin 1977," p. 13.

197. *Ibid*., p. 14. The idea to "restore deterrence" was seen at the time as symbolizing a "war-fighting strategy." In the same speech, Barre also makes a rare reference to the possibility of TNW being deployed with overseas projection forces.

198. The "M1" device had been tested in the morning of February 13, 1960, in the Sahara desert near Reggan, Algeria, and gave a yield of 60-70 kilotons, as expected.

199. There is a debate on de Gaulle's view of these systems. Some testimonies suggest that he attached no particular importance to the Albion missiles, see Peyrefitte, p. 1,378. Others suggest that he thought that France being a continental power, it had to be also defended by visible land-based systems for the French so feel secure, see the testimony by his aide de camp in *L'aventure de la Bombe*, p. 237. In any case, their value as a complement to the SSBNs was quickly acknowledged.

200. On early UK debates, see Heuser, p. 66s.

201. Pierre-Marie Gallois, "Puissance et limitation des armes de la dissuasion," *Le Monde*, Février 14-15, 1960.

202. Pierre-Marie Gallois, "Les sophismes de M. MacNamara et le départ du général Norstad," RDN, October 1962, pp. 1,454-1,471.

203. See, for instance, Beaufre, *Introduction à la stratégie*, chapter 3.

204. See the contribution by Michael Quinlan in Chapter 9.

205. Gallois refers to General Pierre Stehlin, "L'adaptation de l'instrument de la défense à la révolution technique," *Revue militaire générale*, Février 1959, Gallois, *Stratégie de l'âge nucléaire*, p. 229.

206. As reported by Peyrefitte, p. 366.

207. ". . . with 0.4 percent of the atomic potential of the Soviet Union, France could 'raze an habitat' equivalent to hers," Pierre-Marie Gallois, "La dissuasion du faible au fort" in *L'aventure de la bombe*, p. 169; and "To be efficient, the destruction capabilities of our nuclear force must be equivalent to the 'value of France' (*équilibrer la 'valeur France'*)," in *L'aventure de la bombe*, p. 205.

208. Interview of President Giscard d'Estaing in *Le Figaro*, December 12, 1983, p. 6.

209. The naval expression "vital works" appeared frequently. First employed by Ailleret in his 1959 lectures, Poirier, *Des stratégies nucléaires*, p. 298. It was used by Gallois, *Stratégie de l'âge nucléaire*, p. 182, p. 193; and by de Gaulle, radio/TV speech of April 19, 1963, in de Gaulle, *Discours & Messages*, Vol. IV, p. 96; *Mémoires d'espoir*, p. 1,067. Aron used it in *Le grand débat*, p. 124. It appeared as late as 1980 in some semi-official publications, Guy Lewin, "L'avenir des forces nucléaires françaises," RDN, May 1980, pp. 17-18. Beaufre used "anti-resources," *Dissuasion et stratégie*, p. 37, an equivalent of "counter-value."

210. Quoted in Gallois, "La dissuasion du faible au fort," p. 170.

211. "Frightful destructions," press conference at the Elysée Palace, January 14, 1963, in de Gaulle, p. 72-74; and radio/TV speech of April 19, 1963 in *ibid*., p. 95. "Deadly wound," press conference of July 23, 1964, at the Elysée Palace, in *ibid*., p. 233. "Destructions beyond repair," 1967 instruction Lacouture, p. 478; "Frightful wounds," de Gaulle, *Mémoires d'espoir*, p. 1,057.

212. Gallois, *Stratégie de l'âge nucléaire*, pp. 170-175.

213. *Ibid*., p. 174.

214. Quoted in Hervé Alphand, *L'étonnement d'être. Journal, 1939-1973*, Paris: Fayard, 1977, p. 368.

215. General François Maurin, "La mise en place opérationnelle de la triade stratégique, Mirage IV, SSBS Albion, SNLE, et des chaînes de contrôle," in *L'aventure de la Bombe*, pp. 228-229.

216. As reported by Peyrefitte, p. 710.

217. "20 million," as reported by Peyrefitte, p. 179. "One-fourth or half of the Russians," *ibid*., p. 299. "One-half of the Russians," *ibid*., p. 345.

218. As reported by Peyrefitte, p. 350. In 1964, he claimed that around 1971-1972 that capability would be "80 million Russians," *ibid*., p. 654.

219. Press conference at the Elysée Palace, January 14, 1963, in de Gaulle, *Discours & Messages*, Vol. IV, p. 72-74; and press conference at the Elysée Palace, July 23, 1964, in *ibid*., p. 233.

220. Messmer, "Notre politique militaire," p. 747.

221. Barre, "Discours prononcé au camp de Mailly le 18 juin 1977," p. 10. See also Général Maurin, "Entretien avec le général Maurin, chef d'état-major des armées," RDN, July 1974, p. 13: "a notable part of his industrial and demographic potential."

222. Gallois, *Stratégie de l'âge nucléaire*, p. 174.

223. *Ibid*., p. 205, in which he also adds "tens" of other targets; and FEDN/ Université de Paris I, L'arme nucléaire et ses vecteurs. Stratégie, armes, parades, Paris, 1989, p. 374, in which he refers to "20, 30, 40" cities.

224. Quoted in Alphand, p. 368.

225. The optimum targeting set recommended by a JCS Advisory Group in October 1945 was 20 urban Soviet targets, see Barton J. Bernstein, "Eclipsed by Hiroshima and Nagasaki: Early Thinking about Tactical Nuclear Weapons," *International Security*, Vol. 15, No. 4, 1991, p. 171. UK planning in the late 1950s was 30-40 cities; see Heuser, pp. 67, 73; and the contribution by Michael Quinlan in this volume.

226. On this point, see Aron, *Le grand débat*, pp. 115-117.

227. See a conversation with Adenauer reported in Bendjebbar, p. 307, in which he adds Stalingrad; and Peyrefitte, p. 654, in which he adds "the biggest cities."

228. Loi de programmation 1977-1982, in David, p. 194.

229. Méry, "Conférence," p. 20.

230. On these debates, see David Yost, "French Nuclear Targeting," in Desmond Ball & Jeffrey Richelson, eds., *Strategic Nuclear Targeting, Cornell Studies in Security Affairs*, Ithaca, NY: Cornell University Press, p. 132.

231. Tourrain, p. 206.

232. Valéry Giscard d'Estaing, Le pouvoir et la vie (II). L'affrontement, Evreux: Compagnie 12, 1991, p. 180.

233. Marc Theleri, *Initiation à la force de frappe française 1945-2010*, Paris: Stock, 1997, p. 233.

234. Barre, "La politique de défense de la France," pp. 17, 12. Gallois asserted several times in the 1980s that France targeted some military facilities on Soviet territory, see above; however, he never included Soviet nuclear forces in such

assertions.

235. Barre, "La politique de défense de la France," p. 17.

236. See, for instance, interview of Giscard d'Estaing on FR-3 TV channel, March 22, 1979, text reproduced in Tourrain, p. 36. In another TV interview in February 1980, Giscard revealed that French forces totalled 20 Mt in 1974, 75 Mt in 1980, and would total 90 Mt in 1985, making it the "third nuclear power."

237. Such developments were called for by the 1972 *White Paper*. In 1976, Méry referred to Soviet defenses as the main rationale for the coming shift to MIRVed warheads, Méry, "Une armée pour quoi faire et comment?," p. 21. In 1977, Barre stated that in order to counter Soviet defenses France would have to "quadruple" the capacity of the French deterrent, Barre, "Discours prononcé au camp de Mailly le 18 juin 1977," p. 10. The program would lead to the introduction of the MIRVed M4 SLBM in 1985.

238. Jacques Chevallier, "Histoire de la Direction des applications militaires du CEA," in 40° anniversaire de la DAM, Commissariat à l'énergie atomique, 1998, p. 22.

239. See Pompidou's speech to the National Assembly in December 1964, Ruehl, p. 192.

240. See Lucien Poirier, "Dissuasion et Puissance Moyenne," RDN, March 1972, text reproduced in David, pp. 97-110, where he mentions the need for an "intolerable damage capability."

241. "Intervention du Ministre de la Défense," M. Robert Galley à l'IHEDN, Paris, February 3, 1981, text reproduced as "La politique militaire de la France," RDN, March 1981, p. 18.

242. Press conference of July 23, 1964, at the Elysée Palace, de Gaulle, *Discours & Messages*, Vol. IV, p. 233; Bendjebbar, p. 307; and de Gaulle, *Mémoires d'espoir*, p. 1,069.

243. "Our objective is not parity, but sufficiency." Barre, "Discours prononcé au camp de Mailly le 18 juin 1977," p. 10.

244. This last point was acknowledged in the 1972 *White Paper*.

245. As reported by Peyrefitte, p. 350.

246. Poirier, "Dissuasion et puissances moyennes," p. 104.

247. See Pompidou's December 1973 conference, Theleri, p. 327.

248. See, for instance, Guy Méry, "Conférence prononcée par le général Méry," RDN, May 1978, p. 29.

249. Yields mentioned are the most commonly found number in open sources. The yield of the AN22 was 80 kt according to a 1970 parliamentary report, see Ruehl, p. 306, and "nearly 100 kt" according to the 1972 *White Paper*. A CEA source, Chevallier, p. 16, gives 55 kt for the AN21 and 115 kt for the MR31. For a

detailed overview of French nuclear warheads, see Robert S. Norris, Andrew S. Burrows, and Richard W. Fieldhouse, *Nuclear Weapons Databook, Vol. V: British, French and Chinese Nuclear Weapons*, Boulder: Westview Press, 1994.

250. The 3,000 km range is frequently found in the open literature. The *Mirage-IV* was designed to fly at supersonic speed half of the distance. The original 1956 requirement had specified a total range of 2,650 km, but that distance was "doubled" in 1959, see Claude Carlier, "La genèse du système d'arme stratégique piloté Mirage-IV, 1956-1964," in Vaïsse, ed., *Armement & Vème République*, pp. 206-222. The *Mirage-IV* needed one, if not two, in-flight refuellings to reach Soviet targets by using northeastern or southeastern flight plans to avoid over-flying Warsaw Pact countries; hence the use of additional *Mirage-IVs* as refuelling stations and the acquisition in 1962 of 12 KC-135 aircraft. The maximum "useful" range was planned to be 4,800 km with in-flight refuelling, according to Messmer in 1963, Ruehl, p. 187. The operational range probably took into account that, in many scenarios, bombers were not expected to return to their home bases. Counting on the fact that these bases "would have been atomized, by definition," de Gaulle hypothesized that they would land "in Sweden or Turkey"—Peyrefitte, p. 368.

251. Alain C. Enthoven and K. Wayne Smith, *How Much is Enough? Shaping the Defense Program, 1961-1969*, New-York: Harper & Row, 1971, p. 207.

252. U.S. DoD numbers Ball, Vol. I, p. 33.

253. According to Poirier, *Des Stratégies Nucléaires*, p. 297.

254. Most data from Geoffrey Kemp, *Nuclear Forces for Medium Powers. Part 1: Targets and Weapons Systems*, Adelphi Paper No. 106, London: IISS, Fall 1974, p. 5; and *Nuclear Forces for Medium Powers. Parts II and III: Strategic Requirements and Options*, Adelphi Paper No. 107, London: IISS, Fall 1974, p. 5, p. 9. The number of required warheads takes into account the loss of a number of warheads due to reliability problems and interception successes. Calculations for 30 cities in the Western part of the Soviet Union are based on data provided by Kemp, Vol. II-III, pp. 23-25. Note that his calculations are based on the assumption of an average of a 5 psi overpressure, thus not allowing for the complete destruction of industrial installations. Also, the total of the main USSR cities include one or two cities such as Tashkent which may not have been accessible to French SSBNs patrolling in the Atlantic.

255. Kemp, Vol. I, p. 5; 50 percent in Kemp, Vol. II-III, p. 5.

256. The Soviet population, 208 million in 1959, was 241 million in 1970. Thus one-fourth to one-half of the Russian population corresponded roughly to 30-60 million in 1970. Arguably, when de Gaulle said "Russia," he often meant "the Soviet Union." In this hypothesis, France would probably still have been able to target about one-fourth of the Soviet population when adding about 30 air-delivered 60 kt bombs.

257. MacNamara's criteria were 25-33 percent of the Soviet population and

about 66 percent of its industrial capacity, 1965; revised to 20-25 percent and 50-66 percent, 1967; and again in 1968 to 20-25 percent and 50 percent. See Ball, p. 14; and Kemp, Vol. I, p. 25.

258. Gallois met with Premier Mollet in March 1956. He argues that his intervention was critical for the acceleration of the nuclear program, see *Le sablier du siècle*, pp. 362-365.

259. *Livre blanc sur la défense,* Vol. I. The sentence began with "presently," leaving the door open to a future different perspective in light of European integration.

260. For vital interests, see above; for sanctuary, see Pierre-Marie Gallois, "Deux budgets militaires, une politique de sécurité," RDN, June 1962, pp. 937-953.

261. After the 1956 meeting, Gallois met with de Gaulle only once, in 1963. The President wanted to hear Gallois's views on the emergence of China as a nuclear power.

262. The quote is from Robert MacNamara's Ann Arbor address of June 16, 1962.

263. He expounded the argument in Pierre-Marie Gallois, *Les paradoxes de la paix*, Paris: Presses du temps présent, 1967.

264. See Gallois, *Stratégie de l'âge nucléaire*, pp. 231-234. To be fair, his views on the subject have sometimes been exaggerated: he did acknowledge that some countries would see their nuclear deterrent as a mean to blackmail and coerce others.

265. Charles Ailleret, "Opinion sur la théorie stratégique de la flexible response," RDN, August-September 1964, p. 1,328.

266. Gallois, *Le sablier du siècle*, p. 402.

267. Lawrence Freedman, *The Evolution of Nuclear Strategy*, Studies in International Security No. 20, London: MacMillan, 1981, p. 315.

268. Poirier was a lieutenant-colonel at the Policy planning staff of the MoD, along with general Beaufre and civilian analyst Gaston Bouthoul, under the supervision of military engineer Hugues de l'Estoile. With his colleagues, he framed the French concept in a document reportedly entitled "Logical study of a conceivable strategic model for France. Confrontation of the model with some concrete cases." Also known as "document 952" and dated March 15, 1966, it is still classified, but its contents have been made public by Poirier through conferences and writings. See Poirier, *Des stratégies nucléaires*, p. 325.

269. See Lacouture, p. 472.

270. On this, see, for instance, Cohen, *La défaite des généraux*, pp. 96-97.

271. Aron, *Le grand débat*, p. 133.

272. *Ibid*., p. 12, the reference to Gallois being obvious, p. 136. Gallois later

accused Aron of being paid by the CIA, Gallois, *Le sablier du siècle*, p. 164.

273. See his preface to Gallois, *Stratégie de l'âge nucléaire*, pp. v-vi; and Aron, *Le grand débat*, pp. 115-156. Aron, however, credited de Gaulle for being able to convey the impression that he *would* use the nuclear force, *ibid*., p. 122, and thus he was not completely out of tune with the Gallois argument, according to which the psychological factor of deterrence was the most critical.

274. Aron, Le grand débat, pp. 126-127.

275. See Mongin, pp. 254s.

276. Beaufre, *Dissuasion et stratégie*, p. 66.

277. On this point, see David Yost, *France's Deterrent Posture and Security in Europe, Part I: Capabilities and Doctrine*, Adelphi Paper No. 194, IISS, Winter 1984-1985, p. 39.

278. Beaufre also may be the author of the expression "non-use," *non-emploi*, i.e., "non-warfighting," which was to become later a keyword in French nuclear discourse.

279. See Bruno Colson, "La culture stratégique française," *Stratégique*, No. 53, 1992, pp. 27-60.

280. Critical public documents describing this strategy include the 1952 *Global Strategy Paper*, and the 1957 *White Paper*. See Heuser, pp. 93s.

281. Pierre-Marie Gallois, "The raison d'être of French defense policy," *International Affairs*, Vol. 39, No. 4, October 1963, p. 497. See also *ibid*., "Deux budgets militaires, une politique de sécurité." On the influence of British thinking on American, French and NATO strategies, see Beatrice Heuser, *NATO, Britain, France and the FRG. Nuclear Strategies and Forces for Europe, 1949-2000*, London: MacMillan Press, 1997.

282. See Heuser, p. 73.

283. Beaufre, *NATO and Europe*, pp. 51, 54. Gallois claims that the Beaufre group, like many other allied efforts, just added nuclear weapons with conventional strategy without taking into account the revolutionary potential of these weapons, Gallois, *Le sablier du siècle*, p. 315.

284. The group also was comprised of U.S. Colonels Goodpaster and Richardson and UK Colonel MacDonald. It functioned from September 1953 to late 1956.

285. Charles Ailleret, "Unité fondamentale des armements nucléaires et conventionnels," RDN, April 1964, pp. 565-577; and Charles Ailleret, "Opinion sur la théorie stratégique de la 'flexible response'," RDN, August-September 1964, in particular, p. 1334s.

286. For instance, "maintaining a clear and convincing capability to inflict unacceptable damage on an attacker," in Senate Armed Services Committee, Military Procurement Authorization, Fiscal Year 1966, Washington, DC: U.S. Government Printing Office, 1965, p. 43. MacNamara also referred from 1962 on

to "intolerable punishment." See, for instance, Statement of Secretary of Defense Robert S. MacNamara before the House Armed Services Committee on the Fiscal Year 1966-1970 Defense Program and 1966 Defense Budget, February 18, 1965, p. 39. References taken from Desmond Ball, *Targeting for Strategic Deterrence*, Adelphi Paper No. 185, London: IISS, 1983, p. 14.

287. See the contribution by Michael Quinlan, Chapter 9.

288. Press conference at the Elysée Palace, January 14, 1963, in de Gaulle, *Discours & Messages*, Vol. IV, p. 73.

289. Gallois saw the emerging French doctrine as heresy because he saw it as an alibi to maintain important conventional forces. See Pierre-Marie Gallois, *L'adieu aux armées*, Paris: Albin Michel, 1976, chapter 7: "La dérive." He despised the "test" idea and would be no less severe for the later "final warning" concept, described as "childish" and "dangerous," Gallois, *Le sablier du siècle*, pp. 402-408. Poirier, for his part, disdained the 1969 Fourquet concept of engaging a conventional battle with the option to use TNW for military efficiency and as a second "test." He described it as intellectually sloppy, a drift from his intellectually elegant 1968 model, see Poirier, *Des Stratégies Nucléaires*, p. 326.

290. See Lacouture, p. 473; and Peyrefitte, p. 354, in which he imagines a scenario where the Soviet union threatened to bomb Marseilles, and France replied by threatening to bomb Odessa.

291. See Ruehl, p. 223.

292. Cohen, *La défaite des généraux*, p. 95.

293. This is acknowledged in particular by Pierre Messmer, *Mémoires*, Paris: Albin Michel, 1992.

294. Maurice Vaïsse, "Historique du concept français de dissuasion nucléaire 1945-1994," in Pierre Pascallon, ed., *Quel avenir pour la dissuasion nucléaire française?*, Brussels: Bruylant, 1996, p. 5.

295. Quoted in Bendjebbar, p. 324.

296. Charles de Gaulle, *Le fil de l'épée*, Paris: Union générale d'éditions, 1962, p. 142.

297. Both quoted in Bozo, p. 121.

298. "*Des avions d'épouvante*," 1963 statement Claude Carlier, "La genèse du système d'arme stratégique piloté Mirage IV, 1956-1964," in Vaïsse, ed., *Armement et Vème République*, p. 214.

299. See Press conference at the Elysée Palace, p. 74.

300. See Gallois, "Puissance et limitation des armes de la dissuasion."

301. See, for instance, Gallois, *Stratégie de l'âge nucléaire*, pp. 180-183; and Beaufre, *Introduction à la stratégie*, Paris: Hachette, 1998, p. 111.

302. Arguably, the choice was between the ICBM and two more SSBNs, see

Ruehl, pp. 225-226, 303-305; and one should also note that the programme was definitely abandoned only in 1969 after de Gaulle left power. The point here is that a context of budgetary restrictions contributed to the choice made.

303. Messmer, "Notre politique militaire," p. 747.

304. Barre, "Discours prononcé au camp de Mailly le 18 juin 1977," p. 10.

305. Barre, "La politique de défense de la France," p. 17.

306. See, for instance, Fourquet.

307. For a discussion of this point, see the contribution of David Yost in Chapter 7.

308. Giscard d'Estaing, *Le pouvoir et la vie*, p. 180.

309. Theleri, p. 233.

310. An idea suggested by Lothar Ruehl, p. 233.

311. A rare exception is its use by Giscard in his memoirs, *Le pouvoir et la vie*, p. 210.

312. See Messmer, "Notre politique militaire."

313. Georges Pompidou, press conference, December 1973, in Theleri, p. 327.

314. Barre, "La politique de défense de la France," p. 15.

315. Two SSBNs at 100 percent of the time, three at 75 percent, and four in crisis time, if needed.

316. Barre, "La politique de défense de la France," pp. 17, 12.

CHAPTER 3

THE U.S. NAVY'S FLEET BALLISTIC MISSILE PROGRAM AND FINITE DETERRENCE

Harvey M. Sapolsky

In their earliest incarnation Submarine Launched Ballistic Missiles (SLBMs) were the epitome of a Mutual Assured Destruction (MAD) strategy fully implemented in that they were second strike weapons that were mobile, invulnerable to enemy detection and destruction, and capable only of hitting soft urban/industrial targets. *Polaris* was the U.S. Navy's first SLBM. Given its limited accuracy, the *Polaris* could hit a Soviet city only if the city were big enough to make a miss unlikely. But technology, strategy and organizational opportunities change. There is little that is MAD in the *Trident* D-5, the Navy's current SLBM missile, because it is a very accurate system that is capable of destroying hardened missile silos and command bunkers.

Targeting policies for American nuclear weapons are a product of nuclear weapon capabilities, national strategy, and organizational interests. These policies are established through a largely unguided bureaucratic search for what is technically feasible, what is militarily desirable, and what is politically acceptable regarding the potential use of nuclear weapons. But they are also the nation's deepest, most well-guarded secrets, and thus on some level knowable to only a handful of government insiders. The public expression of these policies may be made intentionally misleading so as to protect the real policies from prying eyes, foreign and domestic. We can infer about motivations and try to understand actions, but we may never fully know what was intended or achieved strategically for nuclear weapons.

By any measure SLBMs were a significant innovation, affecting in important ways several dimensions of U.S. strategic policy. They helped kill as unneeded a vast bomber force (our own), helped save the Navy from being marginalized in the assignment of the nation's most vital security mission, and helped win the Cold War by making it impossible for the United States to lose. They also were largely unwanted both within and without the Navy. Civilians did not want the Navy to develop its own ballistic missile. The Air Force criticized

the effort. The Army had to be pushed out of the way. And much of the Navy dreaded SLBMs.[1] Today SLBMs are the key component of our nuclear arsenal. [2]

The Difficult Road to *Polaris*

The U.S. Navy had great difficulty gaining a significant role in the sponsorship of nuclear forces. The Navy had only minimum involvement in the project to develop the atomic bomb, the most important weapon advance to come out of the World War II. It also lacked a viable weapon platform with which to challenge the nuclear weapon dominance that the newly created Air Force had in the early years of the Cold War. And it found that civilian officials had little interest in making the strategic mission competitive among the armed services.

The Navy was essentially frozen out of the Manhattan Project, the bomb project, because of a conflict an admiral had with the scientists who were helping to organize the effort to mobilize civilian science for the World War II. As the war drew near, the scientists offered suggestions for ways to improve the Navy's anti-submarine capabilities through a committee of the National Research Council, but their ideas were rejected as superfluous by Rear Admiral Harold G. Bowen, who at the time was the technical aide to the Secretary of the Navy as well as head of the Naval Research Laboratory. Admiral Bowen told the scientists that the Navy already had a good plan to defeat the U-boats and, if they wanted to, they ought to put on uniforms. Offended, the scientists involved soon found an influential champion, Vannevar Bush, the key wartime advisor to President Roosevelt on science including the development of the atomic bomb. Bush saw to it that Admiral Bowen was relieved of his posts and given an unsatisfactory fitness report.[3] When the time came to organize the atomic bomb project, Bush gave the task to the Army Corps of Engineers, even though the Navy in the form of the Naval Research Laboratory was already involved in atomic research. Bush justified this decision by saying that naval officers, and especially those associated with the Naval Research Laboratory, did not know how to work effectively with civilian scientists.[4]

After the war the Navy sought a role in the delivery of nuclear weapons by building carriers big enough to launch and recover

atomic bomb carrying aircraft, the so-called super carriers.[5] The Truman administration in 1949, citing budget constraints, cancelled the program in favor of an increased investment in the Air Force's B-36 strategic bomber. When the Navy took its case for the carriers to the Congress and the public, including making unproven accusations about corruption by Air Force officials and the bomber's contractor, President Truman fired the Secretary of the Navy and the Chief of Naval Operations for insubordination in a scandal that became known as the Revolt of the Admirals.[6]

The Navy also did not fare well six years later when the Eisenhower administration reviewed available ballistic missile programs. President Eisenhower's concern about winning the race to build strategic missiles was tempered by his fear that a prolonged mobilization of American society for the Cold War, as it seemed likely, might permanently harm the economy and create a garrison state unless weapon acquisition costs were limited.[7] Three Air Force projects (*Atlas, Titan*, and *Thor*) and one Army project (*Jupiter*) were given priority development approval. The best the Navy could do was to team with the Army to develop a sea-based version of the *Jupiter* intermediate range ballistic missile. [8] Given that the Navy wanted to use submarines as the launching platform for its ballistic missile, a teaming effort with the Army seemed quite undesirable from the Navy's point of view. The Jupiter missile was both big and liquid-fueled. A big missile meant that few could be carried on a single submarine and that they would be difficult to launch. As later demonstrated in several Soviet disasters, volatile liquid fuels sloshing about on a submarine can create very dangerous conditions.

Missile advocates within the Navy wanted their own program, one to develop a small, solid-fueled rocket. Studies showed that such a system was feasible provided expected advances occurred in several technologies including the design of smaller nuclear warheads.[9] But because the Eisenhower administration was determined for budgetary reasons to limit the number of priority ballistic missile programs to four, the only way the Navy could gain approval for an independent development project was to do in the Army. The Navy soon did just that by voting with the Air Force in the Joint Chiefs of Staff to prevent the Army from having an independent requirement for a strategic missile. The Air Force saw the Army rather than the

Navy as potentially the most difficult rival for the strategic mission. Once the Navy withdrew from the Jupiter program, the Army's missile effort lost its status as a priority project. In its place, the Navy was given approval for accelerated development of the solid-fueled *Polaris* missile and its associated submarine system. Approval came in 1956. Four years later the first *Polaris* armed nuclear submarine went to sea.[10]

The Navy took a risk in continuing to pursue the strategic mission. Some naval officers thought the Air Force was destined to dominate in ballistic missiles just as the Air Force had in aircraft delivered nuclear weapons. It was better, they believed, for the Navy to concentrate on conventional forces. Avoiding the competition for the strategic mission would avoid another political defeat. Admiral Arleigh Burke, the Chief of Naval Operations during the *Polaris* decision, however, thought that the Navy had to be involved in the development of ballistic missiles and gain part of the strategic mission if it wanted to protect its share of the defense budget and protect its conventional warfare role. Burke, right on so many other issues, may have been wrong on this one because much of the program's initial costs came out of the Navy's base budget. In any case, the nation benefited from his bureaucratic miscalculation.[11]

Not surprisingly because of these internal fears, Fleet Ballistic Missile (FBM) proponents initially looked back at the U.S. Navy almost as much as they focused on the growing nuclear arms race with the Soviet Union in their statements about *Polaris*' deployment and purpose. Although they were totally committed to submarine basing for *Polaris*, they tried to reassure others in the Navy that opportunities for them were not being totally closed off. Thus, the initial design of the FBM system included provisions to place *Polaris* launch tubes on surface ships - aircraft carriers and cruisers specifically - as well as submarines.[12] This way, the major elements of the conventional navy could have a possible strategic role. Spreading *Polaris* missiles across the fleet might not be their best or most likely outcome, but such plans potentially could be used to justify the purchase of conventional forces in a policy environment that seemed certain to favor more strategic investments at the expense of conventional warfare investments.

Defending *Polaris*

Keeping the *Polaris* program viable in Washington's competitive budgetary environment meant that the Navy had to devise effective supporting arguments as well as effective development strategies. The U.S. was going to build ballistic missiles, but not necessarily *Polaris* missiles. Just as the Jupiter missile could be pushed aside so could *Polaris*. The Eisenhower administration sought to impose budget ceilings on the military in order to limit the impact the Cold War mobilization was having on the American economy.[13] Submarines are not cheap. The cost of putting an equivalent payload at sea was initially estimated to be four times that of a land based force.[14] If the Navy had not offered a persuasive case for its FBM Program, the Navy's formal name for its submarine launched ballistic missile system, Air Force ballistic missile programs would have been preferred to what could easily have been viewed as the Navy's wasteful duplicating effort to gain a share of the strategic mission.

Polaris was built primarily on arguments that stressed the Navy system's unique contributions to national security. Ballistic missiles, whatever their basing modes, were certain to be targets for enemy nuclear weapon attacks because of the threat they posed to an opponent. The blast and fallout effects of these attacks could be devastating to civilian populations and vital national infrastructure. Sea-basing, FBM advocates stressed took missile targets away from American shores, reducing the damage that an attack could inflict on the American homeland. Thus, the FBM system was sold in part on its unique damage limitation feature.[15]

Submarine basing has particular advantages for strategic systems, not the least of which is that submarines are extremely difficult for opponents to counter. Submarines are mobile, stealthy platforms that are hard to locate and track.[16] Nuclear-powered ones can stay submerged for months at a time. Defenders must be able to identify, follow and destroy missile carrying submarines in literally millions of square miles of ocean, much of which is likely to be patrolled by U.S. warships and aircraft.

Oskar Morgenstern, the great nuclear strategist, described the Navy's position succinctly and positively in 1960, writing: "The United States can make its force invulnerable by hardening….But

this has the simple consequence that these sites will come under correspondingly heavier attack…Indeed, we must go further and place the major part of the retaliatory force outside our country… on the vast expanse of the world's oceans, in fact under the waters. We then combine through the use of nuclear-powered, missile-firing *Polaris* submarines the tremendous advantages of mobility with invisibility; and we can distribute individual units randomly, thereby making surprise attack on any substantial part of that force impossible."[17]

The survivability of the system was also described as an advantage because it meant *Polaris* was unlikely to be viewed by the Soviets as a first strike weapon. A more vulnerable system could cause the Soviets to fear that it would be used preemptively and therefore could provoke their own preemption. Lurking safely in the depths, *Polaris* was the assured retaliation for an attack against the United States that underlay the mutual assured destruction doctrine and was vigorously promoted as such by some of its early naval advocates.[18]

Even the technical limits imposed by submarine basing of *Polaris* were used to promote the FBM system. Accurate targeting of a ballistic missile requires accurate information about its precise launch point as well as the location of its target. Although improvements were made, navigation at sea was an imprecise science when *Polaris* was being developed. At that time, missile guidance systems could not compensate for the inevitable errors. Also communication with submerged submarines was very difficult, ruling out the close coordination required for preemptive attacks.[19] Taken together the accuracy limits and the communications problems meant that *Polaris* was inherently a second strike weapon.[20] Rather than a limitation, the retaliatory nature of *Polaris* was described as a strategic virtue. *Polaris*, the argument went, would help stabilize the arms race by its inability to do disarming attacks.

As a retaliatory system, FBM could be finite in scale and thus limited in cost. Proponents argued that this would free resources that conventional forces (especially the rest of the Navy) needed to meet likely Soviet inspired global probes that sought to extend the Cold World competition into other arenas.[21] This assertion helped reassure skeptics in the Navy who worried that the expanding strategic forces would absorb most of the service's budget and officer promotion opportunities as they were already doing within

the Air Force. Staking out the retaliatory position signaled that the *Polaris* proponents had moderate ambitions. It also helped avoid continuing investments in strategic counterforce systems, such as the Air Force promoted, which fueled a wasteful arms race with no upper bounds.[22] *Polaris* made nuclear deterrence finite both in terms of its impact on the Navy and its impact on society.

As America's ultra secure second strike, its invulnerable deterrent, the *Polaris* system was a significant constraint on Soviet nuclear aggression. If the Soviets wished to counter it at sea, they would be forced to build a navy of a scale to rival that of the U.S.. The resources required to do effective antisubmarine warfare were vast, especially against a technologically advanced opponent like the U.S.. Moreover, the Soviet Union, because of its geographic isolation from the sea, was at a particular disadvantage in any attempt to counter directly the *Polaris* threat. Pushing *Polaris* could push the Soviets financially, and certainly might entice them to allocate resources away from building and defending their own strategic forces.[23]

Technology and Morality

During public debates about the relative merits of buying Super Carriers versus the B-36 bombers, naval officers raised questions about the morality of the Air Force position. By advocating the deployment of the B-36, they argued that the Air Force was advocating killing civilians because the B-36 would not be able to deliver bombs accurately. The B-36 would repeat the city destroying attacks of the World War II, but this time the near random devastation of strategic bombing would be greater because the B-36 would be dropping nuclear bombs. The intentional targeting of civilians, which a B-36 raid necessarily would be, they noted, was immoral and harmful to national interest. In contrast naval aircraft attacking from the new carriers would be fighter-bombers capable of striking military targets with some precision.[24] Naval officers did not mention that the Navy wanted the Super Carriers to launch larger aircraft needed for nuclear strikes of their own which were likely to cause considerable civilian casualties as collateral damage. [25]

But because *Polaris* like all early ballistic missiles was a city killer by necessity, naval officers advocating the development of the *Polaris* had to ignore the moral objections to city attacks that the Navy made

in the debate over the Super Carrier. To be sure, they cited *Polaris*' potential for attacking military targets, specifically mentioning submarine pens and airfields, but this was in part to justify an independent naval requirement for a nuclear weapon delivery system and in part to mollify critics within the Navy who preferred conventional capabilities.[26] The serious discussion of targets for *Polaris* quickly turned to the list of Soviet urban/industrial targets, cities and civilians.

The retaliatory /deterrent aspects of *Polaris* were more than acknowledged, they were championed. The moral arguments were reversed. With *Polaris* it was virtuous to threaten the annihilation of civilian populations because the ability to cause such destruction would prevent war, not expand it.[27] *Polaris*, the invulnerable deterrent, would be the most effective way to do this. There was no need for a doctrine of massive retaliation. With a secure second strike, nuclear war would never pay.[28] As Rear Admiral I. J. Galantin, later head of the FBM development effort, said: "[*Polaris*] will give assurance of retaliation and fulfill the new function of military force - that of preventing war - by being so attuned and adjusted to grand strategy requirements that battles do not occur." [29]

The Slide Away from MAD

Although a Joint Targeting Planning Staff for nuclear weapons was established in August 1960, the shape of the U.S. nuclear weapon programs remained very much influenced by uncoordinated service initiatives.[30] The Navy in calculating the number of SLBMs (submarines) to acquire sought enough to attack all potential Soviet targets irrespective of the coverage of same targets by Air Force land-based ballistic missile and bombers.[31] Both the Air Force and the Navy planned follow-on strategic systems independently of each other. And both services pursued vigorous technology improvement efforts to make their systems more survivable and more accurate.

The *Polaris* had A-1, A-2 and A-3 versions and was succeeded by first the *Poseidon* and then the *Trident* D-4 and D-5 missiles. The *Polaris* A-2 achieved the range goals originally set for *Polaris* while the A-3 had increased range and multiple nuclear warheads that could thwart early Soviet anti-ballistic missile defenses. *Poseidon* increased the range still further, had improved accuracy, and added multiple

independently targetable warheads that assured penetration of more advanced Soviet defenses. The *Trident* versions improved range and accuracy still further. By the time *Trident* D-5 was deployed, the hard target capabilities of the FBM, achieved gradually, were generally acknowledged.[32]

Within the Navy there was a debate between those who wanted technology improvements in the FBM system merely to protect its assured destruction role and those who wanted the Navy to gain significant counterforce capabilities.[33] The long time director of the FBM's development agency, the Navy's Special Projects Office (later the Strategic Systems Projects Office), Vice Admiral Levering Smith, in particular, sought to constrain the push toward a hard target killing requirements for SLBMs that was advocated within the Navy's staff and Secretariat. Smith thought that an invulnerable and guaranteed to succeed second strike was sufficient to prevent a Soviet attack.[34]

But not everyone agreed that Mutual Assured Destruction was the most desirable strategic doctrine. From the beginning, there were officers and officials in and out of the Navy who did not want to trust the nation's fate to the logic of mutual hostage taking and the rational calculations of the Soviet leadership.[35] Although debates raged over every effort to build ballistic missile defense, the Navy quietly pursued anti-submarine warfare with apparently great and persistent success. The Navy achieved operational dominance over Soviet submarines in the early 1960s and maintained it for more than two decades.[36] Nominally focused on keeping the sea lanes to Europe open, this anti-submarine warfare capability obviously could be used against Soviet ballistic missile submarines; and it was. Here the argument was that our bombers and command facilities had to be protected against a surprise Soviet SLBM attack. As a Soviet ballistic missile submarine retreated under pressure back toward the apparent protection of Soviet shores, the U.S. anti-submarine effort followed. Indications are that the effort remained successful despite Soviet attempts to create Bastions for the safe operation of their missile carrying submarines. The Soviet submarines were in jeopardy no matter their mission. Although unadvertised, the Navy, in essence, had developed the ability to place the Soviet's second strike continually at risk.[37]

Without public declaration or full internal debate, the Navy had given the nation strategic options beyond MAD. The improvements obtained in SLBM accuracy, advances achieved in submarine communications, and the significant anti-submarine warfare advantage achieved by the Navy provided preemption and war fighting possibilities that earlier in the Cold War simply did not exist. Because MAD remained the official policy, it was quite rare and controversial for officials to discuss these new options openly and clearly.[38] Yet, any fair assessment of the capacity of American strategic forces from the 1970s on could not ignore the reality. The U.S. had the capability to do more than absorb a nuclear attack and retaliate with a devastating counter strike.[39]

Technological opportunities were seized. *Polaris* was a very secure retaliatory system, the key component of a MAD strategy. *Trident* is all that plus the formerly unthinkable - the possibility of throwing a disarming first blow - a coordinated, preemptive strike against all Soviet strategic systems. The Soviet Union was attempting to respond by building quieter submarines and mobile land-based missiles when the Cold War ended with the collapse of Communism and the disintegration of the Soviet empire.

ENDNOTES - CHAPTER 3

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2. David Mosher, "The Hunt for Small Potatoes: Savings in Nuclear Deterrence Forces," in Cindy Williams, ed., *Holding the Line: U. S. Defense Alternatives for the Early 21st Century*, Cambridge, MA: MIT Press, 2001, pp. 119-140.

3. Harvey M. Sapolsky, *Science and the Navy: The History of the Office of Naval Research,* Princeton, NJ: Princeton University Press, 1990, pp. 11-19.

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6. Jeffrey G. Barlow, *Revolt of the Admirals: The Fight for Naval Aviation, 1945-1950*, Washington, DC: Naval Historical Center, Department of the Navy, 1994; Paul Y. Hammond, "Super Carriers and B-36 Bombers: Appropriations, Strategy, and Politics," in Harold Stein, ed., *American Civil-Military Decisions*, Birmingham, AL: University of Alabama Press, 1961.

7. Andrew P. N. Erdmann, "'War No Longer Has Any Logic Whatever': Dwight D. Eisenhower and the Thermonuclear Revolution," in John Lewis Gaddis, ed., *Coldwar Statesmen Confront the Bomb: Nuclear Diplomacy Since 1945*, New York, NY: Oxford University Press, 1999, p. 109.

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11. Desmond J. Ball, "The Counterforce Potential of American SLBM Systems," *Journal of Peace Research*, Vol. XIV, No. 1, 1977, p. 25, citing interview with Admiral Burke. Also Sapolsky, *The Polaris System Development*, pp. 160-191.

12. The idea of surface ships as ballistic missile carriers persisted into the 1960s. See Thomas Connolly, "The Ballistic Missile Surface Force," *U.S. Naval Institute Proceedings*, June 1964, pp. 41-47.

13. Robert R. Bowie and Richard Immerman, *Waging Peace: How Eisenhower Shaped an Enduring Cold War Strategy*, New York, NY: Oxford University Press, 1998, pp. 41-52; Erdmann, "'War No Longer Has Any Logic Whatever': Dwight D. Eisenhower and the Thermonuclear Revolution." Note the objections, Commander Laurence. B. Green and Commander John H. Burt, "Massive Retaliation: Salvation or —?" *U.S. Naval Institute Proceedings*, October 1958, pp. 23-28.

14. Captain Dominic A. Paolucci, "Poseidon and Minuteman: Either, Or; Neither, Nor?" *U.S. Naval Institute Proceedings*, August 1968, p. 49.

15. Roy Beavers, "Seapower and Geopolitics in the Missile Age," *U.S. Naval Institute Proceedings*, June 1959, p. 41; Hanson W. Baldwin, "Stalemate—Or? *U.S. Naval Institute Proceedings*,_April 1964, pp. 48-55. "This line of argumentation continued even as SLBMs evolved. See Paolucci, "The Development of Navy Strategic Offensive and Defensive Systems," p. 223.

16. Owen R. Cote, Jr., *The Third Battle: Innovation in the U. S. Navy's Silent Cold War Struggle with Soviet Submarines*, Newport, RI: Naval War College Press, 2002; Paolucci, "Poseidon and Minuteman: Either, Or; Neither, Nor?"; Admiral Claude Ricketts, "Naval Power—Present and Future," *U.S. Naval Institute Proceedings*, January 1963, p. 38. Some claimed the advantage for all sea based weapons, those delivered by carrier aircraft or seaplanes as well as submarines, James H. Smith, Jr., "Mobile Sea Base Systems in Nuclear Warfare," *U.S. Naval Institute Proceedings*, February 1955, pp. 131-135.

17. Quoted in Norman Polmar and Captain Dominic A. Paolucci, USN, Ret., "Sea-based 'Strategic' Weapons for the 1980s and Beyond," *U.S. Naval Institute Proceedings*, May 1978, p. 107.

18. Commander P. H. Backus, "Finite Deterrence, Controlled Retaliation," *U.S. Naval Institute Proceedings*, March 1959, pp. 23-29; Commander Paul H. Backus, USN, Ret., "The Vulnerable Homeland," *U.S. Naval Institute Proceedings*, December 1970, pp. 19-22.

19. Sapolsky, *The Polaris System Development*, pp. 238-240.

20. Backus, "The Vulnerable Homeland"; Ball, "The Counterforce Potential of American SLBM Systems," p. 24.

21. Commander Ralph E. Williams, "Task for Today: Security Through Seapower," *U.S. Naval Institute Proceedings*, March 1958, p. 24.

22. Backus, "Finite Deterrence, Controlled Retaliation,"; Lieutenant George E. Love, "Deterrence—The Next 20 Years," *U.S. Naval Institute Proceedings*, November 1961, pp. 51-59. Naval officers were eager to take the challenge that a more flexible response strategy embraced. See Commander Malcolm W. Cagle, "Sea Power and Limited War," *U.S. Naval Institute Proceedings*, July 1958, pp. 23-27; Captain George L. Rearing, "The Atom, the Navy and Limited War," *U.S. Naval Institute Proceedings*, February 1962, pp. 50-57; and Captain Carl H. Amme, "Naval Strategy and the New Frontier," *U.S. Naval Institute Proceedings*, March 1962, pp. 23-33.

23. Rear Admiral I. J. Galantin, "The Future of Nuclear-Powered Submarines," *U.S. Naval Institute Proceedings*, June 1958, p. 23, expresses an early version of the so-called competitive strategy of forces the Soviets to spend scarce resources on defensive measures. See also testimony of Rear Admiral Levering Smith, U.S. Congress, Senate, Committee on Armed Services, *Undersea Long Range Missile: Hearings before the Ad Hoc Research and Development Subcommittee*, 92nd Cong., 2nd Sess., March 23, 1972, p. 3211; testimony of Vice Admiral Philip Beshany, U.S. Congress, Senate, Committee on Armed Services, *Undersea Long Range Missile: Hearings before the Ad Hoc Research and Development Subcommittee*, 92nd Cong., 2nd Sess., March 22, 1972, p. 3143.

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30. Henry S. Rowen, "The Evolution of Nuclear Strategic Doctrine," in Laurence Martin, ed., *Strategic Thought in the Nuclear Age*, Baltimore MD: Johns Hopkins University Press, 1979, pp. 131-156. Note also Captain Linton F. Brooks, "Dropping the Baton," *U.S. Naval Institute Proceedings*, June 1989, p. 34, who notes the Air Force dominance of the Joint Strategic Targeting Planning Staff.

31. Sapolsky, *The Polaris System Development*, p. 161.

32. *Trident* accuracy is discussed in D. Douglas Dalgleish and Larry Schweikart, "Trident and the Triad," *U.S. Naval Institute Proceedings*, June 1986, p. 76: D. Douglas Dalgeleish and Larry Schweikart, "One Missile for the Triad," *U.S. Naval Institute Proceedings*, August 1989, p. 74; Brooks, "Dropping the Baton," p. 35.

33. Graham Spinardi, *From Polaris to Trident: The Development of U.S. Fleet Ballistic Missile Technology*, London, UK: Cambridge University Press, 1994. Also Graham Spinardi, "Why the U.S. Navy Went for Hard-Target Counterforce in *Trident II*, And Why It Didn't Get There Sooner," *International Security*, Vol. 15, No. 2, Fall 1990, pp. 147-190.

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36. Cote, *The Third Battle*; Tom Stefanik, *Strategic Antisubmarine Warfare and Naval Strategy*, Lexington MA: Lexington Books, 1987.

37. Contrast Rowen, "The Evolution of Nuclear Strategic Doctrine," p. 153. See also Barry Posen, *Inadvertent Escalation. Conventional War and Nuclear Risks*, Ithaca: Cornell University Press, 1992. Our significant ASW capabilities were not usually acknowledged. See James L. George, "START & the Navy," *U.S. Naval Institute Proceedings*, April 1986, p. 38.

38. Ball, "The Counterforce Potential of American SLBM Systems," in Spinardi, "Why the U.S. Navy . . .".

39. Brooks, "Dropping the Baton," p. 36.

CHAPTER 4

MAD AND U.S. STRATEGY[1]

Charles H. Fairbanks, Jr.

From almost the very beginning of the Cold War, American nuclear strategy did not principally target Soviet cities. Most American nuclear weapons were aimed at military targets. Nonetheless, it was not until Secretary of Defense Robert McNamara's address at the May 1962 NATO Ministerial and his subsequent public speech at the University of Michigan that the United States explicitly adopted a "city-sparing" nuclear strategy. Specifically, McNamara called for the creation of a meaningful Single Integrated Operational Plan (SIOP) that spared cities to the extent compatible with destroying enemy military targets.

Through the 1960s, the Defense Department and successive presidential administrations allowed mutually assured destruction (MAD) to be perceived as strategic doctrine. And, indeed, MAD did have significant subsequent influence over plans and technology, blunting calls for greater weapons accuracy. However, MAD never became, in practice, America's strategic doctrine. Moreover, the city-sparing aims of the Athens speech were never fully abandoned. This chapter aims to correct the perception that by 1964, McNamara concluded that his "no cities plan was a dangerous illusion,"[2] and thus turned to rely on MAD.

MCNAMARA'S ATHENS AND ANN ARBOR SPEECHES

Since the mid-1950s at RAND—where the most innovative thinking on nuclear strategy was going on—there was a desire to escape from the danger of spasm nuclear war. Those thinking about this problem at RAND considered MAD so absurd and terrible that they were skeptical that American or Soviet leaders would ever order such an attack.

This doubt was reinforced powerfully by the situation in Europe. The bedrock of the North Atlantic Treaty Organization (NATO) was America's promise to use nuclear weapons first to discourage a

massive Soviet conventional attack. As the Soviets developed their own significant strategic nuclear force, the overwhelming bulk of these weapons were directed against Western Europe rather than the United States. As a result, many Europeans began to wonder whether the American promise to use nuclear weapons would be upheld and, if so, under what conditions. This European concern made it imperative to enhance the credibility of what were then called "type two" nuclear deterrents. These nuclear options were designed not to deter direct nuclear attacks, but rather to deter other unacceptable actions an aggressor might take.

In addition, the need for a wider variety of nuclear options was also very powerfully bolstered by the experience of the long Berlin crisis. In fact, William Y. Kaufman, the analyst most directly involved in elaborating the Athens strategy, claims that Berlin was the most dangerous of all potential nuclear crises, more dangerous than Cuba. Even before the Berlin crisis, however, there was reason for Europeans to worry that the United States would not defend them. Certainly, Nikita Khrushchev's missile bluff, which was underlined by the launch of Sputnik in 1957, powerfully reinforced European doubts about the American nuclear guarantee. What the Russian missile bluff made clear was that there was a Soviet strategy to extract concessions from the West over Berlin by using the West's fear of Soviet ballistic missiles. While this turned out to be a bluff, it took 3 or 4 years for that to be clearly known.

Throughout this period, from the late 1950s through the early 1960s, ideas about nuclear deterrents were very much in flux. The idea of minimum deterrence or finite deterrence, by which nations would need only develop a small invulnerable nuclear force aimed at an opponent's population centers, was put into circulation by the French and the U.S. Navy. The Navy was then promoting its submarine-launched ballistic missile fleet. This idea generated considerable interest. Just before President Kennedy entered office, the new Chief of Naval Operations predicted that an admiral would be the next NATO Supreme Allied Commander, Europe (SACEUR) because America's nuclear deterrent was going to be the Navy's responsibility.

It was in this context that McNamara delivered his speech to the NATO Ministerial in Athens on May 6, 1962. It set forth a

comprehensive statement of American policy on strategic nuclear war, but, importantly, only insofar as it affected NATO.

The Athens speech was intended to stand on its own, but McNamara was so pleased with it that he asked for an unclassified version to be produced for an address to his Michigan alma mater, according to his assistant, Bill Kaufman. Kaufman claims that he refused to work on the Ann Arbor address because of the controversy he believed the Athens strategy would provoke if it were made public and taken out of its original intra-NATO context.

The Ann Arbor speech ultimately was crafted by Adam Yarmolinsky, whose views were more dovish than those of Kaufman. It was only a third as long as the Athens address, having been trimmed of classified information. Another key difference between the speeches was that Athens was specifically designed both to address and evade various NATO sensitivities. The Allies were accustomed to a NATO process in which all changes of military doctrine took a very long time. To get the doctrine of flexible nuclear response accepted by NATO, for example, took years. The same was true of the Athens speech, which was never fulfilled, particularly on the conventional side.

There were, however, several key similarities between the two speeches. In both, McNamara argued that, to the extent feasible, NATO should consider general nuclear war in much the same way that it approached more conventional military operations. NATO's principal military objective in both cases should be the destruction of the enemy's military forces. The speech at Athens went on to say that, under appropriate conditions, a nuclear strike confined to military targets on both sides might save 75 percent of the lives that would otherwise be lost in an offensive that combined an assured destruction attack plus counter force targets.

Equally important, and much more explosive in terms of the NATO reaction, was what Kaufman and McNamara called the "indivisibility of control" over nuclear weapons. In the Athens speech, McNamara argued, "It is for these reasons I've laid such stress on unity of planning, concentration of executive authority, and central direction." He ended this speech noting that, "Without them, general nuclear war means certain ruin. With them we have a chance of national survival."[3] Small nuclear forces—like those

the British and French developed—were judged to be expensive, prone to obsolescence, and lacking credibility as a deterrent. By McNamara's standard of indivisibility of control, the British nuclear forces were less problematic than those of France, since the former were nominally integrated into America's SIOP by the presence of a British officer on Washington's joint strategic target and planning staff. The French, in contrast, were very proud of the independence of their nuclear deterrent and viewed McNamara's Athens speech as an assault on Gaullist military doctrine.

Somewhat more low-key was McNamara's attack on the Multi-Lateral Force (MLF) which was a proposal to create a force of medium range ballistic missiles in the custody of the European NATO member states that would be launched from ships jointly manned by all the NATO countries. The MLF excited great derision in the Pentagon. It originally was developed by Professor Klaus Nor, then on the State Department's planning staff, as a response to the growing European doubts about the credibility of NATO's type two deterrents. McNamara made clear his reservations about the MLF in the Athens speech. "On the multilateral Medium Range Ballistic Missile Force," McNamara noted, "we expect our allies will wish to consider very carefully the full implications of undertaking this venture."

Finally, the Athens speech culminated in a call for much larger conventional forces in Europe, which would have to be raised by the NATO allies. The conventional defense of Germany, which was not much more substantial than a tripwire, was to become a force capable of resisting Soviet Bloc attacks in order to void the question of escalation to the strategic nuclear level.

WHY THESE FORMULATIONS PROVED TO BE UNPOPULAR

Taken together, the Athens and Ann Arbor speeches constituted a major Pentagon strategic initiative. Yet, after the Ann Arbor address, none of McNamara's proposals attracted much public discussion or debate. There were still plans for limited options being prepared in the Pentagon, and there was ongoing work on the SIOP. But, if one considers General Odom's chapter in this volume, one can appreciate how limited the results of these efforts were.

Why, then, were the Athens and Ann Harbor suggestions set aside? Some of the most popular explanations are not very persuasive. The first reason that is most frequently proffered is Soviet opposition. Soviet objections to the Athens and Ann Arbor speeches were, of course, inevitable, given the relatively small size of Russia's nuclear forces. Yet, for all of Moscow's grumbling, the Russians did not conduct a major public relations campaign against the Athens doctrine like they did against Star Wars in the 1980s or the Pershing II and ground-launched cruise missile deployments in the 1970s and 1980s. As such, the Pentagon hoped that the Soviets' position would evolve, which indeed it did, albeit many, many years later.

The second popular explanation is European opposition, which certainly proved a headache for McNamara and the Kennedy administration. It flowed from the asymmetry of the damage World Wars I and II inflicted against Western Europe versus the United States. There remained, particularly in the U.S. Air Force, an enormous interest in fighting and winning a nuclear war, whereas in Europe, most officials were interested in deterring war. The most thoughtful European strategic analysts, like Raymond Aron, Headly Bull, and Helmut Schmidt, were not unsympathetic to the Athens formulations. Instead, what worried them most was McNamara's demand for substantially greater military spending and a meaningful conventional force capable of defending Western Europe.

This European anxiety was best articulated by Raymond Aron in his book, *The Great Debate*. Aron argues that graduated response—another name for counter force and assured destruction alternatives plus the conventional defense of Western Europe—had a two-fold function. The first was deterrence, and the second was actual use. Graduated responses put emphasis on the use of tactical nuclear weapons and the incontestable need after the initiation of nuclear operations to avoid immediate escalation led most Europeans to believe that deterrence of nuclear war was, at best, a secondary objective of the new formulations.

In fact, Europeans viewed the Athens doctrine as being less effective as a nuclear deterrent than as a defense against nuclear hostilities in Europe spinning out of control into Soviet or American territories. Europeans certainly did not see the Athens formulations

as a means to restore the plausibility of the American nuclear deterrent for Western Europe. Instead, their deepest fear, of which the Office of the Secretary of Defense was profoundly aware, was that the Athens doctrine signaled an American withdrawal of its strategic nuclear guarantee to Western Europe. Washington, they feared, would substitute this guarantee with a conventional defense of Western Europe and a tacit agreement with Moscow to spare the American and Soviet heartlands from ever being targeted with nuclear arms.

With the massive nuclear forces and nuclear doctrines of the period, particularly on the Soviet side, European fears that only Europe would suffer if a general war broke out in their neighborhood were not very realistic, but they are easy to understand. Their anxiety in this regard was only aggravated by McNamara's attack on independent nuclear deterrent forces, which was a head-on confrontation with Britain and particularly France. Nevertheless, none of Europe's reservations against the Athens formulations had much impact in the short run because European officials tended either to go along with American strategic decisions or try to slow them down. The Kennedy administration certainly was more than willing to dictate to Europe. For example, Washington's unilateral cancellation of Skybolt, a major U.S.-UK cooperative air-launched ballistic missile project surprised Prime Minister McMillan at the Nassau Summit, undercut the defense policy of the conservatives in Britain, and gave ammunition to the Labor Party. Still, Kennedy stood by his decision, and the British gave way.

This, then, brings us to the real factors that unmistakably undercut support for the Athens doctrine. First, the weapons necessary to implement the Athens doctrine made the Office of the Secretary of Defense lose enthusiasm for its own proposal. After the Athens address, McNamara tasked the Services to specify what weapons would be needed to put it into practice. The results were quite substantial, particularly given McNamara's penchant for defining precise criteria for selecting and sizing U.S. weapons hardware and military forces.

To appreciate these requirements, it is essential to remember the climate at the time. There was considerable fear of nuclear war, constant development of new weapons, and highly publicized

Russian missile bluffs. The United States had difficulties launching a satellite after Sputnik, and the bomber gap, which had already been a brief sensation in the mid-1950s, was followed by the missile gap, which, in turn, was a major factor in the 1960 presidential election. Internal RAND documents during this period claimed that the chance of nuclear war occurring within 10 years was approximately 25 percent. Long-range ballistic missiles were just coming on line which fed the imaginations of weapons designers and the Air Force. Also, after Sputnik, fears of Soviet strategic nuclear weapons fed anxiety on the American side.

There was much more worry in the early 1960s about nuclear war and how to deal with it than there had been in the mid-1950s. The massive targeting routines that the Air Force and the other services were using in the 1960s exacerbated these fears. These targeting schemes were designed to assure a very high percentage of certainty that any given target would be destroyed. As a result, American military planners almost always had to allocate multiple weapons to any single target. With the poor accuracies of American ballistic missiles, the only sure way to guarantee the destruction of a hardened Soviet silo, even a relatively soft one, was to allocate 4 to 14 American missiles against it. The bulk of the strategic forces, moreover, still consisted of bombers. This created enormous demands for more weapons to suppress Soviet air defense bases, air defense interceptor aircraft, surface-to-air missile sites, and conventional anti-aircraft artillery batteries.

As a result, after McNamara's Athens address, there was a lot on the military's shopping list. The first item, which the Office of the Secretary of Defense found hard to swallow, was the RS-70 Bomber, which was a reconfiguration of the B-70 *Vulcan*. The bomber was an extremely high altitude manned plane that was supposed to fly above Soviet air defenses. After the Soviet destruction of Gary Power's U-2 in 1960, officials began to doubt that even the RS-70 could fly high enough. This fear produced a rapid American shift to using B-52 bombers that flew at sufficiently low altitudes to evade Soviet radar detection.

Beyond the RS-70, the U.S. Air Force and Army also requested a new version of the *Titan* intercontinental ballistic missile, the *Titan II*; a new solid intercontinental ballistic missile, the *Minute Man I*;

a new medium-range ballistic missile; the *Skybolt*, an air-launch intercontinental ballistic missile; and the *Nike-Zeus* anti-ballistic missile system.

ASSURED DESTRUCTION AND MAD

The price tag for the weapons on this wish list was frightfully large. What dampened enthusiasm for non-MAD strategic postures even further were a series of RAND studies done by Colonel (later General) Glen Kent in the Pentagon's deputy directorate of Defense Research and Engineering (DDR&E). These studies were published from July 1963 to January 1964 and applied systems analysis methods to evaluate various strategic nuclear postures in terms of American lives saved per dollar spent. For the purpose of these studies, Kent developed two accounting devices which were called "damage limiting," and "assured destruction." This is the formal origin of the term "assured destruction." The term was first used publicly in 1966 in the Defense Department's fiscal posture statement that was prepared in March 1965.

Many Air Force officers were angry at Kent because they thought his studies would kill support for counter force planning, and his work did tend to do this. The Athens formulations, after all, aimed to strengthen U.S. strategic nuclear deterrence and, in a narrow range of contingencies, to win wars. Yet these aims were not reflected in the criteria underlying Kent's studies. More important, complete limiting damage—the elimination of damage to one's society that might be caused by nuclear war—was impossible to achieve under the technical conditions that existed in the early 1960s. Any damage limitation scenario planners could paint had a terrible character.

Pentagon officials were frustrated in their efforts to justify spending on damage limiting measures. Each measure suggested was very expensive and produced improvements that were not very grand. Starting in Fiscal Year 1965, tables printed in the Defense Department's annual posture statements showed that, for each large increase of expenditure, the projected number of lives saved increased. The problem was the number of lives saved was unimpressive against the enormous projected number of casualties the United States would suffer even with the most expensive damage limiting capability in place.

Also, it turned out that civil defense was critical to make any of the damage limiting scenarios even nominally attractive. But McNamara was never able to get Congress to support a substantial civil defense program. As a result, damage limiting, as Kent defined it, was a concept that eventually destroyed itself. Once damage limitation became the key goal and metric of success, it undermined support for sparing cities and focusing exclusively on counterforce targets.

Finally, there were other technical feasibility problems. With the retirement of the B-47 bombers from the strategic inventory and the entry of large numbers of ballistic missiles, the combination of aims sought by the Athens statement was demanding. It was difficult enough to hit all of the counterforce targets such as Soviet arctic bases for the rebasing of Soviet bombers, surface-to-air missile sites, and the like. At the same time, it seemed impossible to avoid or minimize collateral damage to Soviet cities. This was true even though there was very little Soviet missile hardening. At every point, the lack of accurate weapons increased collateral damage not just against the Soviet Union, but the United States as well. It was estimated that a Soviet attack just on U.S. missile sites, many of them soft and therefore time-urgent targets for the Soviet strategic missiles and long-range aviation, would have inflicted very heavy damage to Denver, Colorado; Tucson, Arizona; Wichita, Kansas; Little Rock, Arkansas; Spokane, Washington; Abilene, Texas; Cheyenne, Wyoming; and Lincoln and Omaha, Nebraska. If one added U.S. strategic air command bases, *Polaris* ports, and command and control centers, the collateral damage was worse.

Finally, during the Kennedy and the Johnson administrations, the military's damage limiting shopping list was challenged by other non-nuclear priorities. These competing priorities included the urgent improvements required by conventional forces in Europe and later in Vietnam.

CONCLUSION: MAD'S HISTORICAL MOMENT

The doctrine that still survives under the name of MAD is the focus of considerable mythology. Today it is like the law of the Medes and the Persians, something eternal deriving from the very

nature of nuclear weapons. In fact, assured destruction emerged almost as an accident. It was a coincidence borne of the connection of several different eras. The first was World War II, which taught both the United States and the Soviet Union that the world is very dangerous and that nations should err on the side of being extremely well-armed. This view, and the Korean War, resulted in a three-fold increase in the U.S. defense budget, which, in turn, made the Athens shopping list conceivable.

The second was the post-World War II penchant of defense planners to rely on nuclear weapons. With Eisenhower's New Look defense posture, there was an almost exclusive reliance on nuclear weapons and, in the view of the Air Force, a dearth of available nuclear weapons. Beginning in the mid-1950's with the bomber gap, the launch of Sputnik, the Berlin Crisis, and Khrushchev's missile bluff, public and government fears of nuclear war made nuclear weapons more abundant. This only whetted the demands of the Air Force for more strategic weaponry.

America's strategic doctrine had to catch up with these rapid changes. It was only in 1956 that Albert Wohlstetter defined the preconditions of second-strike deterrents in the famous RAND study, R-290. And, it was only after President Kennedy entered office that the implications of RAND's thinking adequately worked out. From 1965 on, America's preoccupation with nuclear war receded, at least slightly. It became clear that the missile gap was a myth and, following the Cuban Missile Crisis, there was a period of détente with the Soviet Union. Next, the Vietnam War rapidly turned public attitudes against the military. This foreclosed the possibility of making expensive strategic changes or improvements that required substantial public support. MAD is another artifact of this rapidly changing set of circumstances. Like the superiority of the offensive learned from Napoleon, or the superiority of the defensive, which lasted from about 1915 until sometime in the 1930s, MAD was the product of a passing moment in history, one that will never again appear.

ENDNOTES - CHAPTER 4

1. This chapter is based on a study done originally in the middle of the 1970s at RAND. I wrote it together with the late Donald Fortier, who was tragically

taken away before he could fulfill his potential in the service of America's national security.

2. This statement is made in CNN's documentary, "Cold War," but it is not supported by substantial oral interviews.

3. Ann Arbor Address, p. 13.

PART II

MAD IN PRACTICE

CHAPTER 5

SOVIET VIEWS OF NUCLEAR WARFARE: THE POST-COLD WAR INTERVIEWS

John A. Battilega

INTRODUCTION

During the Cold War, many American specialists studied Soviet doctrine for nuclear warfare and the details of the Soviet nuclear force posture. From this protracted study, a conventional wisdom emerged in the United States. That wisdom loosely characterized the Soviet approach to nuclear warfare as "war fighting" to win, in comparison with the U.S. approach of "deterrence" via the threat of mutual assured destruction. Evidence that emerged in the years immediately following the fall of the Berlin Wall and the dissolution of the Union of Soviel Socialist Republics (USSR) sheds new light on the adequacy of this characterization and the Soviet approach to nuclear warfare.

From 1989-94, a team of American Soviet specialists headed by John Hines conducted numerous private discussions in Moscow with former Soviet officials, including high-ranking military officers who served on the General Staff and the Strategic Rocket Force.[1] A rigorous interview process was used, involving multiple interviews with the same individual. These interviews were sponsored by Andrew W. Marshall, Director of the Office of Net Assessment of the U.S. Office of the Secretary of Defense.[2] The interviews were recorded and analyzed in a two-volume technical report prepared for the U.S. Government by the BDM Corporation (1995).[3]

Twenty-two Soviet senior military personnel were interviewed. The interviews included repeated discussions with General Colonel Andrian A. Danilevich, the director of the authors' collective that, from 1977-86, composed and refined the three-volume Top Secret *Strategy of Deep Operations (Global and Theater)*. This document was the basic reference document for Soviet strategic and operational nuclear and conventional planning for at least the last decade of the Soviet Union.

During the interview process, the subjects tended to contradict each other on details, but tended to agree with each other on the larger issues. Many of the interviews corroborate each other's description of specific events. The Hines team, in their subsequent analysis, made judgments about the most significant differences. The team also concluded that the interview results generally were consistent with the Voroshilov General Staff Academy lectures, which were based on Soviet military doctrine as it was taught from 1973-75.[4]

The evidence from the Hines interviews, which surfaces several important issues, is not widely known. It has also not been fully integrated with other evidence about the Soviet Union. Consequently, this chapter has a very narrow objective; to briefly present Soviet views of nuclear warfare as presented in the report documenting the Hines interviews. Some of the views expressed in the interviews challenge U.S. conventional wisdom about Soviet views.

This chapter does not attempt to reconcile the differences; that will require careful research far beyond the scope of this chapter. Hopefully, subsequent work will integrate the evidence from the Hines interviews and other post Cold War evidence, with the conventional body of knowledge on the Soviet Union. Such integration will create a more complete picture of the actual Soviet approach to nuclear warfighting, and that picture will contribute to the understanding of mutual assured destruction as a Cold War concept.

The chapter is organized into four major sections and two appendices.

- The first section summarizes Soviet military strategy over the duration of the Cold War.
- The second section discusses several specific issues central to Soviet views of nuclear war fighting.
- The third section tabulates Soviet bottom lines important to the topic of mutual assured destruction.
- The fourth section discusses work that needs to be done to fully integrate the interview material with other evidence.

- Appendix I lists the 22 Soviet personnel that were interviewed by the Hines team.
- Appendix II contains a bibliography of additional reference material in several categories.

A CHRONOLOGY OF SOVIET STRATEGY[5]

The interviews resulted in a detailed chronology of Soviet strategy for warfare and how and why that strategy changed during the period 1945-91. That chronology falls into five major periods. The nearly verbatim description of the main characteristics of each period, as pieced together by the Hines team after the interviews, is as follows.

Full Mechanization (1945-50).

Soviet strategy emphasized the use of massive conventional armored land forces to obtain a three- to six-fold advantage over the opposing forces and to defeat them with rapid, decisive offensive ground operations. Air and naval forces were modernized but continued to play a supporting role.

Acquisition of Nuclear Weapons (1950-60).

Initially, nuclear weapons were viewed to be anti-city weapons. However, by 1955 nuclear weapons replaced the tank as the central strategic weapon. At the same time, the nuclear weapon was viewed within the existing World War II structure of military thought. As its predecessor the tank, nuclear weapons were to achieve a strategic breakthrough on the battlefield, to be exploited via massive mobile conventional forces. Strategic defensive plans did not exist.

Nuclear Euphoria (1960-65).

Under Khrushchev, a new strategy emerged. Nuclear weapons reached such a level of importance that the value of other weaponry was significantly reduced. The Strategic Rocket Forces were created as a separate branch of the armed forces, and conventional tactical

aviation and artillery were reduced severely. The centerpiece of the nuclear strategy was preemptive global and theater nuclear use.[6] Defense became only a tactical-level concept. The strategy would be executed in two phases: an intercontinental preemptive strike (a single massive salvo) against the United States, followed by a second phase consisting of a single strategic offensive along an entire European theater front. The second phase involved preemptive nuclear strikes followed by a decisive uninterrupted massive land offensive. A key to this strategy was the assumption that the U.S. opponent could be preempted from using nuclear weapons. The comparatively low level of missile technology placed a high premium on preemption because the time required to fuel the missiles and attach their warheads made a "retaliatory meeting strike" impossible and a purely retaliatory strike highly unlikely.

"Descent to Earth" and Intercontinental Ballistic Missiles (ICBMs) (1965-75).

After Khrushchev, there was realization that the usefulness of nuclear weapons had been overestimated, and the opponent had a large number of nuclear weapons that could inflict "unrecoverable losses." A search was undertaken for a more holistic approach to warfare with each type of weapon, including conventional weapons, having a distinct role. A new combined arms strategic operation was formulated for war in the European theater and the military concept of defense was gradually revived. At the same time, the view of war was dominated by the nuclear weapon, and a purely conventional war was not viewed as a realistic possibility. The growth in size of the nuclear arsenal, and the emergence of submarine-launched ballistic missiles (SLBMs), made it possible to plan multiple nuclear strikes instead of a single massive salvo. The Soviet leadership also began to appreciate the consequences of a strategic nuclear exchange. At a nuclear exercise in 1972, they saw the devastating results of a simulated U.S. first strike against the USSR, and the results shocked the leadership.[7]

During this period, the Soviets also watched the development of new U.S. concepts of escalation and nuclear use, initially rejecting them. Prior to 1970, Soviet policy was to respond with a full

nuclear attack. However from 1970-75, there was a shift towards a "controllable nuclear war" policy that was made possible by three doctrinal changes: (a) a preemptive strike was not the only option—retaliatory-meeting[8] and retaliatory strikes became valid options; (b) strikes were now developed for multiple conditions--either global or regional depending on the situation; (c) war was reshaped into four stages: a non-nuclear phase, a nuclear phase, follow-up actions, and concluding actions. The most important of these was the non-nuclear phase, gradually expanded for planning purposes from a few hours to 7-8 days. At the same time, intercontinental strategic operations remained nuclear.

Strategic Balance (1975-91).

This was a long period of rough parity in strategic systems with the United States, rapid growth in the size of the strategic forces, and strong technological competition. Soviet doctrine underwent three major changes during this period. From 1975-80, limited nuclear war was officially rejected, however, it was considered possible for the war to remain conventional from beginning to end. From 1980-85, limited nuclear was accepted and presented in planning documents presented to the political leadership. Different options were presented for the limited use of nuclear weapons: only on the battlefield, only against military targets, limited strategic strikes, and proportional retaliation to limited strikes (either with escalation or deescalation). Gradually, the projected length of the limited phase was lengthened from hours to several days. Finally, from 1985-91, there was the adoption of defensive doctrine and realization that a nuclear war cannot be won. Preemptive strike was ruled out, and only the retaliatory strike remained. If war must be fought, the new foundations of doctrine became deterrence, war prevention, and limited war.

ASPECTS OF SOVIET VIEWS OF NUCLEAR WARFARE

Embedded in the chronology of Soviet strategy are several important aspects of the Soviet approach to nuclear war fighting that were prominent in the interviews. These are briefly discussed below.

The text closely follows that of the Hines report, with transition text added and occasional changes or amplification in wording for clarity in the context of this chapter. The topics featured are:

- Soviet views of winning a nuclear war,
- Soviet fears of a U.S. first strike,
- Soviet first strike strategy,
- Soviet views of deterrence and mutual assured destruction,
- Soviet nuclear war fighting,
- Soviet military strategy in Europe, and
- Soviet views of the nuclear balance.

Although the Hines interviews surfaced important details about many aspects of Soviet thought, material from the interviews related to these specific topics is central to conventional Western views about the Soviet Union in the context of mutual assured destruction (MAD).

No Winners in Nuclear War.

Conventional wisdom in the West was that the Soviets were working hard to try and create a military force posture that would enable them to attain victory in nuclear warfare. The interviews, however, create a somewhat different picture. At least by the early 1970s, the interviews show that informed Soviet military leadership considered victory in a nuclear war to be unattainable in any meaningful sense.[9] Akhromeev stated that in practical terms, neither side would win a nuclear war.[10] According to Tsygichko, the General Staff understood the devastation that would result from a nuclear war and therefore did not develop a working definition of victory. Military planners instead focused on the destruction that they could inflict on the enemy. They hoped that, in a nuclear exchange, some pockets of civilization inside the Soviet Union would survive.[11]

From the interviews, it appears that the Soviet military command understood the consequences of nuclear war and was intent on preventing it. The General Staff, beginning in the 1970s, developed

the idea that nuclear weapons were a political tool, with very limited military utility.[12] This applied to both the strategic and theater use of nuclear weapons. By 1981, the General Staff concluded that nuclear use would be catastrophic as well as counterproductive in combating operations in the European theater.[13]

The Specter of a U.S. First Strike.

During the Cold War, U.S. declaratory nuclear policy was that of deterrence, popularly interpreted to be the use of nuclear weapons in a second strike mode. Nevertheless, virtually all interviewees emphasized that the Soviets perceived the United States to be preparing for a first strike. The Soviet memory of the June 1941 surprise attack colored Soviet strategic planning throughout the Cold War period.[14] This led Soviet leaders, most of whom had personally experienced the German invasion, to consistently interpret U.S. capabilities and actions in terms of their implications for a U.S. surprise attack with nuclear weapons.

The Soviets saw several indicators of this. The most frequently cited indicators included: the development of the highly accurate, multiple warhead MX missile system;[15] programs to develop accurate multiple independently-targetable reentry vehicles (MIRV) warheads for existing missile systems (putting Soviet land-based ICBMs and control systems at risk);[16] the relative vulnerability of U.S. missile silos and control centers to ground bursts; the large and diverse arsenal of tactical nuclear weapons in Europe; the consistent rejection by the United States of no first use doctrine; the deployment of the *Pershing II* missile and ground and sea launched cruise missiles capable of striking command and control targets in Soviet territory with little warning; and the issuance of *Presidential Decision Memorandum 59* (PD-59), which the Soviets viewed to be a deliberate policy for launching a surprise decapitating first strike against the Soviet leadership.[17]

Soviet analytic calculations also reinforced this perception. Soviet calculations demonstrated the vulnerability of their own ICBMs to ground burst. In turn, when Soviet satellite photography showed the proximity of U.S. ICBM silos to each other and to the launch control center, the General Staff concluded that the United States

intended to launch the missiles first.[18] This view was reinforced by Soviet intelligence about the U.S. Strategic Integrated Operations Plan (SIOP), which described the U.S. intent to launch nuclear force on strategic warning against Soviet forces.[19] According to Dvorkin, Soviet modeling and testing was based on the assumption that the United States would strike first.[20]

Soviet First Strike Strategy.

In the conventional Western view, one important aspect of Soviet war-fighting strategy was the execution of a preemptive first strike against the nuclear forces of the West. In the view of Soviet officers interviewed, the 1960s doctrine of strategic nuclear preemption was designed to prevent a successful U.S. strike on Soviet territory. World War II veterans viewed a doctrine of retaliation to be equivalent to the Soviet exposure to surprise attack by Hitler in 1941. Grechko reportedly said that he "wanted to avoid repeating the mistakes of 1941 by waiting to be struck on the head."[21] Soviet military leaders depended on preemption in the 1960s because of Soviet silo vulnerability, coupled with the length of time required to launch their ICBMs and pessimistic views of the survivability of their command and control system.[22] By the 1970s, however, the Soviet political leadership, now more aware of the consequences of nuclear war, started to move away from preemption to a launch-under-attack doctrine and, for the first time, considered retaliation.[23]

According to Danilevich, even though theoretical writings, plans, and exercises included a first strike against the United States, the Soviet political leadership never discussed the possibility of launching a first strike. When Politburo members examined contingencies for nuclear use, they shied away from authorizing nuclear use.[24] After 1972, the political leadership did not participate in a even a single military exercise involving nuclear weapons. The General Staff was left entirely on its own to develop scenarios for nuclear war.[25]

The Hines team detected dual views within the General Staff about their strategic strike posture. This duality stemmed from a basic uncertainty about what was technically and bureaucratically possible in a crisis situation. The military leaders, convinced that the

United States would strike first, prepared for all three possibilities--preemption, launch-on-warning, and retaliation. However they did not like retaliation and did not believe that the Soviet command and control system had sufficient stability to guarantee an effective retaliatory strike. The military leaders also doubted that the political leadership could react fast enough in the face of a U.S. launch in progress. Nevertheless, the military acceded to political pressure to prepare for a retaliatory strike by hardening silos, resuming mobile missile programs, reducing missile launch times, and developing redundant command and control capabilities. As a result, by the mid-1970s, the necessary capabilities existed to execute a launch-on-warning doctrine. Nevertheless, the military leadership still held on to preemption as a possible option.[26]

Deterrence and Mutual Assured Destruction.

The Soviet nuclear strategy relied heavily on deterrence. But the Soviet concept of deterrence was based on the premise that an aggressor would receive crushing punishment in case of an actual or imminent nuclear attack in the form of strikes against strategic targets. However, these strikes could be preemptive, "retaliatory-meeting," or purely retaliatory[27] and would target both military and civilian installations.[28]

The Soviets did not develop an elaborate doctrine of deterrence enhanced by various strategies of nuclear use, selective targeting, planned and deliberate escalation, etc. However, the logic of deterrence exerted a profound influence over Soviet leaders who intuitively acted to avoid nuclear war and to prevent the United States from using any nuclear weapons against Soviet forces and territory.[29]

According to the interview of Marshal Akhromeev, the Soviet Union accepted the Soviet concept of nuclear deterrence by the late 1960s.[30] According to Iurri Mozzhorin, who served for 30 years as the Director of the Central Scientific Research Institute of Medium Machine Building, the Soviet Union accumulated enough ICBMs that it did not expect a U.S. attack. Brezhnev supported deterrence, despite opposition from Defense Minister Grechko. The principles of deterrence, in effect, were adopted as doctrine at a July 1969

meeting of the Defense Council. It was decided at that meeting to manufacture survivable missiles rather than produce vulnerable missiles in large quantities.[31]

Soviet strategists recognized that deterrence was, to some extent, mutual because each side was capable of launching a retaliatory strike and of inflicting unacceptable damage on the other.[32] They nevertheless considered their nuclear power the only guarantee of security from war, and they never examined the question of mutually assured destruction as a condition that they should accept, much less pursue.[33] The Soviet Union never embraced vulnerability as desirable.[34] The Soviets also believed that, given the military uncertainties, mutually assured destruction was only a theoretical conclusion. This is because there was no guarantee in practice that a retaliatory strike would be launched or inflict unacceptable damage on the enemy.[35]

Soviet Nuclear War Fighting.

According to the interviews, in Soviet eyes the concepts of deterrence and war fighting were not mutually exclusive. The Soviets tried to build weapons that credibly could and would be used if nuclear war occurred. In this sense, the ability to fight a war was an integral part of Soviet deterrence strategy, despite the fact that the leadership did not accept the concept of a meaningful victory. However, the Soviets neither embraced the concept of fighting a limited nuclear war (confined to Europe, for example), or of managing a nuclear war by climbing the ladder of escalation.[36]

In the event of nuclear war, the Soviet Union planned to try and strike a mix of cities, industrial centers, and military targets. The proportion of military to industrial targets depended on whether the USSR tried to preempt[37] or launched second.[38] A preemptive Soviet strike would target the enemy's retaliatory forces, including ICBM silos, airfields, command centers, and naval bases. [39] A retaliatory strike would be aimed at soft military targets (such as airfields and C3 facilities), at U.S. infrastructure (such as transportation grids and fuel supply lines), and cities.[40]

At the same time, Soviet military planners worried that weaknesses in their command and control systems might prevent

timely and effective launches of retaliatory strikes. As a result, they designed and deployed a command missile system which carried well-concealed and hardened missiles. They were deployed near launch clusters, would be able to launch on command into near space and give the launch order to the adjacent cluster of ICBMs.[41] The Soviets also investigated a near-automatic Dead Hand launch system, but the interviewees did not agree on whether that system had been deployed.[42] They were also concerned with the possibility of unauthorized use. By the mid-1970s, the USSR introduced command and control systems that gave the General Staff confidence in centralized control over Soviet nuclear forces.[43]

Winning in Europe.

The inherent difficulties of nuclear war fighting notwithstanding, the Soviet military establishment was required to find a concrete operational solution to the problem of winning a general war in Europe. According to the interviews, the Soviet military's confidence in the utility of nuclear weapons for securing this objective declined steadily throughout the period.[44]

Part of Soviet reticence stemmed from the fact that the General Staff expected the battlefield use of nuclear weapons to be devastating.[45] Soviet modeling in the 1970s predicted that the use of one quarter of the nuclear weapons in Europe would completely destroy operational formations, cause combat movement to virtually stop for several days, and produce an ecological disaster.[46] As a result, the Soviet General Staff recommended to the Central Committee that theater nuclear force modernization cease. This was rejected by the political leadership's orders that forced modernization to proceed, and that led the General Staff to prepare for war with the use of theater nuclear weapons.[47]

A change in military doctrine was required to work out what the Soviets considered to be a viable military strategy. By the late 1970s, military doctrine shifted its emphasis to a prolonged conventional phase in a European conflict. At the same time, the Soviets assumed that a war in Europe could not be kept conventional for long and expected the North Atlantic Treaty Organization (NATO) to initiate nuclear use on the battlefield after initial losses.[48]

In order to strengthen deterrence, Soviet leaders wanted the United States to believe that they would massively respond to any U.S. employment of nuclear arms. However, by the late 1970s, the General Staff considered limited nuclear options in the European theater. Some options were considered proportionate response, while others involved escalation or deescalation. The best response would be an equal number of strikes against analogous military targets such as troops, airfields, control centers, and missile sites.[49] However, these discussion were limited to the General Staff. According to Kataev, the party leadership never considered selective use, even tactically.[50] Nevertheless, the Soviets were capable of launching limited strikes.[51] At the same time, the Soviets did not prepare any detailed plans for extended combat on a nuclear battlefield.[52] They did not plan beyond an initial exchange of nuclear strikes on a tactical/operational scale. Neither did they plan for a massive response to a limited NATO nuclear strike against a Warsaw Pact country.[53]

Although the Soviets developed limited nuclear options, they neither discussed nor exercised initiating selective nuclear use. Soviet military leaders also were very skeptical about the escalation control and expected the period of limited nuclear exchanges in theater to last at most for several days.[54]

Soviet military strategists also developed a new conceptual framework for war in Europe that included new operational concepts such as the Operational Maneuver Group and a preemptive air operation coupled with the threat of launching the SS-20 to deter NATO initiation of nuclear use. By the mid-1980s, the Soviet General Staff considered it possible that Warsaw Pact forces could reach the English Channel quickly while avoiding a massive theater nuclear war.[55]

Finally, even though the Soviets explored the limited use of nuclear weapons in Europe, the Soviet theater nuclear force buildup in Europe during the late 1970s and 1980s was primarily designed to reduce the likelihood of NATO nuclear use and keeping the war conventional. Simultaneously, changes in Soviet conventional force posture and employment concepts were designed to maximize operational effectiveness and obtain a decisive and quick success before reinforcements could arrive from the United States.[56] A key component of this conventional strategy was the deployment of

the SS-20 nuclear missile system. This gave the Soviets escalation dominance in Europe, and, hopefully, would deter NATO from escalating to nuclear use. In December of 1987, however, Gorbachev signed the Intermediate Nuclear Force (INF) Treaty and eliminated the SS-20, the enabling element of the new Soviet conventional strategy.[57]

The Importance of the Nuclear Balance.

The nuclear balance between U.S. and Soviet forces was an important factor in the development of the Soviet force posture. The Soviets felt that the only truly stable situation was one in which one side had clear superiority over the other. For them to feel secure and for the balance to be stable, the imbalance had to be in their favor. At the same time, Soviet strategists considered the nuclear balance to be unstable because technological advances and increases in the size of the arsenal could significantly augment the power of one side relative to another, thereby upsetting the balance. The Soviets believed that this situation induced both the United States and the USSR to constantly improve the technological characteristics of their nuclear forces in order to restore the balance. Beteween 1965-85, the Soviets tried to gain strategic superiority over the United States. Their primary goal was not to insure victory in a nuclear war, but to create a stable situation in order to enhance their general security.[58]

IMPORTANT SOVIET BOTTOM LINES

The overarching purpose for this chapter is to contribute to a discussion of Cold War views of MAD. The following Soviet viewpoints, expressed in the interviews and discussed above, are especially important in that context.

No Victory in Nuclear Warfare.

Beginning at least in the early 1970s, the Soviet leadership did not believe in any meaningful concept of victory in nuclear warfare. Nevertheless, the Soviets were preparing to fight such a war and survive it if one occurred.

Psychological Fear of a U.S. First Strike.

A dominant psychological consideration was the Soviet fear of a surprise nuclear first strike by the United States against the Soviet homeland. This fear was deeply rooted in the Soviet experience of the German surprise attack in 1941. Virtually all interviewees emphasized that the Soviets perceived the United States to be preparing for a first strike.

Rejection of MAD.

The Soviets did not believe in the concept of mutual vulnerability as a basis for nuclear strategy. The MAD approach resurrected fears of the Soviet vulnerability that lead to the attack by Hitler. Hence even though concepts of assured retaliation eventually became a part of Soviet doctrine, these concepts did not stem from a deliberate shift to MAD. Rather, they came from what the Soviets saw as the inherent difficulty of successful military counters to a U.S. first strike.

Rejection of Soviet First Strike.

The 1960s doctrine of strategic nuclear preemption was designed to prevent a successful U.S. first strike. By the 1970s, the doctrine shifted. Even though theoretical writings, plans, and exercises included a first strike against the United States, the political leadership avoided considering the possibility of a first strike. In fact, the General Staff operated independently in developing scenarios for nuclear war.

Deterrence, Soviet-Style.

Soviet strategy relied heavily on deterrence of a U.S. first strike. But the Soviet concept of deterrence was based on their ability to inflict significant damage to the aggressor by preemptive, "retaliatory-meeting," or purely retaliatory strikes against both military and civilian targets. Which of these reactions materialized was strongly a function of the operability of the Soviet command

and control system and the reaction time of the Soviet political leadership.

Limited Military Utility of Nuclear Weapons.

Beginning in the early 1970s, the General Staff increasingly believed that nuclear weapons had limited military utility in either strategic or theater use. Eventually Soviet military strategy for victory in Europe depended on maintaining nuclear escalation dominance in theater to deter NATO nuclear use, thus giving the Soviets time to win conventionally.

Importance of the Nuclear Balance.

Throughout the period 1965-1985, the Soviets tried to gain strategic superiority over the United States in nuclear forces. The primary goal was not to ensure victory in a nuclear war, but to create a stable situation in order to enhance their general security.

SOME UNANSWERED QUESTIONS

There are many interesting and important issues that surfaced in the Hines interviews. The points discussed above are no means complete. They were selected because of their centrality to the topic of MAD, and also because they are at variance with some popular Western conceptions of Soviet nuclear warfare. It is important to know the degree to which the interviews correspond to Soviet ground truth or whether they need to be filtered.

The interviews leave much work to be done and some major questions unanswered. For example, one question they raise is the degree to which the views expressed in the interviews are consistent with the details of the Soviet military force posture and operational concepts that were generated via classified and unclassified sources of evidence during the Cold War. A second question is the degree to which the interviews are consistent with evidence of Soviet strategy and nuclear warfighting concepts that became available at the end of the Cold War. A third question is what is the picture that results when all of these sources of evidence are considered simultaneously.

It will take work to answer these questions. Careful research that works back and forth between the conventional wisdom about the Soviet Union, existing open source and intelligence documents that capture that wisdom, the Hines interviews, and other post-Cold War evidence will be required. To the extent that an understanding of actual Soviet military strategy, warfighting style, and the details of Soviet views of nuclear weapons and operations are important today and for the future, that effort is probably warranted. At a minimum, it appears to be worth the effort to set the historical record straight.

APPENDIX I

THE INTERVIEW SUBJECTS

The following 22 senior Soviet military officials were interviewed by John Hines and his research team.

Sergei F. Akhromeev, Chief of the Main Operations Directorate of the General Staff (1974-1979), Chief of General Staff (1984-1988), Personal National Security Advisor to President Gorbachev.

Dimitri Chereshkin, Department Head, All-Union Scientific Research Institute for Systems Studies (VNIISI).

General-Lieutenant G. V. Batenin, staff to MSU Sergei Akhromeev when the latter was Chief of the Main Operations Directorate, and then First Deputy Chief of the General Staff under MSU N. Ogarkov.

General-Colonel Andrian A. Danilevich, Deputy Director, General Staff Main Operations Directorate (to 1977), Special Advisor for Military Doctrine to the Chief of the General Staff (1977-1988), Director of the authors collective that composed and refined (1977-1986), the three volume Top Secret *Strategy of Deep Operations (Global and Theater)*—the basic reference document for Soviet strategic and operational nuclear and conventional planning for at least the last decade of the Soviet state.

General-Major Vladimir Z. Dvorkin, Director of TsNII-4, the Central Scientific Research Institute of the Strategic Rocket Forces.

Army General **Makhmut A. Gareev**, Chief of the Tactical Training Directorate of the General Staff (1974-1977), Deputy Chief of the Main Operations Directorate for Training and Readiness of the General Staff (1977-1984), Deputy Chief of the General Staff for Scientific Work and Operational Readiness (1984-1989).

General-Colonel Igor V. Illarionov, Aide to MSU Ustinov in the Central Committee Secretariat (1965-1976), assistant to Ustinov for special assignments (1976-1984), specializing in Air Defense, Rocket Forces, and Aviation.

Aleksei S. Kalashnikov, Head of Strategic Rocket Force Committee on Science and Technology (5 years), Chairman of State Commission on Nuclear Testing at Semipalatinsk (10 years).

Vitali L. Kataev, Senior Advisor to the Chairman of the Central Committee Defense Industry Department (1967-1985).

General-Major Iurii A. Kirshin, Director, Institue of Military History (1985-1992), Former Chief of the Strategy Department of the Military Science Directorate of the Soviet General Staff.

General-Colonel Grigorii F. Krivosheev, Deputy Chief of the General Staff, Chief of the Main Directorate for Organization and Mobilization.

General-Colonel Varfolomei V. Korobushin, First Deputy Chief of Staff of the Strategic Rocket Force (10 years), Director of the General Staff's Center for Operational and Strategic Research (TsOSI).

General-Lt. Nikolai V. Kravets, Strategic Rocket Forces officer with over 30 years experience in force design, systems acquisition, testing, and evaluation.

Petr M. Lapunov, Department Chief in TsOSI.

Iurii A. Mozzhorin, Director of the Central Scientific Research Institute of Machine Building (TsNIIMash) (30 years).

Vladimir A. Rubanov, Aviation Ministry Official.

Boris A. Strogonov, Missile technology expert, Central Committee Defense Industry Department (1955-1987).

Viktor M. Surikov, First Deputy Director, TsNIIMash, and assistant to the head of the Central Committee Defense Department, the party body responsible for force building, procurement, and arms control.

Vitalii N. Tsygichko, Head of the Theater Forces Modeling Department of the Scientific Research Institute NII-6 of the Main Intelligence Directorate (GRU) for the General Staff (1967-1977), Senior Analyst at VNIISI (1977-1995).

Dimitry Volkogonov, Director, Institute of Military History.

APPENDIX II

BIBLIOGRAPHY OF ADDITIONAL REFERENCES

There is a large amouunt of Western literature on Soviet views of nuclear warfare. There is also a body of evidence on Soviet views of nuclear warfare that comes from Soviet source material that was written during the Cold War. Finally, there is source material that became available in the West after the collapse of the Berlin Wall or in the years following the end of the Soviet Union. A representative set of material in each of these categories follows. In addition to these classes of material, there also exist many formerly classified intelligence documents on related topics.

Other Post-Cold War Materials.

The sources cited below, as with the Hines interviews, have not been fully integrated yet into the conventional body of knowledge about Soviet views of nuclear warfare. There are also other sources of post-Cold War evidence not cited here. Additionally, there is probably significant material in the Russian archives that some day may become available to help create a coherent and consistent picture of Soviet views.

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ENDNOTES - CHAPTER 5

1. The Hines team also repeatedly attempted to gain access, unsuccessfully, to relevant Central Committee and Ministry of Defense archives for the post-1960 Cold War period. The oral testimony is what was possible. John G. Hines, Ellis Mishulovich, and John F. Shull, *Soviet Intentions 1965-1985. Vol. I: An Analytical Comparison of U.S-Soviet Assessments During the Cold War;* McLean, VA: The BDM Corporation, September 22, 1995, p. vi. (Hereafter referred to as Hines, Vol. I.)

2. One purpose of the interviews was to exploit to the short window of opportunity after the collapse of the USSR to gain a better understanding as to how key Soviet senior defense officials assessed the military balance and associated doctrines and forces postures, and how the Soviets developed and operated their nuclear arsenals. A. W. Marshall, "Introductory Memo," Hines, Vol. I.

3. John G. Hines, Ellis Mishulovich, and John F. Shull, *Soviet Intentions 1965-1985. Vol. I: An Analytical Comparison of U.S-Soviet Assessments During the Cold War; Vol. II: Soviet Post-Cold War Testimonial Evidence,* McLean, VA: The BDM Corporation, September 22, 1995, produced for OSD-Net Assessment under Contract MDA903-92-C-0147. Interviews were also conducted with senior U.S. defense officials, and a comparison of views made. Hines, Vol. I.

4. The Voroshilov lectures, published in the late 1980s by the U.S. National Defense University, are a compilation of the translated lecture notes of foreign officers who attended the Voroshilov General Staff Academy in the early 1970s.

5. Extracted from Hines, Vol. I, pp. 72-76; and Interview with General-Colonel A. A. Danilevich, in Hines, Vol. II, pp. 54-57.

6. Marshall V. D. Sokolovskiy was the advocate of the new strategy. His ideas were published in his influential book, *Modern War*, and accepted as doctrine at a Ministry of Defense Conference held in 1962. They were put into practice in 1962-63. Interview, General-Colonel Danilevich, in Hines Vol. II, p. 55.

7. The calculated effects of the U.S. first strike, using ground bursts, showed 100 percent of the ground forces destroyed, 100 percent of nonstrategic aviation destroyed, 80 percent of strategic aviation destroyed, 100 percent of naval forces destroyed, and radiation contamination of 400-3,000 roentgens over European Russia. Hines, Vol. I, p. 74.

8. A "retaliatory-meeting" strike is the Soviet adaptation of the traditional meeting engagement in warfare. Two opposing sides are attempting to launch strikes; comparative command and control processes determine which side actually launches first, and whether or not the warheads of one side are landing during the launch of other side. If, for example, the side with the actual initial launch is the United States, and U.S. warheads are incoming or landing during the Soviet launch sequences, then the Soviet strike becomes a "retaliatory-meeting" strike.

9. Hines, Vol. I, p. 1.

10. Akhromeev, in Hines, Vol. II, pp. 5-6.

11. Hines, Vol. I, p. 26.

12. Akhromeev, in Hines, Vol. II, pp. 5-6.

13. Danilevich, in Hines, Vol. II, p. 24.

14. Hines, Vol. I, p. 2.

15. This was eventually deployed as the Peacekeeper missile.

16. These programs probably included the NS-20 guidance package for the *Minuteman III*, as well as improved U.S. SLBM warhead accuracy resulting from the global positioning system on the Navstar satellite combined with the development of the D-5 missile for the *Triden*t submarine. Additionally, in traditional Soviet views, their land-based intercontinental ballistic missile (ICBM) force had political and domestic significance far beyond its military contribution, so the pending vulnerability of that force element could not be automatically offset by increases in other elements of the Soviet strategic triad.

17. Hines, Vol. I, p. 2.

18. Hines, Vol. I, p. 31.

19. Surikov, in Hines, Vol. II, p. 134.

20. Dvorkin, in Hines, Vol. II, pp. 70-71.

21. Mozzhorin, in Hines, Vol. II, p. 123.

22. According to Danilevich, 5-6 hours were required to fuel the missiles and 2-3 hours to mate warheads. By this time, the U.S. strike would have landed, resulting in heavy damage to both the missiles and the command and control system. Danilevich, in Hines, Vol. II, p. 39. The Soviet measure of effectiveness for their own missiles was the ability of a missile, after an enemy attack, to be launched in the prescribed time and destroy its target. Thus launch impairment in any form as a result of the incoming U.S. attack would result in, in Soviet view, in the inability of the Soviet missile to perform its mission, in other words, a missile kill by the United States. Tsygichko in Hines, Vol. II, pp. 150-151.

23. Hines, Vol. I, pp. 28-29.

24. Danilevich, in Hines, Vol. II, p. 62.

25. *Ibid*., p. 69.

26. Hines, Vol. I, pp. 28-29.

27. Note that the strikes could be precipitated on strategic warning ("imminent nuclear attack"), and the deterrent strikes could be preemptive, retaliatory-meeting, or retaliatory, depending on the parameters of warning, missile preparation, the command and control system, and political decisionmaking.

28. Hines, Vol. I, p. 2.

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

30. Hines, Vol. II, p. 6.

31. *Ibid*., p. 125.

32. *Ibid*., p. 55.

33. Hines, Vol. I, pp. 16-17.

34. Hines, Vol. II, p. 19.

35. *Ibid*., p. 30.

36. Hines, Vol. I, p. 3.

37. Recall that the Soviet concept of preemption is the successful execution of a strike against a U.S. first strike that is imminent. Hence the United States has made the first move.

38. Hines, Vol. II, p. 31.

39. Hines, Vol. I, pp. 17-18.

40. *Ibid*., p. 18.

41. Kataev, in Hines, Vol. II, p. 100-101.

42. Hines, Vol. I, pp. 19-21.

43. Akhromeev, in Hines, Vol. II, p. 5.

44. Hines, Vol. I, p. 4.

45. According to Tsygichko, the Soviets predicted much higher battlefield attrition rates than the United States. This was because the Soviets had concluded that 7 pounds/square inch (psi) overpressure was sufficient to kill personnel, who were similar to dogs in their response to overpressure. Tsygichko, in Hines, Vol. II, p. 152. Nominal U.S. personnel lethality levels were 40 psi. Samuel Glasstone and Philip J. Dolan (eds.), *The Effects of Nuclear Weapons*, Washington: U.S. Department of Defense and U.S. Department of Energy, Third Edition, 1977. Cited in Hines, Vol. I, p. 43.

46. Tsygichko, in Hines, Vol. II, p. 142.

47. Tsygichko, *Soviet Use of Mathematical Models to Support Strategic Decision Making: A Model of Strategic Operations in Continental Theaters of Military Action*, cited in Hines, Vol. I, p. 44.

48. Hines, Vol. I, p. 4.

49. Danilevich, in Hines, Vol. II, p. 60.

50. Kataev, in *Ibid*., p. 101.

51. Analysis in the Hines Report points out that information obtained from the East German archives showed that certain Warsaw Pact exercises included selective nuclear strikes. See Beatrice Heuser, " Warsaw Pact Nuclear and Conventional Strategy in the 1970s and 1980s: Findings in the East German Archives," *Comparative Strategy*, Vol. 12, No. 4, November 1993, pp. 437-457, cited in Hines, Vol. I, p. 39.

52. Tsygichko, in Hines, Vol. II, p. 157.

53. Tsygichko, in *Ibid*., p. 144.

54. Danilevich, in *Ibid*., pp. 57-58; and Gareev, in Hines, *Ibid*., p. 72. Gareev was responsible for all exercises from 1974-88 from the tactical to the operational-strategic level. He insisted that the Soviet military was forbidden to exercise first use of nuclear weapons in the absence of any indication of nuclear initiation by the enemy.

55. Hines, Vol. I, p. 4.

56. Hines, *Ibid*., pp. 44-45.

57. Batenin, in Hines, Vol. II, p. 8.

58. Hines, Vol. I, p. 1.

CHAPTER 6

THE ORIGINS AND DESIGN OF PRESIDENTIAL DECISION-59: A MEMOIR

William. E. Odom

When President James Carter issued Presidential Decision (PD)-59 in the late summer of 1980, it marked the culmination of a series of PDs—41, 53, 57, and 58—that effectively transformed U.S. strategy for the use of nuclear weapons. It retained the principle of assured retaliation with a large preplanned strike in the event the United States was attacked, but it fundamentally altered the options for using nuclear weapons in the event of a major North Atlantic Treaty Organization (NATO)-Warsaw Pact war.

The change, of course, was only on paper and never fully implemented in force structure and doctrine. Programmatic and operational adaptations could not be carried out in the last half-year of the Carter administration, and the incoming Ronald Reagan administration was both slow to grasp what President Carter had directed and ill-disposed to admitting it. PD-59 was rewritten as a Reagan directive, National Security Decision Directive (NSDD)-13, carrying the general thrust of PD-59 but with less comprehension of what was needed. The result was a period of stalemate and stalling in the Defense Department. In fact, little or nothing of consequence was done to pursue this doctrinal change, yet a great deal of money was spent in programs intended to carry out parts of it, e.g., for "continuity of government," but was simply wasted. By the end of the 1980s, as the Soviet Union began to disintegrate, little had changed beyond shrill rhetoric against "mutual assured destruction (MAD)."

THE ANTECEDENTS OF CHANGE

By the time Strategic Arms Limitations Talks (SALT) I were signed in 1972, Soviet strategic nuclear weapons programs were beginning to exceed the levels that Secretary of Defense Robert McNamara had led policy circles in the United States to expect.

Introducing the concept of "assured destruction" as a metric for deciding how much U.S. nuclear capability should be maintained, he capped U.S. forces programs, declaring that preplanned nuclear targeting with the forces on hand effectively made the Soviet Union no longer a functioning political or military entity, and rendered it unable to continue a war in Europe or the Far East. Percentages of roughly classified target sets, e.g., command and control, war supporting industries, and population, were the measures for achieving "assured destruction."

This metric soon became a dogma: MAD, i.e., "mutual assured destruction." Most U.S. officials believed that no defense against such an attack was possible. Thus, U.S. strategic defense programs, such as civil defense and antiballistic missiles, made no sense and should be discontinued. Most of the tactical nuclear forces deployed in Europe and the Far East in the 1950s for battlefield use were slowly decreased and withdrawn during the 1960s and 1970s. No country, insisted McNamara and a growing chorus of lay strategists, could escape the logic of this proposition. The Soviet Union inevitably would recognize it and see the pointlessness of building ever-larger nuclear forces, not just for strategic operations but also for tactical and theater operations. Even before SALT I was signed, however, U.S. intelligence assessments recognized that Soviet nuclear weapons programs were not stopping at levels required for "assured destruction" of the United States. As a result, at least two problems arose in the minds of U.S. defense officials. First, in the event of another crisis like the one over Soviet missiles in Cuba in 1962, would an American president feel sufficient confidence to try to compel a Soviet leader to retreat? Would he be credible if he threatened to initiate a large preplanned nuclear attack on the Soviet Union, knowing that a large Soviet retaliation was inevitable? Second, was the U.S. commitment of a nuclear umbrella for Europe still credible? That is, was the United States willing to respond to a Soviet conventional attack on Western Europe with nuclear weapons if NATO conventional forces were unable to stop it? Some leaders in Europe expressed doubts.

Secretary of Defense James Schlesinger tried to adjust U.S. weapons employment doctrine to deal with the growing Soviet forces. In addition to the large preplanned option, known as the

Single Integrated Operations Plan (SIOP), which could be delivered as one huge strike in about 6 hours time (30 minutes for intercontinental ballistic missiles (ICBMs) and sea launched ballistic missiles (SLBMs) but longer for strategic bombers), he called for "Limited Nuclear Options" (LNOs). That was the substance of National Security Decision Memorandum (NSDM)-242, issued in 1974. These much smaller strikes were supposed to be more "credible," reassuring the NATO allies that the United States would not flinch from nuclear weapons first-use in the face of a defeat in a ground war in Europe. And they presumably would shore up the president's courage in any future variant of the Cuban missile crisis.

NSDM-242 also called for "Regional Nuclear Options" (RNOs). They were meant to support regional military operations in the event of war. Leon Sloss, who helped prepare NSDM-242, has said RNOs were not meant to address a different problem: the use of nuclear weapons in support of the two military theaters where U.S. forces were deployed, Europe and Northeast Asia. In this respect NSDM-242 anticipated PD-59, but LNOs did not. RNOs never gained the attention that LNOs did. Moreover, if RNOs for Europe had been emphasized, they would have created problems for "extended deterrence," that is, the U.S. nuclear guarantee for Europe that it would treat a Soviet attack only in Europe as if it had also been an attack on the United States. The so-called "nuclear coupling" of Europe with the United States was a sensitive matter for Europe. Issues around coupling arose during the Carter administration in connection with Soviet SS-20 forces. These were intermediate range nuclear forces that Germany in particular believed were tilting the Euro-strategic balance against NATO. In any event, RNOs were receiving even less planning attention than LNOs when I began investigating the White House procedures for nuclear weapons command and control in the spring of 1977.

Precisely how LNOs were to work was never made clear. Judging from the rhetoric at the time, both from the Defense Department and outside analysts, LNOs were to provide the president with choices having less devastating consequences than launching the entire SIOP. By responding in a crisis with a limited nuclear strike, a very small one, it hoped that a halt could be negotiated before things escalated to the SIOP level. The rhetoric of the time was "escalation control."

With the Carter administration, Soviet nuclear weapons began to exceed U.S. capabilities in "megatonnage" of explosive power and numbers of warheads. Soviet civil defense also was expanding. Air defenses were increasing against low flying bombers and cruise missiles, and the antiballistic missile (ABM) system around Moscow was growing apace. The forecasts were grim enough to prompt Secretary of Defense Harold Brown to support three initiatives: a study of Soviet civil defense; the B-2 bomber program in place of the B-1 bomber (as a counter to the surprisingly effective Soviet low altitude air defenses); and the deployment of another U.S. ICBM, the so-called "MX." Brown came to his post an avowed proponent of the assured destruction school of strategic thought, but when he learned what Soviet force builders were actually doing and how they were conducting practice exercises, he began to rethink his assumptions.

In late February 1977, Presidential Review Memorandum (PRM)-10 was issued. It called for a comprehensive net assessment of how the United States was doing vis-à-vis the Soviet Union, not just in the military area but also in all categories of power and in all regions of the world. It also directed a military force structure review. Thus two studies emerged, PRM-10 Comprehensive Net Assessment (a lineal descendant of National Security Council (NSC)-68 and NSC-162) conducted by the NSC, and PRM-10 Force Posture Review conducted in the Defense Department. Based on these studies, PD-18 was approved in August 1977. It outlined a comprehensive national strategy and military capabilities required to support it. A few items, however, were left undecided for further analysis. Strategic nuclear weapons employment doctrine was one of them because there was no consensus about how to deal with the issues that prompted the NSDM-242 policy in the early 1970s. Thus, PD-18 left the big nuclear issues to be decided later. Arms control played a key role in how the issue would be decided, and how much cooperation Moscow would offer in that arena was still an open question. Also, disputes over intelligence assessments of Soviet military programs needed to be resolved before deciding whether or not to change U.S. nuclear employment doctrine.

These are the major antecedents that led to the changes in policy that President Carter would make; however, other contributing factors also had emerged in the first year of his presidency.

COMMANDING AND CONTROLLING U.S. NUCLEAR FORCES: FANTASY VERSUS REALITY

In 1977, a number of events impacted the thinking at the White House and the NSC staff about nuclear weapons employment doctrine. The first was a test of the president's command and control system for responding to an imminent nuclear attack. The White House Military Office handles the president's physical movements and assures the availability of his "Black Book" for directing the use of nuclear weapons. In February 1977, the president's assistant for national security affairs, Dr. Zbigniew Brzezinski, tested this system one evening about 9 p.m. He called in the Director of the Military Office and told him to assume that an attack was in progress and to execute the White House Emergency Procedures (WHEP). Things did not go well. As a result, he directed me, his military assistant on the NSC staff, to review the WHEP, including the command and control links from the Pentagon to the Strategic Air Command (SAC), that controlled all of the strategic nuclear forces.

Over the next year, I explored the system, tracking the lines of communication and control to the J-3 of the Joint Spectrum Center (JSC) Staff in the Pentagon and on to SAC in Omaha, Nebraska. This led to other issues, namely transportation and protection of the president during a nuclear attack, the survivability of the military command and control structure for all U.S. forces, not just nuclear forces, and securing the survival and continuity of U.S. Government operations on the civil front in the event of a nuclear attack. Four results from this exploration are noteworthy.

First, the communications link to the president from the North American Air Defense Command (NORAD) and SAC was reliable. The commander of SAC expressed grave doubts that he could "get to the president in a crisis." This proved less a technical problem than an expression of his disappointment that Hugh Carter, the President's cousin, was placed in charge of the White House Military Office rather than an air force officer. The episode did, however, clear up in my mind the realities of the communications from NORAD to the J-3/JSC, SAC, and the White House. They were excellent, although not secure from foreign intelligence interception. Moreover, American

Telephone and Telegraph (AT&T) provided and managed them for the Pentagon. They were only marginally under the control of the Defense Department. In the 1950s, when such communications were being arranged in anticipation of growing Soviet nuclear forces, AT&T hardened many of its switching centers, putting them in deep underground bunkers, and creating a highly redundant and, therefore robust, nation-wide telecommunications network. Neutralizing it posed a very complex and large targeting problem for an enemy.

Second, SAC and the Air Force began expressing doubts about Carter's interest, accessibility, and willingness to address issues of nuclear weapons. Charges were made to me that SAC was being neglected. They wanted their "command and control people to fix the problems in the White House" because no one else could do it, certainly not an army officer. This prompted me to focus White House attention to SAC, which it probably did not want. Dr. Brzezinski accepted my suggestion to visit SAC and become more familiar with SAC's war plans. This allowed him to understand in much greater depth how the system worked. To be sure, he attended all of the presidential briefings on nuclear weapons control before the president assumed the office and several presented after his inauguration. Moreover, I talked to him frequently as a result of my continuing review of the system. But in light of the problems I was uncovering, a "hands on" experience was essential for him to view my memoranda as credible. At times I simply could not believe what I was being shown and told, causing me to doubt my own comprehension. It was an unnerving experience for me personally, and made me feel very diffident about my analysis and conclusions.

In the list of questions I prepared for him to ask at SAC, the most important one was "Now that I have heard your war plan for D-Day, what is your plan for D+10, D+30, and longer?" The SAC commander and his staff had no answers. They talked about a "secure reserve force"—which did not exist—and a few other things, such as "damage assessement," but it became obvious to Brzezinski that they had no effective plans beyond executing the SIOP. Things would just cease in their world about 6 to 10 hours after they received the order to execute the SIOP. What Brzezinski reported

to the president about this experience I do not know, but its impact on Brzezinski was palpable. Apparently it inspired him to get the president directly involved.

The third result soon followed. President Carter decided to participate in an exercise simulating a massive nuclear attack on the United States. The Pentagon and SAC scrambled to arrange secure telephone lines for the exercise because they did not want to risk exposing what might be said in the conference call to hostile intelligence. Thus an impetus was created for secure communication. More immediately, as I listened to the exercise, I realized that all the unified commanders with nuclear weapons that would be used in the SIOP were nervous and impressed that the President was engaging them with questions. The SIOP and strategic nuclear weapons had always been more an academic than a real operational responsibility in the minds of all but the SAC commander.

Fourth, the so-called "Black Book," which provides the president a written and graphic view of his alternatives for executing the SIOP, was thoroughly redesigned. No president before him practiced these emergency procedures, and therefore, no president had ever given the J-3 in the Pentagon guidance as to what the president desired. The J-3 had for years simply guessed what he might want. President Carter found the Black Book too complex and confusing. The simplifications and clarity introduced thereafter were a significant improvement.

Some time later, the president participated in a second exercise to verify that the changes he directed had been made and to assure himself of being able to handle his own responsibilities no matter what time of the day or night.

By late spring 1977, I discovered that the Limited Nuclear Option issue was not just a policy matter, but also an operational one. The J-3 staff officers responsible for nuclear weapons complained that they could not get "political guidance" for designing LNOs. Thus they picked out six to eight small target sets requiring six or eight or a dozen weapons to destroy, and developed the preplanning information so that SAC could program them for execution. I asked myself what "political guidance" would look like. Pondering this question for only a short time will make any sensible person wonder how such an absurd task could ever be taken seriously. How could

launching a dozen nuclear weapons at any place in the Soviet Union provoke anything but a quick and massive retaliatory strike? This was the very thing it was supposed to prevent. Was I in a house for the mad? (The pun unintended.)

This discovery was the zenith of many awakenings I was experiencing as I reviewed the entire nuclear command and control system. The first was the idea of deciding to go to war in 10-12 minutes based on NORAD warnings of incoming missiles. I had heard much about "deterrence theory" as a student at Columbia University, but I quickly dismissed it as nonsense because of my earlier training as a tactical nuclear targeting officer at the Armored School in Fort Knox, Kentucky. There I learned detailed information about nuclear weapons testing results against armor-protected and entrenched infantry troops. I learned enough nuclear physics at West Point to recognize both the gravity of nuclear effects and how they could be mitigated. I served in the first Pentomic division formed in Germany in the 1950s. I knew that destroying the entire world with nuclear weapons was not feasible with the arsenal the United States possessed, although staggering damage would occur. There would be a "day after," and millions of Americans would be around to face the post-strike realities. To pretend that the U.S. Government could simply ignore addressing this responsibility was inconceivable. Yet the command and control system and the SIOP did not include any consideration of post-strike realities.

Having reviewed everything available in open Soviet sources about nuclear weapons, I had seen nothing to suggest that the Soviet General Staff saw nuclear weapons the way SAC or the academic deterrence theorists did. In 1964, Marshal V. D. Sokolovskii's edited volume, *Voennaya strategiia* (Moscow, 1963), struck me as a sober and realistic assessment of what nuclear weapons meant for modern warfare. These Soviet military officers addressed nuclear weapons within the intellectual context of Clausewitz's philosophy of war: that war is a political phenomenon with all the uncertainties, friction, and psychological dimensions of human conflict. Nuclear weapons do not rule out war. They complicate it. Wars still can only be understood as political phenomena, fought with politically chosen war aims to achieve political purposes.

Looking at the SIOP and its executive plan, I realized that this was a war plan that did not allow for choosing specific war aims at the time and in the context of the outbreak of hostilities. It was just a huge mechanical war plan aimed at creating maximum damage without regard to the political context. I concluded that the United States had surrendered political control over nuclear weapons to a deterministic theory of war that depoliticized the phenomenon outright and ensured an unprecedented devastation of both the Soviet Union and the United States. Not even a finger would be raised to allow more Americans to survive; a highly immoral act in my view. And the president would be left with two or three meaningless choices that he might have to make within 10 minutes after he was awakened from a deep sleep late some night.

This disturbing discovery caused me to investigate NSDM-242 and LNOs with new curiosity. Was there a way out of the absurd SIOP approach to war? My discussions at staff levels in the Pentagon yielded more confusion rather than clarity. Frustrated, I sent Brzezinski a memorandum for his signature, addressed to the Secretary of Defense and the Chairman of the Joint Chiefs of Staff (JCS). The memorandum asked them to come to the White House and personally explain to the president how LNOs worked, not in theoretical terms but in the most practical sense. For example, where should the president be when he directed the launch of an LNO? Should he be in the White House, his airplane, or perhaps in an underground bunker? What about press guidance and communications with Moscow, and so on?

My hope was that a conversation among the principals responsible for making decisions would bring some sense to this Alice in Wonderland planning world. Brzezinski sent the memorandum, but the invitation was ignored. In its place, a long, confusing memorandum was sent explaining that LNOs were meant to increase U.S. credibility since the size of Soviet forces made it less attractive to threaten to execute the SIOP in a crisis. I was puzzled. Why would a half-dozen nuclear weapons launched at any target in the Soviet Union be less likely to provoke a large retaliatory nuclear response if coupled with a Soviet invasion of Western Europe? I tried to imagine President Carter sending Brezhnev a message over the Washington-Moscow Hotline, telling him that an LNO would

soon be coming, and not to panic because it consisted of only six weapons and was intended to underscore U.S. credibility and lead to deescalation. And suppose Brezhnev responded, "I understand. I recognize your 'credibility' problem, but now I have a credibility problem. So I am launching only four nuclear weapons at Seattle. Do not panic. Additional strikes will not follow before we begin to negotiate." What could the president do at this point? What guidance would he give his press secretary for explaining this nuclear exchange to the White House press corps? Would the press secretary ask the rest of the country to pray for those people in Seattle? How would he explain to the large surviving public that it had no civil defense capability? Polling at the time indicated that a large majority of Americans believed that as much as $6 billion was spent annually on civil defense. Was I in a MAD house? (The pun intended.)

This may sound like a caricature of the situation at the time, but I do not believe it is. On the contrary, it understates the realities. Not only was there no civil defense that supported programs for disasters other than natural ones, e.g., hurricanes and tornados, but there was no assurance that telecommunications could survive more accurate Soviet warheads. "Continuity of government" operations in crises had been allowed to deteriorate after President Richard Nixon dismantled the Office of Emergency Preparedness in 1972. The Pentagon ran a war game requiring mobilization of manpower and industry a couple of years later. It produced deeply disturbing results and showed how unprepared both the military and the defense industrial sector were.

The sense of unreality was difficult to exaggerate. If the SIOP was no more than a bluff, a plan that would never be executed, then why had SAC been allowed to keep it finely honed and ready to launch without any of the other critical capabilities for World War III? Why was the President practicing the execution procedures? The SAC and other nuclear commands seemed to believe it was a genuine option.

THE TARGETING AND C^3I STUDIES

When PD-18 postponed dealing with nuclear employment doctrine, at least two studies were initiated in the Pentagon. In the Office of the Secretary of Defense (OSD), Leon Sloss led a

nuclear targeting study, ably assisted by Colonel Joachim Schulz. In addition, William Bader managed a review of C^3I capabilities, emphasizing the "intelligence" part of C^3I. By 1978 these studies were either completed or reaching some preliminary conclusions.

The C^3I study caught my attention because one of my duties on the National Security Council (NSC) staff was to over see the White House Situation Room and its connections to the Intelligence Community. I became reasonably well-acquainted with our technical surveillance capabilities that penetrated the Soviet Union as well the rest of the world. I also became familiar with the Defense Intelligence Agency's (DIA) support of SAC's targeting efforts. Imagery intelligence was most important because it provided precise location data for aiming nuclear warheads. Signals intelligence and human intelligence helped but seldom did they provide adequate geo-location coordinates.

Thinking about alternatives to the SIOP and ways to escape the predicament in which it placed the president, I considered how to lessen our dependency on locating all targets before a conflict. With preplanned targeting, once a war broke out, no adjustment for changing target sets was possible because "real time" imagery over the Soviet Union was assumed not to exist. Technological advances, however, were beginning to change that. The shift from silver nitrate film, which requires recovery from a satellite and then development and printing—a lengthy process—to electro-optical imagery, which can be transmitted in digital form directly from a satellite and printed almost instantly, made rapid discovery of new targets possible anywhere inside Warsaw Pact territory.

The implications were exciting. Nuclear weapons were considered useless for striking mobile military forces once they deployed into field positions because precise locations were difficult to determine and could change significantly over a few hours. When it became possible to look for targets and provide precise location data to SAC in an hour or two, perhaps less, and then to strike those targets with ICBMs in less than an hour, this radically changed possible targets. Conventional military forces already deployed to invade Western Europe could be hit with enough precision to cripple them and dramatically slow their offensive operations.

The destruction of traditional SIOP target sets, such as high-level command and control, population, and war-supporting industry,

would not hinder the movement of large Warsaw Pact armored forces attacking westward into Germany, the BENELUX, and France. If a war broke out, the SIOP could do vast damage to the Soviet Union, but it could not stop a Soviet ground offensive from reaching the Atlantic coast. We could lose Europe as we wreaked massive destruction on the Soviet homeland. Would that be a favorable outcome? In the long recovery period following, Soviet forces might be able to rule Western Europe and the United States unable to take it back.

If nuclear weapons were used, I asked myself repeatedly, why should they not be used to affect the outcome of the war favorably for the United States? How does the SIOP contribute to that? I could see no way that it did and began to believe that it could make the situation highly unfavorable to the United States. Critics, of course, would accuse me of pure fantasy analysis because they believe that life would essentially cease to exist as we know it after a large U.S.-Soviet nuclear exchange. Moreover, they do not believe it would happen because "mutual assured destruction" makes it impossible for a war to start. Perhaps, but as long as human beings have a degree of "free will," we cannot assume that all leaders will be deterred. As long as that prospect is possible, even if highly improbable, military officers and their commander-in-chief, the president, must consider their alternatives if deterrence fails. Are they not morally bound, as well as legally responsible, to plan for that contingency? The critics, of course, retort that such plans make nuclear war more likely because leaders will begin to believe they can fight and win nuclear wars.

Obviously this debate cannot be resolved because critics do not accept new evidence that undercuts the assumption that a major nuclear war will not end human existence. Acceptance would compel them to admit that prudent planning for the failure of nuclear deterrence is justified. We will never resolve this debate because this is a matter of faith, not of evidence. We must make a choice as to which course is more prudent.

Because massive use of nuclear weapons is horrible to contemplate, I have never had difficulty in choosing to prepare for the failure of nuclear deterrence. How far to carry such preparations, of course, is the next most important question, and the

economic impact of such programs certainly has to be considered. That, however, is qualitatively a different kind of question. Cost-effectiveness comparisons between civil defense and counterforce targeting on Soviet nuclear forces showed that a dollar spent on civil defense bought much more damage limitation than a dollar spent on offensive nuclear forces. Some mix of passive defense and offensive nuclear forces, therefore, makes a lot more sense than total dependence on the latter.

In any event, technological advances in intelligence collection systems convinced me that a nuclear weapons employment policy based entirely on preplanned targeting was no longer essential and that a flexible targeting system analogous to that for artillery and tactical air support was possible. This amounted to a basic paradigm shift, not unlike the one Copernicus caused by shifting from Ptolemy's geocentric view of the solar system to a heliocentric view. Deterrence theorists defined nuclear war in a way that removed it from the realm of politics, and, apparently, rendered Clausewitz's instrumental philosophy of war irrelevant.

Yet Clausewitz also considered "absolute war." In theory, he argued, any war should logically escalate to the "absolute" level, but in practice, "friction" slows down operations and prevents escalation from reaching "absolute war." Deterrence theorists never addressed the prospect that what Clausewitz identified as friction could limit the effects of large preplanned nuclear attacks, such as described in SIOP. Soviet writings on the subject always struck me as implicitly embracing the role of friction in wars involving nuclear weapons. In fact, it always seemed unlikely to me that the Soviet General Staff would risk launching several thousand nuclear weapons at once. What if a large number did not work? Would it be better to try a few and observe the success rates for different delivery systems? After all, flawless technical performance was never a Soviet trademark.

In any event, new technology brought the use of nuclear weapons back into the realm of real war, where it could be an instrument of policy to impose one's will on an enemy by disarming him, by destroying his military forces. SAC's ICBMs, bombers, and SLBMs could be used to support theater campaigns in Europe and East Asia, not just to smash cities and factories deep inside the Soviet Union.

Moreover, attacking military forces inside of such civil and economic targets made a lot more sense from the viewpoint of winning a war rather than simply preventing the enemy from winning.

What were the implications for "counterforce" targeting? The idea of a disarming nuclear strike at an opponent's strategic nuclear forces, a strike powerful enough to destroy all or most of the enemy's delivery systems, always enjoyed a central place in theoretical debates about deterrence. The Soviet buildup coupled with hardening and dispersal of mobile capabilities, especially in submarines, made such a strike highly problematic if not downright fanciful. The logic of MAD converted invulnerability of nuclear forces into a desirable condition as long as both sides had it. By that logic, acquiring a counterforce striking capability was destabilizing. Thus, accurate ICBM warheads that could destroy silo-based nuclear-armed missiles were not desirable to possess.

My view on this issue was both simpler and more complex. As Clausewitz said, "war is a gamble." It is imprudent to bet on achieving a fully disarming counterforce strike in the emerging conditions of a war, but that does not mean that all counterforce targeting should be discontinued. The question is how much and in what priority vis-à-vis other targeting, especially in light of the deployment of conventional forces in Europe or East Asia. Targeting silos made sense only if they had missiles in them. A large strike at a missile silo field might hit only empty silos. The Soviet military, however, built reusable silos, so their destruction could be useful in any event. Still, counterforce strikes could not be the only thing of importance, even in a first strike. They had to be combined within an overall campaign plan dealing with the realities and political aims of a nation's commitment to war. Flexible reconnaissance and targeting of strategic nuclear forces is essential for any effective campaign plan.

My discussions with Leon Sloss about his study revealed that I was not alone in such speculations and suspicions about the wisdom of the SIOP and LNOs. If the president resorts to nuclear weapons, why not commit them to support the theater of conflict in conventional military campaigns? Why adapt targeting and harness it to the political aims of the war? Why should the president have only nuclear options that are unconnected to war aims for the conflict

at hand? At the time, Sloss was not as ready to break fully with large preplanned nuclear options as I was, but he did not discourage the line of reasoning that events had driven me to follow.

If new intelligence capabilities permitted real-time location of military forces in the field, targeting could be dictated by traditional military criteria: to destroy the enemy's armed forces instead of cities and factories and civilian population.

FEDERAL EMERGENCY MANAGEMENT AGENCY AND PDs—41, 53, 57, AND 58

The implications, of course, were far wider than nuclear targeting policy. Any attempt to give the president less than catastrophic and politically meaningless options (the SIOP) required addressing several other large issues. When one considers the U.S. Government's responsibilities once nuclear weapons are used, civil defense immediately comes to mind. So, too, does the survival and continuity of government operations—civil and military. If military forces are deployed worldwide as well as within state and local governments in the United States, the survival of telecommunications within the United States is essential. And in the longer run—not just weeks but months after the use of nuclear weapons—industrial mobilization for war production is also essential.

In the year after the issuance of PD-18, two developments occurred that addressed some of these implications. The NSC launched an interagency study (PRM-32) to investigate civil defense and to make recommendations for changes to U.S. civil defense policy. The civil defense program had dwindled to about $120 million annually, enough money to keep alive the thinly staffed Defense Civil Preparedness Agency located within the Department of the Army. (President Nixon had disbanded the Office of Emergency Preparedness (OEP) in about 1972.) Another part of OEP, responsible for "continuity of government," was parked inside the General Services Administration (GSA). A third part, responsible for disaster assistance, was put in the Commerce Department. All three sets of responsibilities were given very low priority and left to decay. This was the organizational context in which the review of civil defense took place.

In August 1978, the results from the civil defense review prompted the issuance of PD-41, setting a new civil defense policy, stating that both defensive and offensive capabilities were part of the overall strategic balance with the Soviet Union. As a policy document, PD-41 specified neither a particular funding level, nor a specific strategy for civil defense (e.g., shelters in place versus population dispersion in emergencies). Its main purpose was to legitimize civil defense and other forms of strategic defense in principle. Only a modest increase in civil defense was sought thereafter, but the important change was that Civil Defense went from neglect to serious attention.

Somewhat fortuitously, President Carter's "Presidential Reorganization Project" addressed a reform that would create the Federal Emergency Management Agency (FEMA). I noticed a draft bill from the House of Representatives that directed restoration of the three parts of OEP. State and local governments preferred to deal with one federal agency on programs split among the three pieces of the former OEP. The draft law would effectively recreate OEP. And OEP was the last vestige of the war mobilization bureaucracy from World War II. Believers in MAD saw no need for it. That was probably one of the reasons it was disbanded. MAD was certainly logically consistent with disbanding OEP.

Seeing a strong national security need to restore OEP, I took the draft law to the staff members of the President's Reorganization Project (PRP) and suggested that they support it, listing several security reasons for doing so. They gave me a hearing but showed no enthusiasm for the project. A month or so later, they appeared in my office, asking me to repeat the national security arguments that favored reorganization. They felt political pressures from members of the Congress to support the reorganization. Their attitude changed from indifference to serious interest. The coincidental joining of parochial political pressures and public national security interests was apparent. The PRP soon made it one of its projects, and FEMA was the outcome.

Not only did FEMA provide a better home for a national civil defense program, but its existence emphasized the importance of continuity in government (COG) programs. I started an interagency review of COG which, a year later lead to the issuance of PD-58.

Parallel to PD-41 and 58, Colonel Charles Stebbins, a member of the NSC staff, chaired an interagency working group on military industrial stockpiling and wartime mobilization plans. FEMA, of course, had these responsibilities as well. PD-57 resulted from his working group's proposals.

The missing piece in this set of new policy directions was communications. The complexity of the issue is more than this chapter can describe, but entangled in the telecommunications deregulations policy debate was how funding for Defense Department communications would be handled. Absent in the debate was a "requirement," set at the national level, for how much and what kind of telecommunications were needed for military and COG purposes. Was a level capable of controlling conventional military operations in a non-nuclear environment adequate? Or was it essential to control forces in the event of nuclear war? And if it was the latter, was it enough to enable the president only to launch the SIOP? Or should he be able to retain control through initial attacks and for longer periods of weeks and months thereafter? When the Carter administration disbanded the Office of Telecommunications Policy, putting most of its function in the Commerce Department, it discovered that the 1934 telecommunications law made "crisis management" of the electromagnetic spectrum a responsibility of the White House. This was a responsibility that could not be pushed off on a cabinet department. Thus "national security telecommunications policy," the euphemism for allocating frequencies in a crisis, was given to the NSC staff. When staff members of the PRP came to discuss this option with me, I was puzzled at first but realized that having this responsibility might be an advantage in setting communications requirements in the event of a nuclear attack. Brzezinski agreed, and the PRP shifted the task of telecommunications management to the Special Coordination Committee of the NSC because it was designated to deal with "crisis management."

As I surmised, putting emergency management of the electromagnetic spectrum into the NSC Staff was advantageous. As the Commerce Department pushed for deregulation and the break up of the AT&T monopoly, I began to understand that the military did not operate its own communications above the level of tactical

units. Rather it "outsourced" its communications needs to AT&T, which spent large sums hardening its switching centers and creating a robust network. Most of the costs of these features were defrayed by spreading the cost among all customers, including those in the private sectors. Deregulation would remove AT&T's power to cover the costs in this manner. To improve the national network to meet the challenge of Soviet nuclear weapons capabilities would cost large sums that would have to be appropriated by Congress.

Initially, Commerce Department officials understood this better than I did, but a very able Army captain, Thomas Laney, with a graduate degree in economics from Harvard University, worked for me as an intern during the summer of 1979. He investigated telecommunications issues and sorted things out quickly. Based on his analysis, I decided that we should separate the cost issue from the policy issue. We tried to get consensus on a presidential directive from several agencies, including Defense, State, and Central Intelligence. The Directive established a standing "requirement" for adequate communications to support the president's command and control. The cost issue was separate and could be handled either by keeping AT&T as a monopoly or by proceeding with deregulation and seeking the money from Congress. I suspected that the actual costs to AT&T were much less than if they had to be appropriated by Congress. The transaction costs could be much higher through the appropriations route. AT&T officials, however, refused my several requests for comparisons based on their internal figures. Thus I could not produce analyses to help defend it against deregulation, but I was able to secure interagency support for a presidential directive. PD-53, signed in 1979, included very demanding requirements for management of military forces and the country for months after an attack by hostile nuclear forces.

By late 1979 and early 1980, directives and guidance were in place on all of the key fronts that had to be addressed if the United States was serious about dealing with the advent of the failure of nuclear deterrence. No one working on these issues, as far as I could tell, suffered illusions about fighting and winning a nuclear war. No one seemed to take that as the primary aim. In my case, the rationale was plain. A modicum of effort was necessary in order to prepare for failure of deterrence. This was the barest minimum a responsible president could afford to do.

PD-59

By 1980, the Carter administration was wholly absorbed with the hostage crisis in Iran and the Soviet invasion of Afghanistan. Finishing PD-18, a nuclear employment policy, seemed unlikely. In the summer of 1980, however, Dr. Brzezinski directed me to begin a dialogue with the Defense Department on a presidential directive to set this policy.

I suspected that Brzezinski and I would soon be in a deadlock with the Pentagon on the draft, given the earlier views of Harold Brown and his primary aide, Walter Slocombe, on nuclear weapons issues. Brown's views alternated, depending on accumulated intelligence on Soviet capabilities, nuclear exercises, and other evidence of their policy for use of nuclear weapons. His change on the civil defense issue was the first major shift that I noticed.

In the event, the dialogue went quickly. My initial draft was revised beyond recognition. I responded with a compromised version, explaining the need for commanders to have the capability of launching nuclear weapons attacks on conventional forces. I removed the apparent misunderstanding that I favored a "counterforce" strategy of destroying Soviet strategic forces before they could be launched against the United States. To me, this was not feasible and, at best, a very high-risk tactic. Prevailing in our defense of Western Europe ought to come first. If Slocombe accepted this notion of flexible and limited use of nuclear weapons, I would not try to eliminate the SIOP entirely, as my first draft did.

Brown not only accepted this, but he also accepted linking procurement policy to employment policy, which had never been done in directives on nuclear employment policy. Thus the design of our nuclear forces and C3I for managing them was locked into paths created by procurement agencies. Past changes in employment policy had no affect on procurement, effectively making them irrelevant.

Brown also added an important description of the purpose of PD-59. He described it as a "countervailing" strategy. In fact, that is precisely its rationale. And his term was a brilliant way to convey publicly that the United States was committed to blunting and defeating any attack in Europe or East Asia. At the same time, it was

ambiguous, giving no details on just how strategic nuclear forces could be used to help NATO "countervail."

This concept was also consistent with President Carter's emphasis in NATO on increasing conventional military capabilities to counter the Warsaw Pact's continuing buildup that reached disturbing levels by the late 1970s. At the NATO summit in May 1978, he persuaded the allies to commit to 3 percent annual increases in defense spending. He also reversed 10 years of declining U.S. defense spending, which began in 1968 and totaled 38 percent by 1977. In August 1980, the president signed PD-59.

CONCLUSION

A major question arises from this account. What did President Carter really think of this series of PDs on nuclear weapons issues? I do not know his real views because Brzezinski dealt directly with him on all of these issues. I just know that the President read the rationales for each PD and that he signed them. I suspect that his reaction to the experience of participating in SIOP drills was not unlike my own: "launch on tactical warning" or even an immediate retaliatory strike is an absurd and irresponsible way to go to war. He gave no hint in those drills of how he might act if an attack were real. I suspect that he realized the choices given him made no political sense. I also suspect that he would not have directed the execution of the SIOP in a crisis. By the time those drills took place, I had already learned enough about the system and the attack options to conclude that implementing the SIOP would be the height of folly.

If that were true, then the question was what options should replace the SIOP alternatives? There was no way to escape terrible consequences, but if one were going to use nuclear weapons, it made more sense to aim them at military forces engaged in offensive operations against NATO forces or U.S. and allied forces in the Far East than to attack empty Soviet ICBM silos, cities, leadership facilities, and factories. Perhaps this far more limited use—less than a dozen weapons in a single strike—would be answered by massive attacks against the United States, but it would at least allow one more chance for the Soviet side to reconsider and not escalate. From my study of Soviet military thinking, I thought the United States should

avoid resorting to massive attacks. Everything in Soviet nuclear weapons policy reflected a lack of understanding and interest in western deterrence theory. I also doubted that Soviet nuclear forces commands had adequate computer power to organize and deconflict massive targeting of the kind required for the U.S. SIOP. Finally, many years later, when I interviewed Soviet officers about their doctrine of nuclear weapons employment, I learned that they gravitated towards limiting nuclear use to the European theater and avoiding nuclear attacks on the other's homeland. This approach held primacy beginning in the late 1970s as Soviet strategic forces gained rough equivalence to U.S. forces.[1] In other words, under PD-59 the targeting of Soviet forces in East Europe probably would not have prompted an immediate Soviet strike on the United States. For the general staff, Europe was an accepted nuclear battleground after 1979.

On the official record, President Carter consistently supported reducing the numbers of nuclear weapons and doing everything possible to control or totally eliminate them. This image is at odds with the image one gains from seeing his signature on all of the PDs. I do not see the two images as incompatible. The PDs, including PD-59, offered a way to avoid a SIOP decision on short notice. Perhaps it was not much better than the choice to launch the SIOP, but it certainly was a responsible attempt to make massive nuclear exchanges of thousands of nuclear warheads less probable. Moreover, with what we have learned after the fact about Soviet high-level military views of nuclear use after 1978, PD-59 options look far more credible than the awful choices presented by the SIOP.

Public reaction to PD-59, when word of its promulgation leaked out, was disapproving. The Directive was described as a new "counterforce" doctrine aimed at killing virtually all of Soviet strategic forces before they could be launched. This, of course, was absolutely untrue. It also was described as a "nuclear warfighting" doctrine, which in a sense it was. But the purpose was not primarily to fight and win nuclear wars. It was created as a last resort if deterrence failed. This resort was designed to limit the geographic areas of nuclear use and to make their use support theater military operations to "countervail" in the two major theaters of war where U.S. and Soviet forces could conceivably go to war against one another.

With the dissolution of the Soviet Union and the emergence of unipolarity in the international balance of power, the PD-59 approach makes as much, and probably more, sense than it did during the U.S.-Soviet Cold War stand off. If nuclear weapons capabilities are retained in the U.S. military arsenal, they should not be dedicated to large preplanned nuclear options but rather designed for limited targeting to support regional military operations. That includes primarily small yield and particularized nuclear warheads and delivery means, target acquisition means for near real time operations, and staff capabilities in the unified commands that can develop targeting missions in support of regional military operations. Even in this role, it is difficult to conceive of scenarios where nuclear weapons are essential. Other advanced weapons and technologies are likely to prove far more desirable for use in war.

ENDNOTES - CHAPTER 6

1. William. E. Odom, *The Collapse of the Soviet Military*, New Haven: Yale University Press, 1998, pp. 69-70.

CHAPTER 7

FRANCE'S NUCLEAR DETERRENCE STRATEGY: CONCEPTS AND OPERATIONAL IMPLEMENTATION

David S. Yost*

This essay offers a survey of operational implementation issues in France's nuclear deterrence strategy since the late 1970s.[1] The survey begins with a brief account of the development of France's nuclear posture. It then turns to the political and strategic purposes of the posture. While the French have consistently upheld basic objectives such as ensuring the nation's decision-making autonomy and its security from aggression by major powers, they have modified a number of operational principles and priorities. In some cases, they have signified these modifications by introducing new terms to describe their strategic conceptions. They have usually abandoned the previous terms without fanfare or explanation, and only specialists have taken note of the evident adjustments in strategic policy. The insistence that France's strategy remains one of non-use enables the French to minimize the potential awkwardness of certain issues, including relations with allies and potential adversaries and the strategy's moral and political legitimacy.

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New international circumstances have been more important than technical factors in leading the French to modify their strategic priorities and operational concepts since the late 1970s. Concepts of "proportional deterrence" and "anti-cities" targeting occupied center stage in French strategic discourse when the main object of France's nuclear posture was the Soviet Union. During that era, several arguments against flexible targeting carried the day: above all, the limitations of French means in any contest with the Soviet Union. However, while the utility for France of targeting flexibility options was implausible vis à vis the USSR, in post-Cold War circumstances more discriminate nuclear options have gained importance in French analyses of contingencies involving regional powers armed with weapons of mass destruction (WMD). The history of French nuclear employment policy has been a gradual movement away from underscoring "anti-cities" threats with massive demographic effects to a greater emphasis on administrative, political, and military targets. The French have nonetheless continued to uphold the principle of non-use, thereby expressing their rejection of nuclear "war-fighting" concepts and their confidence that their threats of punishment will deter their adversaries and that actual nuclear strikes will not be required.

Indeed, French commentators have at times implicitly praised Paris for developing a strategy of *non-emploi* — that is, of non-use — and have contrasted the French approach with that of Washington and Moscow, accused of designing strategies for the operational use of nuclear arms. France's nuclear deterrence strategy has nonetheless obviously had operational dimensions, because a nuclear posture incapable of being employed operationally would deter no one. The French have made substantial investments in capabilities for the practical implementation of their strategy. Technical and operational credibility is intended to reinforce deterrence and thereby ensure the continuing relevance of the non-use principle.

The French rarely employed the American term "assured destruction" to describe their strategy during the Cold War but they endorsed the principle of deterring aggression and preventing war by maintaining survivable second-strike forces capable of causing massive damage to enemy cities. The French repeatedly accused Washington and Moscow of developing and maintaining arsenals far in excess of what would be required for deterrence via threats to

attack cities. The policies of the two largest nuclear powers, French commentators said, stood in contrast with the strict "sufficiency" sought by Paris. The French have for decades held, however, that their strategy is not constrained by an "all or nothing" rigidity. Operational flexibility has become more important since the early 1990s as the French have adapted their strategy to deter WMD-armed regional powers while retaining capabilities that constitute a hedge against the emergence of a new major-power threat.

France's Nuclear Posture

The French instituted their nuclear weapons program through a complex process that included the contributions of the French scientists associated with British, Canadian, and U.S. efforts during World War II, General de Gaulle's establishment of the Commissariat à l'Énergie Atomique in 1945, the series of limited decisions during the Fourth Republic (1946-1958), and the wide-ranging decisions of the Fifth Republic (1958 to the present) on specific weapons designs, delivery systems, and deterrence strategies. France conducted its first nuclear explosive test in February 1960 in Algeria, then under French rule, and its first thermonuclear explosive test in August 1968 in French Polynesia. The French have not conducted any nuclear explosive tests since the series of six tests in 1995-1996.[2]

Aircraft and standoff missiles. France's initial delivery means, from 1964 on, consisted of Mirage IV bombers, each carrying a single bomb. In the late 1980s 18 more advanced models of these aircraft were equipped with ASMP standoff missiles, each with a single warhead and a nominal range of 300 km; and these 18 ASMP-armed aircraft remained in service until 1996. From 1972 to 1991 several types of aircraft were equipped with "tactical" AN-52 gravity bombs. ASMP standoff missiles, with warheads of a reported yield of 300 kt, began to replace the gravity bombs in the late 1980s. Today most of France's ASMP missiles are allocated to 45 Mirage 2000N aircraft. In contrast with Britain, Russia, and the United States, France continues to maintain nuclear weapons for its surface fleet: ASMP missiles for Super-Étendard aircraft on the aircraft carrier *Charles de Gaulle*. The warhead on the improved 500 km-range ASMP-A missile, which is to be deployed on Mirage 2000Ns in 2007, will reportedly have a more "robust" design, to compensate for the lack of testing; and

the missile itself will be capable of diverse trajectories to enhance its prospects of defeating air defenses. Beginning in 2008 Rafale aircraft, both ground and carrier-based, will also be armed with the ASMP-A.

Land-based missiles. From 1971–72 to September 1996, when they were deactivated, France maintained 18 ballistic missiles on the Plateau d'Albion with a range of 3,000 to 3,500 km. Each missile carried a single warhead with a reported yield of about a megaton. From 1974 to 1992, the French army had 30 Pluton missile launchers (not counting spares and training launchers), and a stockpile of 120 km-range Pluton missiles. 30 follow-on Hadès missiles, with a published range of 450 km, were produced in the late 1980s and early 1990s, but never operationally deployed. In February 1996, President Jacques Chirac announced that the Hadès missiles, then still in storage, would be dismantled.

Submarine-based missiles. The first generation of French SSBNs entered service between 1971 and 1980. France's first SLBMs carried single warheads, but the M-4 SLBMs introduced in 1985 carry 6 independently-targeted warheads, each with a reported yield of 150 kt. A new SLBM type, the M45, also equipped with 6 warheads, entered service in mid-1996, on *Le Triomphant*, the first of France's four new-generation SSBNs. In 1996, it was announced that the successor SLBM, the M51, will have almost double the range of the M45 — that is, the M51 will have a range of over 8,000 km — in the interests of increased target coverage and SSBN survivability.[3] The M51 will reportedly have greater throwweight to accommodate penetration aids as well as larger and heavier warheads of a more cautious and "robust" design. Rather than devices with highly efficient yield-to-weight ratios verified through explosive testing, the TNN warheads that are to replace the TN 75 on the M51 SLBM in 2015 may have more shielding, high explosive, fissile material, and safety features. Current plans call for the fourth and final new-generation SSBN, *Le Terrible*, to enter service in 2010, equipped with the first M51 SLBMs.

Current capabilities. Since September 1996, France's operational nuclear forces have consisted solely of four nuclear-powered submarines, each equipped with 16 MIRVed ballistic missiles, plus aircraft equipped with ASMP standoff missiles. In addition to the force cutbacks, alert rates have been modified for air-delivered

systems and submarines. For example, from January 1983 to June 1992, the French maintained three SSBNs on station at sea at all times. From June 1992 to February 1996, two were on station at all times. Since February 1996, at least one has been on station at all times; and France is capable of maintaining two on station, if necessary. France could even deploy three "during a crisis, after a certain delay, if need be."[4]

In January 2000, President Chirac reviewed the unilateral reductions in France's nuclear posture in the course of reaffirming long-standing principles of French nuclear deterrence policy:

> The place of our nuclear deterrent is simple and central. Our nuclear forces, reduced to a level of strict sufficiency, are the ultimate guarantee of the survival of our nation. They threaten no one, but they assure whoever might wish to attack our vital interests that he would in return suffer unacceptable losses, out of proportion with the stakes of a conflict. France must therefore have reliable and safe nuclear weapons. This objective necessitated the conduct of six tests in 1995 and 1996 which provided us with the scientific and technical data that we lacked before committing ourselves definitively to the path of simulation. We have reduced the size of our nuclear forces by withdrawing from service, in particular, [the intermediate-range ballistic missiles on] the plateau d'Albion and the [shorter-range] Hadès missiles. France has signed and ratified the comprehensive test ban treaty, and has dismantled its test center. France has stopped producing fissile materials and has undertaken the dismantling of its production facilities. And we invite our partners to follow this example. But no one should make any mistake about it. As long as risks persist and we have not achieved a general and verified disarmament, which does not concern nuclear weapons alone, France will retain the capability to protect itself from any threat to its vital interests, which might come notably from countries armed with weapons of mass destruction. To deal with the diversity of situations with which we might be confronted in the course of the coming decades, France must have a credible and properly designed nuclear arsenal, offering a maximum of flexibility.[5]

Chirac's reference to "a maximum of flexibility" raises the question of operational employment concepts. Owing in part to France's relatively modest capabilities (in relation to those of the

Soviet Union or Russia) for extended nuclear operations — in terms of numbers of weapons, delivery accuracy, and survivable command and control — the French have historically been reluctant to endorse operational concepts that might be seen as "licensing" limited nuclear strikes. French discussions of nuclear operations during the Cold War usually emphasized a "single salvo" of warning to an aggressor, to be delivered by shorter-range nuclear systems, prior to the unleashing of France's full strategic nuclear arsenal against the enemy's population centers, economic assets, and administrative control system.

However, as suggested earlier, in post-Cold War conditions the French have increasingly emphasized the utility of nuclear deterrence threats against WMD-armed regional powers; and these threats imply a willingness to conduct limited nuclear operations. At the same time, the French have refined capabilities and nuclear employment concepts inherited from the Cold War and intended to counter any major-power threats that may emerge. This shift in policy is examined below: a brief overview of the policies in the period from the late 1970s to the end of the Cold War in 1989-1991 sets the scene for the post-Cold War preoccupation with devising policies capable of deterring regional powers equipped with WMD.

Operational Employment Concepts during the Cold War

From 1964 to 1971, France's sole means of delivering nuclear weapons to the Soviet Union consisted of Mirage IV bombers, each armed with a single sixty-kiloton bomb. With these capabilities, the French concluded, they had little choice but to aim at Soviet population centers as a deterrent. President Charles de Gaulle argued in 1964 that the disproportion in destructive capabilities between Paris and Moscow was irrelevant: "[O]nce reaching a certain nuclear capability and as far as one's own direct defense is concerned, the *proportion* of respective means no longer has absolute value. In fact, since a man and a country can die but once, deterrence exists as soon as one can mortally wound the potential aggressor and is fully resolved to do so, and he is well convinced of it."[6]

French proportional deterrence theory, or the "deterrence by the weak of the strong" (*la dissuasion du faible au fort*),[7] holds that France could deter a much stronger power, such as the Soviet Union

or Russia, through the "equalizing power of the atom" (*le pouvoir égalisateur de l'atome*). The argument is that France could deter a stronger power because the damage France could cause would exceed what the aggressor would stand to gain in conquering or destroying France.

As late as the 1970s and early 1980s, this was often defined in mainly demographic terms. In 1980, in a rare use of the American term "assured destruction," Prime Minister Raymond Barre referred to France's ability to cause an aggressor "the assured destruction of a notable part of his cities and of his economy."[8] In 1981 Prime Minister Pierre Mauroy said that France's anti-cities strategy aimed "to be able to inflict on the aggressor . . . damage judged superior to the stake that the vital interests of the country represent for him."[9] General Jeannou Lacaze, then Chief of Staff of the Armed Forces, specified that the adversary would suffer "damage 'judged superior' to the demographic and economic potential that we represent," and that deterrence is "a matter of persuading him that such an action would present unacceptable risks because of the losses in human lives that he could suffer."[10]

It was nonetheless around 1980 that French declaratory policy began to place greater emphasis on threatening to destroy the infrastructure of the Soviet economy and administration than on targeting the population.[11] Expositions of official policy that year suggested that the shift was motivated by the prospective deployment of multiple-warhead M-4 SLBMs as well as a determination to respond to Soviet civil defense programs:

> The neutralization of the adversary [state's] administrative, economic, and social structures, the destruction of the framework of life and activity of millions of persons constitute damage that would be difficult to accept, even if a part of the population concerned by these destructions escapes immediate death. Let us imagine, for example, the situation of the USSR with 100 or 150 of its largest cities destroyed, some tens of millions of people killed, and as many persons displaced who must be taken in charge by a state emptied of its substance.[12]

> The response is undoubtedly to be sought in the multiplication of targets and selectivity, the aim being to reduce to nothing the structures and the "vital works" [*oeuvres vives*] of the adversary state, even if part of the population of the objectives targeted

> escapes destruction. Thus one differentiates between an "anti-cities" strategy and a strictly "anti-demographic" strategy. This strategy will without doubt lead to obtaining an important number of medium-yield warheads, preferred over megaton yields. In this respect the M-4 program constitutes a remarkable increase in the value of our nuclear armament.[13]

This decision to respond to Soviet civil defense programs by targeting the infrastructure of Soviet administrative control as well as industrial and economic assets was referred to as "an enlarged anti-cities strategy,"[14] and described as "a concept of the same strategic nature but more complete and, therefore, more operational and credible."[15] Valéry Giscard d'Estaing, President from 1974 to 1981, reported in his memoirs that he had approved "as the objective for our strategic strike 'the destruction of 40% of the economic capabilities of the Soviet Union on this side of the Urals, and the disorganization of the country's leadership apparatus.' To be sure of obtaining this result, we had to be able to reach the totality of Moscow's industrial region, including its extensions to the east."[16] In 1981 Defense Minister Charles Hernu said, however, that the force modernization decisions in prospect did "not imply any change in our anti-cities strategy, corollary of deterrence by the weak of the strong."[17]

Furthermore, French officials rejected concepts of counterforce strikes in any conflict with a major power like the Soviet Union. As Prime Minister Barre put it, "For our country, the problem of choosing between an anti-forces strategy and an anti-cities strategy does not arise."[18] As an exposition of the official strategy noted, only an anti-cities strategy conformed to France's means:

> We aim at the adversary's cities because these targets are easy to reach, without great accuracy in the missiles required, and especially because one can thus cause important damage with a limited number of weapons. . . . It is only in the framework of an anti-cities strategy that the desirable level of damage can be guaranteed with the means that remain in proportion to the scientific, industrial, and economic possibilities of France. Any other strategy would necessitate much more important means, without doubt beyond our reach, and could not but weaken deterrence.[19]

In short, beyond France's lack of means for a counterforce strategy, it was argued that an anti-cities posture would maximize the probability of successful deterrence. French officials reasoned that implying that France would not respond as massively as possible could undermine the deterrent and invite Soviet aggression. General Guy Méry, the Chief of Staff of the Armed Forces, condemned as "totally stupid" any suggestion of limited, initial counterforce strikes against the USSR by France: "even if we had sufficiently accurate weapons, we would destroy only a truly minor part of his entire order of battle, and we would then be assured of his immediate retaliation."[20] In other words, as another French official noted, the "equalizing power of the atom no longer applies in counterforce actions."[21]

In an actual crisis, it was envisaged that France would undertake a "deterrent maneuver" intended to reach a political resolution short of war. From this perspective, France's nuclear employment planning during the Cold War (like NATO's) was "more oriented toward the political management of crises than toward military effectiveness."[22] To achieve these political results, France would rely on capabilities complementing its strategic nuclear forces aimed at Soviet cities. In 1981 Defense Minister Robert Galley said that "This strategy relies in the first place on strategic nuclear forces capable of inflicting unacceptable damage [*des dommages insupportables*] on any possible aggressor in the very heart of his territory. It also relies on tactical nuclear forces and conventional forces which, by allowing France not to find itself driven into an 'all or nothing' situation, enhance the deterrent impact of the strategic nuclear forces."[23] Without such capabilities, Prime Minister Mauroy indicated in 1982, France could be driven to "either premature use or non-use of our strategic armament."[24]

France's "tactical nuclear" capabilities provoked extensive doctrinal and political discussions in France and NATO, particularly vis à vis the Federal Republic of Germany and the United States during the Cold War.[25] Various concepts of tactical nuclear employment — including battlefield use, "testing" enemy intentions, signaling resolve, and warning the enemy of France's readiness to employ its strategic arsenal — coexisted and competed until the late 1970s. It was in this context that President Valéry Giscard d'Estaing declared in 1976 that such weapons were "not only an instrument

of deterrence, but also an instrument of battle."[26] After the debate in the late 1970s the predominant view of French political-military authorities was that such weapons were "not a 'super-artillery,' for we refuse nuclear battle," in the words of Defense Minister Hernu in 1982.[27] Indeed, the French added the term *non-bataille* (non-battle) to their strategic lexicon, a corollary of the term *non-emploi* (non-use). As on the strategic nuclear level, France's means were too limited to contemplate combat with tactical nuclear arms. Concepts for large numbers of tactical nuclear weapons for battlefield use were rejected as likely to lead to undermining deterrence, a loss of political control of the escalation process, and a battle in which the superiority of Soviet numbers would give the enemy victory.

In an effort to clarify the role of France's non-strategic nuclear weapons, Hernu in October 1984 directed that the term *armements pré-stratégiques* (pre-strategic weapons) replace the expression *armes nucléaires tactiques* (tactical nuclear weapons).[28] The intention was to make clear that any use of these weapons would constitute a threat of almost immediate escalation to strategic nuclear strikes. Although the term "pre-strategic" remained in use until the early 1990s, it fell into official disfavor in the late 1980s. In 1987 President François Mitterrand reportedly said, "I do not believe at all in the utility of pre-strategic weapons. To tell the truth, they should rather be called post-strategic weapons, because their use would necessarily signify that the Russians were already in Germany and one would find oneself beyond the moment when strategic deterrence should have worked."[29]

While Mitterrand nonetheless continued to use the term "pre-strategic," he increasingly favored the term *arme d'ultime avertissement* (weapon of final warning). In 1988, Mitterrand said that France's "final and unique warning" strike would be delivered solely against "strictly military targets."[30] During the late 1980s and early 1990s Mitterrand and other officials became more consistent in avoiding the term "prestrategic" and instead employing the term "final warning." In September 1991, for example, Mitterrand said, "the targets of what is called the 'final warning' are military targets."[31]

Jacques Chirac, who served as Prime Minister under Mitterrand in 1986-1988, said in 1988 that the "warning" strike "must be precise, effective and limited, because we refuse to enter into a cycle of repeated nuclear exchanges which would be the negation of deterrence. It

must also be able to be carried out as far as possible in the depth of the adversary's deployment."[32] Chirac specifically referred to the possibility of using highly accurate S-4 IRBMs (then scheduled to replace the S-3 IRBMs after 1996) to perform the "function of final warning against the 'sanctuary' of a potential aggressor."[33] President Mitterrand also evoked the potential limited use of "strategic" systems for the "pre-strategic" purpose of "ultimate warning" in the late 1980s.[34]

The preoccupation with the forces capable of strategic attacks was understandable, because the capability to hold Soviet assets at risk — the USSR's population centers, economic and industrial facilities, and administrative control mechanisms — was considered the bedrock basis of security through deterrence. France's interest in keeping Soviet and (after 1991) Russian cities vulnerable to French SLBMs was apparent in (a) France's support for the ABM Treaty until the U.S. withdrawal took effect in June 2002 and (b) French investments in multiple warheads, penetration aids, and other measures intended to defeat ballistic missile defenses.[35]

Adjustments in Declaratory Strategy Since the End of the Cold War

As Bruno Tertrais of the Fondation pour la Recherche Stratégique pointed out in 2000, "Since the mid-1970s, the foundations of French nuclear doctrine have remained unchanged in the speeches and public remarks of the political authorities."[36] Certain rationales for maintaining France's nuclear arsenal have been consistently restated: preventing war, maintaining national independence and decision-making autonomy, protecting the nation's vital interests, and making an indirect contribution to the security of France's allies by complicating the decision-making calculus of adversaries.

While these fundamental rationales have remained constant over the past quarter-century, some noteworthy adjustments have been made since the end of the Cold War in 1989-1991.

As suggested above, the distinctions between aircraft and missiles with "strategic" or "pre-strategic" or "final warning" missions became increasingly vague in the late 1980s and early 1990s. Since September 1991, all the nuclear-capable means in France's air force (including the ASMP missiles on Mirage 2000Ns previously described as equipped with "prestrategic" weapons) have been under the

command of the Forces Aériennes Stratégiques. Since the early 1990s the terms "prestrategic" and "final warning" have disappeared from official discourse; and the French have accordingly considered all their nuclear weapons strategic.[37] The government has nonetheless retained the idea that France could employ signaling options short of an all-out strategic nuclear attack. For example, in 1997 an Armed Forces Staff document noted that, "If the adversary was not convinced of France's determination and went ahead, the President of the Republic, who alone can order the commitment of the nuclear forces, could signal to him without ambiguity at that time that he considers the vital interests of our country at stake, thus recalling his determination to safeguard them."[38]

During the Cold War, following the statements in 1967-1968 by President de Gaulle and General Charles Ailleret, then the Chief of Staff of the Armed Forces, the French declared at times that their nuclear deterrent had an "all points of the compass" (*tous azimuts*) orientation. No references to the Soviet Union or the Warsaw Pact as the potential adversary appeared in the multi-year military program-laws while de Gaulle was President (1958-1969), and the explicit references to the Warsaw Pact and the Soviet Union as potential adversaries in the military program-laws in 1976 and 1983 were considered exceptional and newsworthy. The more typical wording during the Cold War was to refer simply to "the adversary" and to discuss the situation of a "medium power" (France) deterring a "great power" (the Soviet Union).

In 1990, when the Cold War was coming to an end, the French Ministry of Defense employed the Gaullist approach of declining to identify Moscow or any other foreign capital as a "designated enemy" of France. "The French nuclear deterrent is not directed against anyone in particular. France has no designated enemy. Our deterrent is at the service of our independence."[39] In 1992, Pierre Joxe, then Minister of Defense, said that the *tous azimuts* concept "today finds its full meaning after the fading away of the potential Soviet adversary."[40] As some French experts have pointed out, rather than saying that France's deterrent is aimed at "all azimuths," it would be more accurate to say that it is currently directed at "no azimuth in particular."

In September 1997, President Jacques Chirac announced that, given the dismantlement of the IRBMs on the Plateau d'Albion, "none of the

nuclear means of the French deterrent force is henceforth targeted."[41] This brought French declaratory policy into line with that adopted by Britain, Russia, and the United States in 1994. This implied no change in the fundamental rationales for France's nuclear deterrent noted above, however.

Since the end of the Cold War, it has become apparent that the French discern two categories of threats to be deterred with their nuclear forces: a possible reappearance of a major-power threat, even one such as the USSR once constituted, and regional powers armed with weapons of mass destruction. According to the July 1992 draft military program-law for 1992-1994, "It is today difficult to discern clearly the types of threats that we might have to face — a return of the previous threat, [or] the emergence of new threats for which an anti-cities strategy would not necessarily be appropriate. It is therefore necessary, while remaining faithful to the concept of strict sufficiency, to seek means to respond to a broader range of scenarios than in the past and therefore to think about a new structure for our nuclear forces."[42]

The February 1994 defense white paper raised the possibility that in the next twenty years, a new threat of major aggression against Western Europe could emerge "from a state or coalition of states with large nuclear and conventional forces." If such a threat emerged, its military capabilities would include "means for selective or massive nuclear strikes, high-technology conventional forces, and means of internal subversion." France must therefore maintain nuclear and C3I capabilities suitable for dealing with "the possibility of the re-appearance of a large threat comparable to that which the Soviet Union represented."[43] Such a major-power threat in Europe could not have come from a country other than Russia, so the discussion of the potential "resurgence of a major threat to Western Europe" in the 1994 white paper was among the last implicit public references to a specific country as a target of French nuclear deterrence capabilities.[44]

The major-power threat is in abeyance in the foreseeable future, but its potential reemergence has been repeatedly recalled in conjunction with the more immediate threat posed by regional powers armed with weapons of mass destruction (WMD). This significant shift in emphasis since the end of the Cold War has been evident in remarks on the utility of France's nuclear arsenal in deterring WMD use. As Chirac put it in February 1996,

> Nuclear deterrence remains the fundamental element of our strategy. Certainly, it no longer constitutes, as in the past, the expression of a defense organized essentially to meet a permanent and identified threat, but it remains the ultimate guarantee against any threat to our vital interests, whatever might be the origin and form [of the threat]. . . . *the clearly identified, massive, and permanent nuclear threat that prevailed during the period of the East-West confrontation has gone away*, but during the same period other types of dangers capable of threatening our vital interests have appeared. *Uncertainty persists about the balances that will be established in eastern Europe and therefore about the risks for our own security. On other continents there already exist weapons of mass destruction, nuclear or of other kinds, and it cannot be excluded that they might someday also affect our vital interests. In these conditions, nuclear deterrence remains a fully imperious necessity*. It alone can avert the worst scenario. It is still today a determining factor of peace in Europe and for Europe.[45]

Chirac's statement combined the persistent "uncertainty . . . about the balances that will be established in eastern Europe" (presumably a reference to Russia and possibly additional post-Soviet states) with the weapons of mass destruction already present "on other continents" in the arsenals of regional powers. The military program-law for 1997-2002, adopted by the French legislature in July 1996, used almost the same terms in explaining the importance of nuclear deterrence for France:

> France's very survival is no longer threatened by the presence, in the immediate proximity of our frontiers, of considerable nuclear, air-ground, and chemical forces. But the threat, for long years yet, of thousands of nuclear weapons in the arsenals inherited from the Cold War, and the appearance of other types of dangers capable of threatening our vital interests, notably the development on other continents of weapons of mass destruction, mean that nuclear deterrence remains a fully imperious necessity. It must be capable of being adapted with flexibility to the uncertainty that surrounds the nature of the future threats and risks.[46]

Prime Minister Lionel Jospin also referred to both categories of threats in September 1997:

> To deal with proliferation hazards that might get out of hand and with the risk of a resurgence of a major threat, France has

> maintained a credible deterrent force but at a level of strict sufficiency, inferior to that during the cold war. Moreover, in a world still dominated by the play of power relationships, its nuclear status is one of the elements that allows France to maintain its freedom of action and assessment on the international scene.[47]

Jospin's vague allusion to "the risk of a resurgence of a major threat" was consistent with a trend since the late 1990s to note that a "major power" threat to France could take forms other than Russia's reconstitution of capabilities approximating those of the Soviet Union. French observers have noted, for instance, that China's developing arsenal might threaten France in some circumstances. However, of these two categories, the WMD proliferants — the regional powers equipped with nuclear, chemical, and/or biological arms — present the more immediate and novel challenges for French nuclear deterrence strategy.

Challenges in Deterring WMD Proliferants

Prior to the 1990s France's public discourse gave little attention to possible threats arising from regional powers armed with weapons of mass destruction. Despite some official references in 1977 to possible use of what the French then called "tactical nuclear weapons" in situations outside Europe,[48] concern promptly arose regarding the potential "devaluation" of nuclear threats through such concepts:

> Do we have the right, in order to support distant actions which would not put our vital interests into question, to envisage recourse to the atom, at the risk of desacralizing it, creating a customary phenomenon? Is it not necessary to reserve nuclear weapons to the immediate defense of our territory?[49]

This concern evidently led the French to emphasize that the "tactical nuclear weapons" deliverable by carrier-based aircraft had the "same vocation" as France's other tactical nuclear forces — that is, possible employment in deterrence maneuver actions intended to protect the national homeland.[50]

President François Mitterrand was therefore upholding a long-standing policy when, during the 1990-1991 Gulf War, he ruled out any nuclear retaliation for Iraqi use of chemical or biological weapons:

> We must not use chemical weapons. We have conventional means that will permit us to defend ourselves and to make law triumph, but we must not succumb to this will to reply on the same level. . . I exclude it. Neither chemical, nor bacteriological, nor nuclear arms. . .To use arms of these types would be a retreat towards barbarism that I refuse.[51]

In explaining Mitterrand's policy, Foreign Minister Roland Dumas emphasized a distinction between deterrence for the protection of the homeland — the "hexagon," as the French call it — and the security of forces projected overseas.[52]

> In contrast with chemical weapons, nuclear weapons cannot be battlefield weapons, and cannot be used except as the ultimate recourse when the national territory is threatened. We are not in this hypothesis. The Gulf war is taking place in a theatre distant from the hexagon [that is, France]. The national patrimony is not directly threatened. The risk of world war, as the President of the Republic has said, does not exist. Therefore, to use the nuclear weapon now, and in this context, would constitute a sort of repudiation of ourselves, of our doctrine, and therefore a political and strategic error.[53]

The Mitterrand decision was sharply criticized at the time by some center-right political leaders — including Jacques Chirac — as likely to undermine nuclear deterrence. Since he became President in May 1995, Chirac has differentiated his approach to deterrence from that of Mitterrand in several ways. For one thing, the distinctions Mitterrand made about the circumstances in which nuclear deterrence might apply have been blurred. In August 1995, for example, Chirac made this simple statement:

> Responsible before the nation for the future and the security of our country, it is my duty to remind the French that only the [nuclear] deterrent force guarantees France against the possible use of weapons of mass destruction, of whatever type they may be. The notion of deterrence in the face of threats from wherever they may come retains — and will retain for a long time to come — all its meaning.[54]

Similarly, Admiral Jacques Lanxade, then the Chief of Staff of the Armed Forces, in June 1995 also underscored the broad relevance of France's nuclear deterrence posture:

> We will henceforth have to take two new considerations into account: on the one hand, [nuclear] deterrence will have to apply in much more varied and complex situations than in the past; on the other hand, conventional forces, called upon much more than in the past, will have to play a strategic role in their own right. The role of our nuclear weapons will nonetheless remain unchanged: that is, they will continue to exert the threat of unacceptable damage against any aggressor that might threaten our vital interests, whatever might be the circumstances, the form, and the origin of the threat.[55]

The current outlook seems to be that vague nuclear threats may help to deter regional powers from using WMD, not only against "the hexagon" of France but also against the nation's armed forces overseas. The threats remain imprecise because there is some concern that excessively explicit or specific threats could help to provoke WMD proliferation. This concern applies both to declaratory doctrine and to the weapons procured. For an example of the linkage between the doctrine for deterrence and the policy intended to advance non-proliferation goals, one might consider the statement by Alain Juppé, then Prime Minister, in September 1995:

> Our nuclear doctrine must be concerned with being compatible with the objective of non-proliferation. That is why it seems right to me to underline once again that France has ruled out the development of miniaturized weapons for employment, which would furnish a pretext for clandestine nuclear programs.[56]

The French have nonetheless consistently affirmed that they retain the right to employ nuclear weapons to defend their vital interests. For example, in April 1995, Alain Juppé, then the Foreign Minister, articulated France's negative security assurances in the context of the nuclear Non-Proliferation Treaty (NPT).

> France reaffirms that it will not use nuclear weapons against non-nuclear-weapon states party to the NPT, except in the case of an invasion or any other attack conducted or supported by such a state, in alliance or in association with a nuclear-weapon state, against it, its territory, its armed forces or other troops, or against its allies or a state with which it has a security commitment. The

> new formulation of our assurances is. . . circumscribed since it refers only to states party to the NPT, which is consistent with our will to favor the universality and indefinite extension of this treaty.

Juppé proceeded to add the following reservations:

> . . . security assurances are compatible with our strategy of deterrence for three reasons. The first is that our strategy of deterrence has a strictly defensive character: France rejects the threat or use of nuclear weapons for aggressive purposes; our nuclear strategy is a strategy of non-war, based on nuclear capabilities limited to the strictly necessary level. . . . Secondly, our declarations regarding security assurances naturally do not affect in any way our inalienable right to self-defense as defined by article 51 of the United Nations Charter. . . . Finally. . . the French deterrent's purpose is the protection of our vital interests, whose definition is up to the President of the Republic. It is obvious that our deterrent covers any challenge to our vital interests, whatever the means and origin of the threat, including of course that of weapons of mass destruction produced and used despite the international prohibitions that concern them. No one can doubt. . . our will and our capability to inflict unacceptable damage on an adversary in such circumstances.[57]

In other words, if the French President decided that an adversary armed with chemical or biological weapons — or anything else, for that matter — had threatened France's vital interests, the negative security assurances would not apply.

The French have, however, exercised some caution in articulating threats of nuclear retaliation against WMD-armed regional powers, apparently for at least two reasons. First, explicit nuclear threats could encourage and/or "legitimize" nuclear proliferation in some cases. The French theory of deterrence by the weak of the strong (*la dissuasion du faible au fort*) has already provided an example and strategic rationale of interest to certain proliferant states. In relation to some proliferants France may be the power targeted by "the weak." Second, making such nuclear threats explicitly, to say nothing of carrying them out, could erode the legitimacy of nuclear deterrence in Western societies for the primary function of war-prevention.[58]

Some French observers have advanced a third rationale for restraint in making and carrying out nuclear threats. Conducting such strikes

would break the "nuclear taboo" and might undermine France's general position that nuclear weapons support a strategy of "non-war" (*non-guerre*) and that they should not be used operationally. By this logic, it would be preferable and more prudent to maintain the equation that nuclear deterrence means non-use (*non-emploi*). In addition to perhaps demonstrating that nuclear weapons have political-military utility, the results of actual use might also convey the impression that the effects of nuclear weapons use are "manageable" or "sustainable." If governments concluded that the consequences of nuclear weapons use are sustainable, at least in some circumstances, with genuine political-military utility, they might increasingly regard nuclear arms as suitable for operational employment. This might in turn promote the further proliferation of nuclear weapons, and raise the probability of actual use in subsequent conflicts. Various French observers have for years argued that it is imperative for these reasons to uphold and maintain the nuclear taboo as long as possible. Retired Admiral Marcel Duval, for example, wrote in 1995 that it is proper

> to prepare for the eventuality of a conflict with an adversary armed with primitive nuclear weapons, with regard to whom the deterrent — that is, the threat of massive nuclear retaliation — would be inappropriate, psychologically ineffective, or morally inadmissible. It is prudent to conceive of other strategies, weapons systems, and means of protection for these eventualities. Emerging technologies, without recourse to nuclear weapons, might enable us to respond to these eventualities, because it is imperative in our view to preserve the 'taboo' against using nuclear weapons which is the basis of their peace-preserving effect. . . The banalization of nuclear weapons would not fail to lead to their use and then to the end of their peace-preserving effect.[59]

These arguments remain potent in French analyses in some circles, yet the French government evidently discerned a need in the late 1990s to prepare a new statement of nuclear strategy. President Jacques Chirac's June 2001 speech deserves careful reading for its strategic implications and for what it reveals about the enduring French emphasis on non-use (*non-emploi*).

Chirac's June 2001 Articulation of France's Current Strategy

While some recent adjustments in British deterrence policy have evidently derived in part from reactions to the terrorist attacks against the United States on 11 September 2001, the French have made few modifications in the declaratory policy announced in June 2001, three months before those attacks. In his speech of 8 June 2001 President Jacques Chirac revealed the results of decisions made over a period of almost three years in a series of around ten secret meetings involving members of the Conseil de Défense, including the President and the Prime Minister.[60] According to Chirac,

> Deterrence must also enable us to deal with the threats to our vital interests that regional powers armed with weapons of mass destruction could pose. I mentioned a short while ago the development by certain states of ballistic missile capabilities that could one day give them the means to threaten European territory with nuclear, biological, or chemical weapons. If they had hostile intentions toward us, the leaders of these states must know that they would expose themselves to damage that would be absolutely unacceptable for them. *In this case, the choice would not be between the total annihilation of a country and doing nothing. The damage to which a possible aggressor would be exposed would be directed above all against his political, economic, and military power centers*. Naturally, nuclear weapons are essentially different, and people understand this. I assure you that France, while faithful to its concept of non-use, has and will retain the means to maintain the credibility of its [nuclear] deterrent in the face of all the new threats. . . Our nuclear capability relies on two types of means with different and complementary technical characteristics: ballistic missiles equipping the oceanic component, carried on submarines, and air-launched missiles for the airborne component. The renovation and modernization of these forces, as well as the advancement of the simulation program, designed to compensate for the abandonment of nuclear tests for the maintenance of our capabilities, constitute the principal objectives of the next military program-law in this domain. These means have been defined, in their quantity and characteristics, at a level of strict sufficiency determined as a function of the political and strategic context. In the application of this principle, France has always taken care to define the lowest level of capability possible that is, of course, consistent and compatible with its security. While restricted to a level of strict sufficiency, our nuclear deterrent is therefore,

> more than ever, at the heart of our country's security. In France's geographic and political situation, it is the best guarantee against the threats born of proliferation, whatever the delivery system.[61]

Chirac's speech made clear an evolution in policy that had been underway for years. During the Cold War, as noted earlier, the French referred repeatedly to "deterrence by the weak of the strong" (*la dissuasion du faible au fort*) — that is, France's ability to deter the Soviet Union by posing a threat of unacceptable damage, despite the asymmetry in French and Soviet capabilities. In post-Cold War circumstances, as was noted in the 1994 defense white paper, France's nuclear deterrent could also be expected to prevent aggression against the country's vital interests by WMD proliferants — powers in relation to which France was not the "weak" party. However, some French policy statements implied that the retaliatory threat could be of the same nature as that which had been directed during the Cold War against the Soviet Union — strikes against cities (*des frappes anti-cités*). This impression prevailed despite the abandonment of the term "anti-cities" and the use in the 1994 defense white paper of the term "unacceptable damage" (*des dommages inacceptables*).[62] It is noteworthy that President Mitterrand, as late as May 1994, said that France was capable of destroying "the vital forces" (*les forces vives*) of a superpower, an expression reminiscent of the Cold War "vital works" (*les oeuvres vives*) requirement.[63]

Chirac's June 2001 speech revealed, as a French journalist put it, the government's decision to acquire "more accurate, less powerful, and longer-range [nuclear] weapons, in order, as the President of the Republic explains, to reach 'above all the political, economic, and military power centers of a possible aggressor.' To be capable, for example, of destroying Saddam's bunker without completely destroying Baghdad."[64] In other words, experts in Paris have observed, the objection that some commentators have advanced — that "political, economic, and military power centers" are in fact cities — is ill-founded, because the French are seeking nuclear means with greater accuracy and more limited and controllable effects.

The journalist's formulation should nonetheless be qualified in some respects. To begin with, the French evidently intend to acquire a wider range of options, and not simply lower yield or "less powerful" weapons capable of being delivered with greater precision, because

some targets (including targets not located in cities) might call for higher yield weapons and greater precision while others might also require greater ranges. The clear move away from the "anti-cities" strategy, historically based on the "deterrence by the weak of the strong" concept, to the acquisition of a wider range of options, including more precise and more discriminate strike capabilities, explains why Chirac said that "the choice would not be between the total annihilation of a country and doing nothing."[65] Moreover, the journalist's reference to a weapon suitable for attacking a bunker in Baghdad is probably not a reliable indication of French procurement or targeting priorities, for several reasons, including (a) the doctrinal shift away from an "anti-cities" strategy; (b) the interest in such a contingency in avoiding collateral damage, such as the radioactive contamination of a city; and (c) the emphasis on targeting an enemy regime's instruments of power, not its leaders. By this logic, the French would be more likely to target assets distant from cities, such as military installations or oil extraction or refining facilities, than cities or leadership command bunkers. At the same time, French observers note, the enemy regime's leaders could well be included in targeting directed against political "power centers."[66]

According to an analysis by Bruno Tertrais, a former Ministry of Defense official,

> It is a question in this regard of adapting the deterrent threat to the stakes of the conflict, which would not be our national survival in dealing with a regional power. It is therefore no longer possible to sum up the French concept with the idea of an anti-cities deterrence, an expression which moreover had long ago disappeared from our public language. . . . While conventional forces contributed, in the Cold War scenario, to avoiding the 'circumvention' of deterrence, henceforth the reverse may be true: in external operations, in regional crises, nuclear deterrence will guarantee the freedom of action of the political authorities by enabling France to avoid being subjected to blackmail placing its vital interests at risk.[67]

Chirac's speech also included an adjustment in French policy on ballistic missile defense. Chirac announced that he had directed French authorities to study "the possibility of equipping our forces, within a period corresponding to the emergence of new ballistic

missile threats, with a defense capability against theater missiles."[68] According to French observers, in supporting missile defenses for deployed forces overseas, Chirac was deliberately vague as to whether these forces would also be protected by the nuclear deterrent as part of France's "vital interests." Despite the reference in Chirac's speech to "European territory" as the possible target of WMD proliferants that could provoke France's nuclear retaliation, France's military forces deployed outside Europe could also be covered among the country's "vital interests," because the definition of these interests depends on the President.[69] It should nonetheless be noted, as Thérèse Delpech has pointed out, that missile defense protection for forces deployed overseas will be "increasingly necessary" since the legitimacy of relying on nuclear deterrence alone for this purpose will "be contested because vital interests will not be clearly at stake."[70]

In June 2001 the French government continued to hold, in Chirac's words, that pursuing strategic missile defenses outside ABM Treaty constraints "would open the way to new uncontrolled competitions."[71] Instead of seeking strategic missile defenses for the protection of the homeland to gain freedom of action against WMD proliferants in regional conflicts, the French emphasized a redefined and more precise nuclear retaliatory threat as the source of their freedom of action. Some French observers even reaffirmed the traditional French doctrine that missile defenses for the protection of national territory and population would be unaffordable and would tend to weaken the credibility of retaliatory deterrence, in that such defenses would imply that threats of nuclear retaliation might fail to deter.

In mid-2002, however, U.S. withdrawal from the ABM Treaty took effect without leading to any U.S.-Russian confrontation or "new uncontrolled competitions," to use Chirac's phrase. Indeed, in the May 2002 Moscow Treaty Russia and the United States agreed on extensive reductions in their operationally deployed strategic nuclear warheads. Moreover, Washington and Moscow (and NATO and Russia) agreed in the same month to initiate (or carry forward) a wide array of collaborative activities, including dialogue and cooperation on missile defense. At the same time, missile proliferation trends have underscored the potential utility of missile defenses for the protection of national homelands. These circumstances may have contributed to France's support for NATO's November 2002 decision

to conduct "a new NATO Missile Defence feasibility study to examine options for protecting Alliance territory, forces and population centres against the full range of missile threats."[72] In French expert circles, however, some skepticism persists about strategic missile defenses, owing in part to their cost and uncertainties about their operational effectiveness, and a conviction that the probability of a failure of nuclear deterrence is quite low. In June 2003, General Henri Bentégeat said, "The only true response to an emerging nuclear threat from 'rogue' states is the nuclear deterrent, for the simple reason that nobody can count on an anti-missile defence system — which is just as costly to build as a nuclear arsenal — being 100% effective."[73]

While the greatest innovation in French nuclear deterrence strategy concerns dealing with WMD proliferants in regional crises, the original focus of the strategy remains — protecting the country against a major military power. In his June 2001 speech, President Chirac said,

> Our [nuclear] deterrent guarantees, in the first place, that France's survival will never be placed into question by a major military power with hostile intentions and ready to employ all means to give them concrete expression. As long as considerable arsenals still exist or are being developed in diverse parts of the world, this guarantee remains fundamental for us.[74]

Authoritative French observers have indicated that the phrase "a major military power with hostile intentions and ready to employ all means to give them concrete expression" could apply to Russia, China, India, or other states, depending on the circumstances.[75] Some French observers have said that Prime Minister Lionel Jospin's October 1999 reference to "distant" threats as also covered by France's nuclear deterrent was in fact an allusion to such remote contingencies:

> The strategic situation's rapid evolution, the pursuit by certain powers of significant efforts in the nuclear domain, and the proliferation of weapons of mass destruction, notably ballistic missiles, justify France's continuing to maintain a range of modern deterrent weapons. . . . The nuclear weapon is the basis of an essentially deterrent strategy. This strategy is guided by the strictly defensive conception of our policy. It guarantees that the survival of our country will not be placed into question by

> a hostile power. It allows us to deal with the risks linked to the existence of weapons of mass destruction and ballistic delivery systems, while preserving our freedom of action in the face of a threat to our vital interests. It contributes in this way to Europe's security. In the current strategic situation, which is fluid, with many constrasts, and marked by the appearance of new risks, *nuclear deterrence is based on autonomous capabilities that enable us to oppose the materialization of a threat to our vital interests, whatever might be its origin – even if it is distant – its nature or its form. We will therefore see to the modernization and adaptation of a nuclear arsenal which, while remaining limited in volume, in conformity with the principles of strict sufficiency that we uphold, must henceforth take into consideration the weapons of mass destruction and ballistic missiles that certain powers are acquiring.*[76]

Some observers have related this intention to hedge against "distant" and "major" threats to the acquisition of the M51 SLBM, with its range of over 8,000 km.

Despite various indications that France's nuclear deterrent posture will remain strictly under national control and dedicated to guaranteeing the country's security, President Chirac in June 2001 repeated long-standing French convictions that France's nuclear forces also contribute to the security of NATO and the European Union:

> Finally, it is France's wish that our nuclear deterrent also contribute to Europe's security. It thus participates in the overall deterrent that can be exerted by the democracies joined together by the treaty of collective security concluded, over fifty years ago, by Europe, the United States, and Canada. In any case, it is up to the President of the [French] Republic to assess the harm that might be done to our vital interests in a given situation. This assessment would naturally take into account the growing solidarity of the countries of the European Union.[77]

President Chirac then recalled, without using the previous French "pre-strategic" or "final warning" formulas, France's long-standing policy of being prepared to use nuclear weapons to signal France's resolute willingness to defend its vital interests:

> I wish finally to remind you that our concept of [nuclear] deterrence, founded on the principle of oneness, does not exclude the capability of showing a possible adversary, when necessary,

> that our vital interests are at stake and that we are determined to safeguard them.[78]

The French word *unicité* is translated here with the word "oneness," although it is often rendered as "uniqueness," because the word also carries the connotations of "oneness," "wholeness," or "all of a single piece." In other words, France's nuclear deterrence posture constitutes a whole at one with the nation's vital interests: any threat to France's vital interests could oblige Paris to use its "capability of showing a possible adversary . . . that our vital interests are at stake." Paris could thus choose to employ nuclear means, presumably in a fashion short of comprehensive strategic nuclear strikes, to communicate its determination to "safeguard" those interests.

In short, Chirac announced "the modernization and adaptation" of the nuclear arsenal to be able to strike a regional adversary's "political, economic, and military power centers" in a comparatively discriminate fashion. While some critics have argued that such targets sound like cities, French officials clearly view the new policy as a step toward limited and controllable nuclear employment options that may reinforce deterrence by informing adversaries that France has usable options between "all or nothing." However, it is noteworthy that Chirac reaffirmed in the same speech that France will remain "faithful to its concept of non-use," an expression of confidence in the effectiveness and reliability of France's nuclear deterrence posture and a confirmation of France's rejection of nuclear "war-fighting" concepts.

In November 2002, the Chief of Staff of the Armed Forces, General Henri Bentégeat, who served as President Chirac's military adviser during the formulation of the new articulation of nuclear deterrence strategy in the president's June 2001 speech, testified as follows to the National Assembly's Committee on National Defense and the Armed Forces:

> The Americans judge that deterrence does not work with "rogue states" that are considered irrational. However, the leaders of these states are sensitive to threats exerted against their center of power. Our doctrine and our means have therefore been adapted. France must have the nuclear capabilities that forbid any sort of blackmail. The countries that would threaten its population and its vital interests must know that they would expose themselves to damage that would be unacceptable to them, that is, notably to

> their power centers. *Deterrence has been adapted to remain credible within the enduring framework of a non-use policy.* Nuclear weapons are not battlefield weapons for us. We have only acquired the means to oppose aggressors of a new type with a reliable and logical response.[79]

Similarly, in January 2003 the military program-law for 2003-2008 stated that France's nuclear deterrence strategy "remains characterized . . . by a concept of non-use."[80]

France's concept of non-use should not be construed as signifying a policy of "no use" or "no first use." The concept reflects, as noted above, confidence in the reliability of France's deterrent posture as well as a refusal to regard nuclear arms as banal "battlefield" weapons. The French are nonetheless fully prepared to conduct nuclear operations, if necessary. In June 2003 General Bentégeat referred in the same article to France's "doctrine of non-use of nuclear weapons" and to its ability "to deliver nuclear weapons, in the event of a failure of deterrence, rapidly and with a maximum of autonomy of action."[81] Indeed, Bentégeat confirmed that France's threat of nuclear retaliation applies to enemies armed with chemical and biological weapons as well as to nuclear powers:

> If a dictator in a 'rogue' state understands that any attack on a French city with chemical or biological weapons would lead instantly to the destruction of his power centres and military capacity, he will desist. . . . France's deterrent has the precision and diversity tailored to meet any degree of threat. . . . We don't intend to develop battlefield weapons as the *force de frappe* is a political deterrent; instead, we rely on a diversified payload that can spare an adversary's population and cities.[82]

Advantages of the Non-Use Concept

Insisting that the strategy remains one of non-use enables the French to avoid possible discomfiture regarding certain issues, including relations with allies and potential adversaries and the strategy's moral and political legitimacy.

Non-use and relations with allies. France's decision to acquire nuclear arms involved multiple motives in addition to reservations about relying on U.S. nuclear commitments. When de Gaulle said that

"France, by acquiring nuclear arms, is performing a service for the world equilibrium,"[83] he evidently had in mind France's autonomy and international status and the political balance within the Alliance, as well as broader strategic purposes, such as enhancing deterrence by obliging Moscow to face an additional center of nuclear decision-making in Europe. France's ability to "nuclearize" a conflict independently would, it was argued, underscore the risks to the Soviet Union in committing aggression. In the early 1960s, when the United States proposed that NATO adopt a strategy of "flexible response," de Gaulle interpreted the new strategy as a U.S. attempt to weaken what he considered an already dubious nuclear guarantee by advertising America's unwillingness to use nuclear weapons through an emphasis on strengthening conventional military forces. De Gaulle refused to accept the new strategy; and the other allies did not adopt it until 1967, after de Gaulle withdrew France from the Alliance's integrated military structure in 1966.

The other allies could not establish the Nuclear Planning Group (NPG) until late 1966, after France's withdrawal from the integrated military structure. While Britain has made its nuclear forces available for Alliance planning since 1962, subject to national command and control and sovereign employment decisions, France has never participated in the NPG or associated NATO bodies for consultations regarding nuclear strategy and deterrence. Since the early 1960s, France has insisted on the distinctness and autonomy of the French approach to nuclear deterrence strategy in relation to U.S. and NATO concepts. While France participated in the Alliance's 1990–1991 and 1997-1999 Strategic Concept reviews and approved the 1991 and 1999 documents, the French are excluded from two of the key paragraphs referring to nuclear deterrence.[84]

In currently foreseeable circumstances, there is no likelihood of France participating in the NPG's deliberations. It would be difficult for France to join the NPG because the French themselves have made it a symbol of American "hegemony" and of the "subordination" they consider to be implicit in Alliance institutions such as the NPG, the Defense Planning Committee, and the integrated military structure. French absence from the NPG has correspondingly become a symbol of national autonomy and strategic independence. Aside from the French lack of interest in formal common planning, nuclear weapons have become identified with France's sovereignty and status; and

participation in NPG deliberations would be portrayed by critics of the government, on the left and the right, as undermining the nation's autonomy.[85]

In this respect, as in some others, the French reveal the continuing tension between maintaining a strictly national nuclear deterrent policy and professions of solidarity with NATO and the European Union. France alone will decide whether and how to use its nuclear forces on behalf of its own security and/or in defense of broader NATO and/or EU security interests, and (to date at least) it has remained France's policy to do so without participating in NATO's Nuclear Planning Group. No analogous EU group for nuclear deterrence matters has yet been constituted, for various reasons in addition to French policy principles. Yet the view that France's nuclear deterrence posture contributes to the security of the Atlantic Alliance (a judgement repeatedly endorsed by France's NATO allies, most recently in the 1999 Strategic Concept) has enabled the French, in conjunction with the avowed policy of non-use, to minimize the potential awkwardness of France's abstaining from consultations about nuclear weapons employment policy in the NATO framework.[86]

Moreover, the French have not excluded consultations about nuclear deterrence in other frameworks. In February 1986, President Mitterrand expressed a willingness to consult with the Chancellor of the Federal Republic of Germany regarding possible use of French nuclear weapons on German soil.[87] In July 1993, President Mitterrand and British Prime Minister John Major announced a decision to make permanent an Anglo-French Joint Commission on Nuclear Policy and Doctrine, a body that had been established on a provisional basis in November 1992. In October 1995, Major and Chirac declared that they would "deepen nuclear cooperation. . . while retaining the independence of our nuclear forces." They added that "We do not see situations arising in which the vital interests of either France or the United Kingdom could be threatened without the vital interests of the other also being threatened."[88] In the years 1995-1997 French officials suggested that France and other members of the European Union might discuss *dissuasion concertée*, a phrase that might be translated as "deterrence supported by continuing consultations and substantive consensus." While the *dissuasion concertée* initiative had few results, evidently owing to political

obstacles within the European Union and France itself,[89] it reflected a long-standing French conviction that France's nuclear forces serve European security interests. In the words of the 1994 defense white paper, "National independence and that of Europe in the future are without any doubt linked to the possession of such weapons."[90]

Non-use and international legitimacy. The broader utility of the non-use policy in international politics involves more speculative judgements, given the multiplicity of audiences and circumstances. The French have consistently and even emphatically noted that non-use does not mean "no first use," but rather confidence in the reliability of their nuclear deterrence posture and rejection of a nuclear "war-fighting" strategy.[91] At the same time, the French have tried to derive political benefit from their deterrent and non-use orientation. For example, France's official reaction to the July 1996 advisory opinion of the International Court of Justice on the legality of the use or threat of use of nuclear weapons included the following observation:

> France's nuclear doctrine has an exclusively deterrent and defensive character. The French deterrent is oriented toward war-prevention. For France, nuclear weapons could not constitute instruments of coercion or combat arms. The nuclear deterrent aims to prevent any placing into question of our vital interests as they are defined, in the final analysis, by the chief of state.
>
> The French deterrent constitutes a factor of stability and contributes to the maintenance of international peace and security. It is inseparable from the resolute action of our country in favor of collective security, arms reductions, and non-proliferation of nuclear weapons, as the President of the Republic noted in his recent speeches before the IHEDN [Institut des Hautes Études de Défense Nationale] on 8 June 1996, and then before the members of the Conference on Disarmament on 11 June 1996.[92]

Even during the Cold War, it was exceptional for official French policy statements to refer explicitly to the Soviet Union as the target of France's nuclear deterrence posture. In post-Cold War conditions, official references to specific countries as possible targets of French nuclear retaliation have become practically nonexistent. It would be politically awkward to refer publicly with any specificity to the scenarios that could arise with regional powers armed with weapons

of mass destruction. French officials have accordingly chosen to speak of such countries as a general category and to emphasize the merits of flexibility in the nuclear posture while reaffirming the concept of non-use.

It should be noted that France's reservations about the negative security assurances it has extended in the NPT context are linked to its interpretation of its disarmament obligations under Article VI of the NPT.[93] Because France's "vital interests" could be threatened by biological, chemical, or conventional attacks, France cannot exclude responding with nuclear weapons to such attacks. This deterrence policy is consistent with the nation's disarmament policy: that is, France could not consider nuclear disarmament in the absence of complete and general disarmament. As Hervé de Charette, then the Foreign Minister, noted in 1997,

> France supports the objective of the final elimination of nuclear weapons in the framework of general and complete disarmament. From now until the realization of this objective . . . France intends to maintain in all circumstances the credibility and the effectiveness of its nuclear deterrent force.[94]

Non-use and domestic legitimacy. Discussions of nuclear operations have been comparatively rare in France. Far more emphasis has been placed on the idea that nuclear deterrence has made France an invulnerable "sanctuary" that no aggressor would dare to attack. Nuclear weapons have become associated with national independence and security against another world war and, more broadly, with de Gaulle's efforts to restore France's honor and international status after France's humiliating defeat in 1940. In the early 1990s, when some French politicians, military officers, and experts conducted a semi-public debate about developing more flexible nuclear employment options (with more accurate delivery systems and low-yield warheads with confined effects), they discovered that the mainstream consensus in France remains opposed to such options if they appear to increase the likelihood of conducting actual nuclear operations.[95]

Some French observers are concerned that planning and preparing for such employment options could undermine the domestic political legitimacy of France's nuclear forces by implying that the principles

of "no war" (*non-guerre*) and "no battle" (*non-bataille*) in French nuclear deterrence strategy could be overturned by aggression. French politicians and experts have traditionally maintained that discussions of nuclear operations are irrelevant and potentially dangerous because they imply that France's deterrent posture could fail. The long-standing French doctrine has accordingly been that nuclear forces are "weapons of non-use" (*armes de non-emploi*); and this doctrine has been reaffirmed in official discussions of the strategy and posture modifications announced by President Chirac in June 2001.[96] As noted above, even in discussions since June 2001 of France's more flexible and discriminate capabilities designed to deter WMD-armed regional powers, French officials have regularly restated the "non-use" principle and their corresponding confidence in the effectiveness of the nation's nuclear deterrent posture.

The high level of confidence in the probable success of France's nuclear deterrence strategy promotes the strategy's domestic legitimacy. In the words of the 1994 defense white paper, France's "strategy remains essentially defensive. The refusal of war or of conventional and nuclear battle that the doctrine of deterrence is based on will continue to inspire it. It remains one of the bases of the indispensable national consensus in defense matters."[97] In the 1980s Pierre Hassner offered the following critique of French strategy:

> [I]f one accepts the logic of the French doctrine, the search for discrimination and proportionality, the classic just-war criteria, would mean the acceptance of limited war, and hence of the failure of deterrence. . . . When challenged on these grounds the usual French response has been to dismiss the moral problem altogether in the name of deterrence (nuclear weapons are moral since they are meant to prevent war, not to wage it) and of retaliation (since France will never be the attacker, it bears no moral responsibility for what it might have to do in response to aggression or blackmail). . . . A critic of the doctrine, Pierre Lellouche, has pointed out that what made the French posture acceptable was precisely its lack of operational credibility, which reassured potential pacifists that French nuclear weapons were not meant to be used.[98]

French experts have pointed out that Hassner's critique applied above all to France's Cold War nuclear strategy, when the Soviet Union was the principal adversary and Paris emphasized "anti-

cities" threats. Since the early 1990s, the preoccupation with deterring WMD-armed regional powers has led the French government to seek forces capable of much greater "discrimination and proportionality" and to reaffirm the traditional purpose of successful deterrence and war-prevention.[99]

It is significant in this regard that President Chirac in June 2001 repeated that France will remain "faithful to its concept of non-use" while modifying the country's declaratory strategy and revealing improvements in force characteristics in the direction of greater operational usability — that is, listing more specific targets and seeking more discriminate and controllable weapons.

Despite uncertainties about the operational utility of France's nuclear weapons in dealing with specific threats, the consensus behind nuclear deterrence in France remains comparatively robust. As noted above, the strategy articulated by President Chirac in June 2001 was formulated with the concurrence of Lionel Jospin, then France's Prime Minister and the leader of the Socialists. The French generally deem nuclear weapons an insurance policy in an uncertain and unstable world, and a guarantee of France's political and strategic autonomy. All the major parties, including the Socialists, are committed to maintaining nuclear deterrence as a means of war-prevention and thus support the strategy of non-use and the operational instruments necessary to uphold it. As Lionel Jospin observed in September 1998,

> The evolution of the strategic context has permitted a reduction in the number of weapons and in the alert level of the forces, but *nuclear deterrence remains at the heart of our defense. It manifests in an explicit fashion the adherence of our country to a strategy of preventing war and testifies to our will to protect the supreme interests of our country with autonomous capabilities*. France is therefore maintaining its effort in the nuclear domain, but adapting the level of its arsenal and its posture. For France, as for European security, so long as general and complete disarmament has not been achieved, nuclear weapons remain a necessity.[100]

ENDNOTES - CHAPTER 7

1. For a valuable discussion of the intellectual origins and objectives of France's nuclear capabilities up to the late 1970s, see the chapter by Bruno Tertrais in this volume.

2. The 1995-1996 test series had three purposes: the final certification of the TN75 warhead, the validation of robust warhead designs, and the acquisition of data for simulation. See Jacques Bouchard, Directeur des Applications Militaires, Commissariat à l'Énergie Atomique, testimony before the Commission de la Défense Nationale et des Forces Armées, Assemblé Nationale, 20 February 1996, Compte rendu no. 27, p. 2. Since the 1995-1996 test series France has relied entirely on its simulation capabilities. France has dismantled its test site in the South Pacific and has ratified the Comprehensive Test Ban Treaty.

3. The M51 SLBM was attributed a range of 9,200 km in *Le Monde*, 9 June 2001. According to a dossier published by the Documentation Française (and prepared by a non-governmental organization, the Centre de Documentation et de Recherche sur la Paix et les Conflits, Observatoire des Armes Nucléaires Françaises), the M51 SLBM will have a range of 8,000 to 10,000 km, and the ASMP-A air-launched missile will have a high-altitude range of 500 km. See www.ladocumentationfrancaise.fr/dossier_international/nucleaire/etat_lieux/france.shtml.

4. Bruno Tertrais, *The French Nuclear Deterrent After the Cold War*, P-8012 (Santa Monica, California: Rand, 1998), p. 37.

5. Jacques Chirac, interview in *Armées d'Aujourd'hui*, no. 246, January 2000, p. 8.

6. Charles de Gaulle, press conference of 23 July 1964, in *Discours et messages*, vol. IV, *Pour l'effort, Août 1962-Décembre 1965* (Paris: Plon, 1970), p. 233; italics added.

7. The French word *dissuasion* is normally translated into English (by the French themselves and others) as "deterrence." The French do not have a word for "dissuasion" with the meaning attributed to the term in the U.S. Quadrennial Defense Review in 2001, and therefore employ formulas such as *la dissuasion de l'acquisition des capacités militaires* to describe the U.S. concept in the 2001 QDR.

8. Raymond Barre, "La politique de défense de la France," *Défense Nationale*, November 1980, p. 12.

9. Pierre Mauroy, "La cohérence d'une politique de défense," *Défense Nationale*, October 1981, p. 21.

10. Jeannou Lacaze, "La politique militaire," *Défense Nationale*, November 1981, pp. 11, 12.

11. This declaratory policy may have expressed aspirations more than then-current capabilities. It is not clear whether France's capabilities at that time could support this declaratory strategy.

12. Guy Lewin, "La dissuasion française et la stratégie anti-cités," *Défense Nationale*, January 1980, p. 27.

13. Guy Lewin, "L'avenir des forces nucléaires françaises," *Défense Nationale*, May 1980, pp. 17-18.

14. Raymond Tourrain, *Rapport d'information par la Commission de la Défense Nationale et des Forces Armées sur l'état et la modernisation des forces nucléaires françaises*, no. 1730 (Paris: Assemblée Nationale, October 1980), p. 206.

15. Pierre Riou (the pseudonym of a high-level Ministry of Defense official), "La force des choses," *Défense Nationale*, July 1980, p. 17.

16. Valéry Giscard d'Estaing, *Le pouvoir et la vie*, vol. II, *L'affrontement* (Paris: Compagnie 12, 1991), p. 180.

17. Charles Hernu, "Répondre aux défis d'un monde dangereux," *Défense Nationale*, December 1981, p. 15.

18. Raymond Barre, "La politique de défense de la France," *Défense Nationale*, November 1980, p. 14.

19. Guy Lewin, "La dissuasion française et la stratégie anti-cités," *Défense Nationale*, January 1980, pp. 24, 31.

20. Guy Méry in *Le Monde*, 19 November 1980, p. 12.

21. Guy Lewin, "La dissuasion française et la stratégie anti-cités," *Défense Nationale*, January 1980, p. 28.

22. Ivan Margine (the pseudonym of a high-level Ministry of Defense official), "L'avenir de la dissuasion," *Défense Nationale*, April 1978, p. 29.

23. Robert Galley, speech at the Institut des Hautes Études de Défense Nationale, 3 February 1981, p. 13 of text furnished by the Délégation à l'Information et à la Communication de la Défense.

24. Pierre Mauroy, "Vers un nouveau modèle d'armée," *Défense Nationale*, November 1982, p. 24.

25. For a valuable discussion, see Bruno Tertrais, "La coopération militaire depuis 1969: La France, l'OTAN et la question nucléaire," in Maurice Vaïsse, Pierre Mélandri, et Frédéric Bozo, eds., *La France et l'OTAN, 1949-1996* (Brussels: Éditions Complexe, 1996).

26. President Valéry Giscard d'Estaing, "Allocution," *Défense Nationale*, July 1976, p. 15.

27. Charles Hernu, "Face à la logique des blocs, une France indépendante et solidaire," *Défense Nationale*, December 1982, p. 16.

28. Hernu's change in terminology was analyzed by Jacques Isnard in *Le Monde*, 31 October 1984, p. 9.

29. Mitterrand statement of 17 December 1987 to Hans Jochen Vogel, reported in Pierre Favier and Michel Martin-Roland, *La décennie Mitterrand*, vol. 2, *Les épreuves (1984-1988)* (Paris: Éditions du Seuil, 1991), p. 645.

30. Mitterrand speech of 11 October 1988, reported in *Le Monde*, 13 October 1988, p. 9.

31. Mitterrand press conference of 11 September 1991, text furnished by Service de Presse, Présidence de la République, p. 11.

32. Jacques Chirac, "La France et les enjeux de la sécurité européenne," *Défense Nationale*, February 1988, p. 16.

33. Chirac quoted in *Le Monde*, 9 March 1988, p. 14.

34. Mitterrand quoted in indirect discourse in *Le Monde*, 22 October 1987, p. 4.

35. For background, see David S. Yost, *Soviet Ballistic Missile Defense and the Western Alliance* (Cambridge, Massachusetts: Harvard University Press, 1988), especially pp. 170-183.

36. Bruno Tertrais, "La dissuasion nucléaire française après la guerre froide: continuité, ruptures, interrogations," *Annuaire Français de Relations Internationales* (Bruxelles: Bruylant, 2000), p. 760.

37. Some French observers have linked the disappearance of the terms "pre-strategic" and "final warning" to the disappearance of the USSR. It is not clear whether the abandonment of the terms was influenced by British arguments (a) that calling the initial nuclear use a "final warning" was dangerous because it would oblige France to engage in larger follow-on strikes if that "final warning" failed to achieve the intended results and (b) that it would be wiser to maintain uncertainty (and political and operational latitude) about the magnitude of initial and follow-on strikes.

38. Division Emploi de l'État-Major des Armées, *Concept d'emploi des forces*, Lettre no. 827/DEF/EMA/EMP.1, 23 juillet 1997 (Paris: Service d'Information et de Relations Publiques des Armées, Ministère de la Défense, 1998), p. 18.

39. Ministère de la Défense, *La Défense de la France: Une action inscrite dans la durée* (Paris: Service d'Information et de Relations Publiques des Armées, October 1990), p. 13.

40. Pierre Joxe, interview with *Le Progrès-Le Journal de la Saône-et-Loire*, 21 February 1992, in *Propos sur la Défense*, January-February 1992, p. 90.

41. Discours prononcé par M. Jacques Chirac, Président de la République, à l'Institut d'État des Relations Internationales de Moscou, 26 September 1997, text provided by the Service de Presse, Présidence de la République, p. 11.

42. *Projet de loi de programmation relatif à l'équipement militaire et aux effectifs de la défense pour les années 1992-1994*, no. 2877 (Paris: Assemblée Nationale, July 1992), p. 14. This draft military program-law, unlike all previous military program-laws of the Fifth Republic, was never debated or approved by parliament. The draft text nonetheless reflected thinking in the executive branch of the government in mid-1992.

43. Ministère de la Défense, *Livre Blanc sur la Défense* (Paris: Service d'Information et de Relations Publiques des Armées, February 1994), pp. 70, 72.

44. Ministère de la Défense, *Livre Blanc sur la Défense* (Paris: Service d'Information et de Relations Publiques des Armées, February 1994), p. 70.

45. Speech by President Jacques Chirac at the École Militaire, Paris, 23 February 1996, in *Propos sur la Défense*, no. 57 (February 1996), p. 179; emphasis added.

46. "Loi no. 96-589 du 2 juillet 1996 relative à la programmation militaire pour les années 1997 à 2002," *Journal Officiel de la République Française*, 3 July 1996, pp. 9987-9988.

47. Speech by Prime Minister Lionel Jospin at the Institut des Hautes Études de Défense Nationale, 4 September 1997, p. 4 of text furnished by the French Foreign Ministry.

48. Raymond Barre (then Prime Minister), "Discours prononcé au Camp de Mailly le 18 juin 1977," *Défense Nationale*, August-September 1977, p. 16; and General Guy Méry (then Chief of Staff of the Armed Forces), "Conférence," *Défense*, no. 9 (May 1977), p. 22.

49. Ivan Margine (the pseudonym of a high-level Ministry of Defense official), "L'avenir de la dissuasion," *Défense Nationale*, April 1978, p. 26.

50. Charles Hernu, "La politique et la volonté de défense," *Politique Internationale*, no. 16 (Summer 1982), p. 13.

51. Mitterrand, 7 February 1991, in *Le Monde*, 9 February 1991, pp. 8-9.

52. Another factor in Mitterrand's decision-making was evidently his determination to promote adherence to the Chemical Weapons Convention, and therefore to assert the principle that chemical, biological, and nuclear weapons should not be considered operationally usable. Author's interviews in Paris, April 2003.

53. Roland Dumas interview in *Journal du Dimanche*, 10 February 1991.

54. Jacques Chirac, discours à l'occasion de la réception des ambassadeurs, Palais de l'Élysée, 31 August 1995, p. 10; emphasis added.

55. Admiral Jacques Lanxade, "La défense française dans le nouveau cadre géostratégique," *Défense Nationale*, August-September 1995, p. 19.

56. Alain Juppé, discours à l'Institut des Hautes Études de Défense Nationale, 7 September 1995, p. 7.

57. Communication du Ministre des Affaires Étrangères, M. Alain Juppé, à la Commission des Affaires Étrangères, de la Défense et des Forces Armées du Sénat, Paris, 6 April 1995.

58. A thorough comparative analysis of British, French, and U.S. declaratory policies regarding nuclear deterrence and WMD proliferants might help to establish whether, as some French observers maintain, these arguments for caution have exerted even greater influence in London and Washington than in Paris. Some French observers hold that French nuclear deterrent threats to WMD proliferants have been more explicit than those articulated by the United Kingdom and the United States. Author's interviews in Paris, April 2003.

59. Admiral Marcel Duval, "De la non-prolifération à la contre-prolifération?" *Défense Nationale*, August-September 1995, pp. 37, 39.

60. The Conseil de Défense, a top-level decision-making body, is France's closest equivalent to the U.S. National Security Council. It should be noted that Socialist leader Lionel Jospin served as Prime Minister from June 1997 to May 2002, and that the policy announced by Chirac in June 2001 was determined in concurrence with Jospin.

61. Jacques Chirac, speech at the Institut des Hautes Études de Défense Nationale, 8 June 2001, available at www.elysee.fr; emphasis added.

62. Ministère de la Défense, *Livre Blanc sur la Défense* (Paris: Service d'Information et de Relations Publiques des Armées, February 1994), p. 57.

63. Intervention de M. François Mitterrand sur le thème de la dissuasion, 5 May 1994, p. 5 of text furnished by the Service de Presse, Présidence de la République.

64. Jean-Dominique Merchet, "Chirac menace les 'États voyous' du feu nucléaire," *Libération*, 9 June 2001.

65. This affirmation of choices between "total annihilation" and "doing nothing" can be seen, some French observers have noted, as a less explicit way of saying (to use the old terms) that France has "prestrategic" and "final warning" options, now related to possible confrontations with regional powers as well as major powers.

66. Author's interviews in Paris, June-July 2001, March 2002, June-July 2002, and April 2003.

67. Bruno Tertrais, "Dissuasion nucléaire: Une doctrine adaptée au contexte stratégique," *Armées d'Aujourd'hui*, no. 262 (July-August 2001), p. 65.

68. Jacques Chirac, speech at the Institut des Hautes Études de Défense Nationale, 8 June 2001.

69. Author's interviews in Paris, June-July 2001, March 2002, and June-July 2002.

70. Thérèse Delpech, "Le deuxième âge nucléaire?" *Le Figaro*, 8 June 2001.

71. Jacques Chirac, speech at the Institut des Hautes Études de Défense Nationale, 8 June 2001.

72. North Atlantic Council, Prague Summit Declaration, 21 November 2002, par. 4g.

73. General Henri Bentégeat, interview in *Jane's Defence Weekly*, 4 June 2003.

74. Jacques Chirac, speech at the Institut des Hautes Études de Défense Nationale, 8 June 2001.

75. Author's interviews in Paris, June-July 2001, March 2002, June-July 2002, and April 2003. An official explanation of Chirac's phase indicated that "The world has shrunk. Therefore, we are not completely indifferent to what is happening in China." An anonymous official source quoted in Jean-Dominique Merchet,

"Chirac menace les 'États voyous' du feu nucléaire," *Libération*, 9 June 2001. A well-informed observer has suggested the following distinction: a major military power could destroy France or threaten its survival, while a regional power could threaten its vital interests but not its survival.

76. Lionel Jospin, "La politique de défense de la France," *Défense Nationale*, December 1999, p. 9; emphasis added. This article reproduces the text of Jospin's speech on 22 October 1999 at the Institut des Hautes Études de Défense Nationale. In an interview in April 2003, an observer in Paris said that the word "distant" in Jospin's speech meant "in Asia."

77. Jacques Chirac, speech at the Institut des Hautes Études de Défense Nationale, 8 June 2001.

78. Jacques Chirac, speech at the Institut des Hautes Études de Défense Nationale, 8 June 2001.

79. Audition du général Henri Bentégeat, chef d'état-major des armées, sur le projet de loi relatif à la programmation militaire pour les années 2003 à 2008 (no. 187), Commission de la Défense Nationale et des Forces Armées, Compte Rendu no. 19, 13 November 2002, available at www.assemblee-nat.fr/12/cr-cdef/02-03/c020319.asp; emphasis added.

80. Loi no. 2003-73 du 27 janvier 2003 relative à la programmation militaire pour les années 2003 à 2008, section 2.3.1., "Les fonctions stratégiques," available at www.legifrance.gouv.fr.

81. General Henri Bentégeat, "Stratégie militaire française," *Défense Nationale*, June 2003, pp. 34-35.

82. General Henri Bentégeat, interview in *Jane's Defence Weekly*, 4 June 2003.

83. Charles de Gaulle, press conference of 10 November 1959, in *Discours et messages*, vol. III, *Avec le renouveau, Mai 1958-Juillet 1962* (Paris: Plon, 1970), p. 134.

84. In the 7 November 1991 Strategic Concept, the French are excluded by the "Allies concerned" formula (paragraph 57) and by the reference to "European Allies involved in collective defense planning in nuclear roles" (paragraph 56). In the 24 April 1999 Strategic Concept, the same formulas are used in paragraphs 63 and 64.

85. As President Mitterrand put it in May 1994, "This indispensable autonomy of the Chief of State's decision excludes submitting this decision to international bodies and even to an Alliance and even to the most faithful, the closest, and the strongest of our allies. That it is why it was formerly decided to withdraw France from the integrated command of the Atlantic Alliance, of NATO, and that is why I firmly uphold this decision." Intervention de M. François Mitterrand sur le thème de la dissuasion, 5 May 1994, p. 3 of text furnished by the Service de Presse, Présidence de la République.

86. "The supreme guarantee of the security of the Allies is provided by the strategic nuclear forces of the Alliance, particularly those of the United States;

the independent nuclear forces of the United Kingdom and France, which have a deterrent role of their own, contribute to the overall deterrence and security of the Allies." North Atlantic Council, Strategic Concept, 24 April 1999, paragraph 62. This statement repeated an identical statement in the Alliance's Strategic Concept of 7 November 1991 (paragraph 55). This wording represented a recasting of the formula used in the Alliance's June 1974 Ottawa Declaration, which noted that two of the European Allies "possess nuclear forces capable of playing a deterrent role of their own contributing to the overall strengthening of the deterrence of the Alliance." See North Atlantic Council, Declaration on Atlantic Relations, Ottawa, 19 June 1974, in *Texts of Final Communiqués, 1949-1974* (Brussels: NATO Information Service, 1975), p. 319 (paragraph 6).

87. For background, see David S. Yost, "Franco-German Defense Cooperation," in Stephen Szabo, ed., *The Bundeswehr and Western Security* (London: Macmillan and New York: St. Martin's Press, 1990), pp. 223, 234-242.

88. Joint Statement by President Jacques Chirac and Prime Minister John Major, 29-30 October 1995.

89. For background, see David S. Yost, *The US and Nuclear Deterrence in Europe*, Adelphi Paper no. 326 (London: Oxford University Press for the International Institute for Strategic Studies, March 1999), pp. 36-40.

90. Ministère de la Défense, *Livre Blanc sur la Défense* (Paris: Service d'Information et de Relations Publiques des Armées, February 1994), p. 52.

91. Some French observers deplore the government's repetition of the expression *non-emploi* (non-use) because it has sometimes been construed to imply that France might be prepared to endorse a policy of "no first use," whereas France has always rejected such proposals.

92. Communiqué of the Ministry of Foreign Affairs, 8 July 1996, in *Documents d'Actualité Internationale*, no. 17 (1 September 1996), p. 697.

93. According to Article VI of the Non-Proliferation Treaty, "Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control."

94. Hervé de Charette, Foreign Minister, answer to a written question, National Assembly, 24 February 1997.

95. For background, see David S. Yost, "Nuclear Weapons Issues in France," in John C. Hopkins and Weixing Hu, eds., *Strategic Views from the Second Tier: The Nuclear Weapons Policies of France, Britain, and China* (San Diego, California: Institute on Global Conflict and Cooperation, University of California, San Diego, 1994), pp. 87-91; and Bruno Tertrais, *The French Nuclear Deterrent After the Cold War*, P-8012 (Santa Monica, California: Rand, 1998), pp. 21-25.

96. The terms *non-bataille* and *non-guerre* were prominent in 1970s and 1980s. Since the early 1990s, the expression *non-emploi* has been used most consistently.

97. Ministère de la Défense, *Livre Blanc sur la Défense* (Paris: Service d'Information et de Relations Publiques des Armées, February 1994), p. 49.

98. Pierre Hassner, "Ethical Issues in Nuclear Deterrence: Four National Debates in Perspective (France, Great Britain, the United States and West Germany)," in Hassner, *Violence and Peace: From the Atomic Bomb to Ethnic Cleansing*, trans. by Jane Brenton (Budapest: Central European University Press, 1997), pp. 126, 133. This essay was first published in German in Uwe Nerlich and Trutz Rendtorff, eds., *Nukleare Abschrekung — Politische und ethische Interpretation einer neuen Realität* (Baden-Baden: Nomos, 1989).

99. Author's interviews in Paris, April 2003.

100. Lionel Jospin, speech at the Institut des Hautes Études de Défense Nationale, 3 September 1998, p. 14 of text furnished by the French Foreign Ministry; emphasis added.

CHAPTER 8

CHINESE AND MUTUALLY ASSURED DESTRUCTION: IS CHINA GETTING MAD?

James Mulvenon

INTRODUCTION

Alone among nuclear powers in the Cold War, the People's Republic of China (PRC) maintained a publicly ambivalent attitude about Armageddon, occasionally shocking the world with statements that appeared to welcome the deaths of hundreds of millions, if not billions, of people as a possible shortcut to communist nirvana. Yet these disturbing assertions often were tempered by comments disparaging nuclear weapons, refusing to see atomic arsenals as more decisive in war and peace than "man" or "the people." Outside observers struggled to interpret these seemingly contradictory Maoist precepts about nuclear war, and tried to disentangle the dialectical embrace of opposites from the practical impulse to denigrate that which one does not possess.

Since the death of Mao and the deployment of nuclear-capable delivery systems, however, Beijing's attitudes about nuclear warfare continue to change in subtle but important ways. Put briefly, Chinese views of nuclear weapons have evolved from initial disparagement and covetousness prior to the acquisition of an arsenal, to a nuclear minimalist perspective that resembles mutually assured destruction (MAD) in every way but name. Ironically, China appears to be implicitly embracing MAD and achieving a credible minimal deterrent at precisely the same time that the United States, from the Chinese perspective, appears to be abandoning MAD and deterrence in favor of defenses and preemptive strike.[1] In its desperation to retain the MAD dynamic, China may therefore be forced to build to higher force levels, permitting the PRC to actually contemplate post-MAD counterforce strategies in the future.

The chapter is divided into four sections. The first outlines Chinese attitudes about mutually assured destruction from 1945 to

1964, and focuses on the interplay between Maoist ideology, the split with the Soviet Union, and ongoing tension with the United States. The second section charts the evolution of Beijing's policies from 1964 to 1976 and assesses the impact of the successful acquisition of the bomb on China's views of nuclear weapons and warfare. The third section analyzes Beijing's evolving attitudes about deterrence from the death of Mao Zedong in 1976 to the present day. Finally, the chapter concludes with a discussion of the strategic implications of Beijing and Washington's diverging views on MAD.

DEFINITIONS

The Chinese literature on nuclear deterrence presents significant terminological challenges to comparative study. To a certain extent, the linguistic divergence is intentional, as Chinese scholars and officials explicitly rejected the content and frameworks of the Western deterrence discourse as hegemonist and imperialist. For the purposes of this chapter, MAD is defined as minimum, mutual deterrence,[2] and has three key principles. First, do not pursue first-strike options. Second, do not attack weapons, since they cannot all be destroyed and the process will lead to an arms race. Instead, aim at cities and people in the form of countervalue strikes. Third, do not defend against the adversary's weapons with missile defenses, since it would be impossible, prohibitively expensive, and destabilizing by encouraging preemptive first strike. A MAD force therefore is relatively minimalist, seeking to satisfy, not maximize and secure forces through mobility, concealment, and hardening. Submarine-based forces are the ideal MAD system, because they are relatively invulnerable to a decapitation strike.

Chinese strategists use two terms to describe their nuclear doctrine: "minimal deterrence" and "limited deterrence." Minimal deterrence is China's self-defined doctrine, characterized by a small, second-strike countervalue force bound by a no-first use doctrine as well as negative and positive security assurances. In many respects, the doctrinal aspects of the concept strongly resemble MAD, though the credibility of the PRC's deterrent force was historically in question. More recent Chinese writings call for an aspirational

doctrine of "limited deterrence" (*youxian weishe*) comprised of counterforce, warfighting capabilities "to deter conventional, theater, and strategic nuclear war, and to control and suppress escalation during a nuclear war."[3] According to Chinese analysts, such a posture requires "a greater number of smaller, more accurate, survivable, and penetrable intercontinental ballistic missiles (ICBMs); sea launched ballistic missiles (SLBMs) as countervalue retaliatory forces; tactical and theater nuclear weapons to hit battlefield and theater military targets and to suppress escalation; ballistic missile defense to improve the survivability of the limited deterrent; space-based early warning and command and control systems; and anti-satellite weapons (ASATs) to hit enemy military satellites."[4] In terms of Western theories, this "limited deterrence" concept resembles the "flexible response" concept of the late McNamara period.

CHINESE ATTITUDES ABOUT NUCLEAR WEAPONS, 1945-PRESENT

1945-64: Paper Tigers, Bloody Feuds.

When the American atomic bomb fell on Hiroshima in 1945, the Chinese Communist Party and its leader, Mao Zedong, were mopping up their victory over the Japanese Imperial Army and readying themselves for civil war against Chiang Kai-Shek's Nationalist forces. Mao's guerrilla armies had been fighting for nearly 2 decades and were beginning to see the fruits of his theories of protracted struggle and People's War against technologically superior foes. Among his tenets was a belief that man was ultimately more powerful than machine and that no weapon was sufficient to defeat the will of the "the people." Despite this view, however, there was understandable fear about the awesome destructive power of atomic weapons and a significant amount of frustration, as evidenced in this unattributed historical analysis published by a Chinese author:

> At the end of World War II, after it had dropped two atomic bombs on Hiroshima and Nagasaki in Japan, U.S. imperialism assumed that armed with this "ultimate weapon" it could ride roughshod over the world and do whatever it pleased. At the time there was a kind of fear mentality

> among the Chinese people as well as among the peoples of other countries. U.S. imperialism, possessed of atomic weapons, appeared to them so powerful that they thought it could put down peoples' revolutions at will.

Until 1955, China sought to control these fears by enforcing a virtual news blackout on news related to global nuclear developments. For example, there was no mention in any Chinese news source about Britain's 1952 successful test of a nuclear weapon.[5]

When the bomb was mentioned by Chinese officials or media, the tone was always disparaging, downplaying the strategic significance of the technology and emphasizing the power of the Chinese people. The classic encapsulation of this viewpoint was Mao's famous statement:

> The atom bomb is a paper tiger with which the American reactionaries try to terrify the people. It looks terrible but, in fact, is not. Of course, the atom bomb is a weapon of mass annihilation: the outcome of a war is decided by the people, not by one or two new weapons.[6]

Quoting Mao, then Minister of National Defense Lin Biao in his 1963 article, "Long Live the Victory of People's War," argues "The spiritual atomic bomb which the revolutionary people possess is a far more powerful weapon than the physical atomic bomb."[7] While these statements accurately reflect Mao's normative and ideological beliefs about the primary of man over technology, it is also clear that he made a virtue out of a necessity. A country that does not have nuclear weapons has an incentive to downplay their strategic significance. Moreover, the Beijing government believed that "exaggeration of the destructiveness of nuclear war only served to demoralize the socialist camp and plays into the hands of U.S. nuclear blackmail,"[8] while consistent dismissal of the threat "boosted the morale" of the Chinese people.[9] As explored in more detail later, these dismissive views also played an important part in shaping China's minimalist view of its own nuclear weapons and their role, encouraging Beijing to develop the smallest possible deterrent and thus embrace the essence of MAD.

While Beijing sought to devalue nuclear weapons in this period, events in the international security environment also highlighted the fact that nuclear weapons were in some cases counterproductive to

Chinese national interests and relations with other countries. From a threat perspective, the Korean War, as well as the 1954 and 1958 Quemoy-Matsu crises, were marked by implicit or explicit threats of nuclear attack from the United States, which the Chinese denounced as "nuclear blackmail." Unprotected from such an attack, Beijing turned to its ally, the Soviet Union, for a nuclear umbrella commitment and technical assistance in building its own bomb. In 1956, Mao Zedong stated plainly that China needed nuclear weapons, arguing that "if we are not to be bullied in the present-day world, we cannot do without the atomic bomb."[10] He implicitly accepted that nuclear weapons had deterrent value, at least against the corrupt West. Yet the intra-alliance debate over the correct interpretation of these crises and the nature of nuclear war itself, as well as the subsequent negotiations for a Chinese bomb, severely frayed the unity of the socialist camp, and eventually was a major factor in its rupture in the late 1950s and early 1960s.

The Sino-Soviet debate over the nature of nuclear warfare reveals important features of Chinese attitudes about the bomb and its perceived utility. View in hindsight, the heart of the argument was a disagreement over whether "mutually assured destruction" was indeed "mutual." While both Moscow and Beijing agreed with Clauswitz's dictum that "war is the continuation of politics," they disagreed over its continuing applicability in the nuclear era. Asserting that "the effects of massive retaliation are highly doubtful,"[11] China interpreted American unwillingness to use nuclear weapons in Korea and the 1954 and 1958 Quemoy-Matsu crises as further proof that atomic weapons were a "paper tiger."[12] Beijing also believed that nuclear weapons limited American power:

> Recourse to this kind of weapon places U.S. imperialism in a position of extreme isolation, and militarily, the massive destructiveness of nuclear weapons limits their use, for in civil wars and wars of national independence, where the lines zigzag and the fighting is at close range, the use of nuclear weapons of mass destruction would inflict damage on both belligerents.[13]

For the Union of Soviet Socialist Republics (USSR), however, the consequences of war, i.e., total destruction, threatened to undermine

the desired political end of communist domination. In response to Malenkov's 1954 statement that nuclear war would result in the "annihilation of mankind," Foreign Minister Chen Yi responded, "We do not believe that the power of atomic weapons is too overwhelming. We do not believe that atomic weapons could destroy mankind."[14] Indeed, Beijing rejected the potential effectiveness of nuclear weapons against China:

> Nuclear weapons would not be effective against China because of her large territory and the general dispersal of her armed forces, population, and industrial centers, and that battles were won decisively only with the occupation of enemy territory by infantry forces.[15]

> The atomic bomb itself cannot be the decisive factor in a war . . . It cannot be employed on the battlefield to destroy directly the fighting power of the opposing army in order not to annihilate the users themselves. It can only be used against a big and concentrated object like a big armament industry center or huge concentration of troops. Therefore, the more extensive the opponents' territory is and the more scattered the opponent's population is, the less effective will the atomic bomb be.[16]

As a result, Mao insisted in 1957 that China was not afraid of nuclear war:

> People all over the world are now discussing whether or not a third world war will break out. In regard to his question, we must be psychologically prepared and at the same time take an analytical view. We stand resolutely for peace and oppose war. But if the imperialists insist on unleashing another war, we should not be afraid of it. Our attitude on this question is the same as our attitude toward all disturbances: Firstly, we are against it; secondly, we are not afraid of it.[17]

More disturbing to observers in Moscow and around the world, Mao in the same year asserted that China could survive and prevail in a nuclear war, and therefore saw global megadeath as a potential historical shortcut to victory over capitalism:

> The first World War was followed by the birth of the Soviet Union with a population of 200 million. The Second World War was followed by the emergence of the socialist camp with a combined population of 900 million. If the imperialists should insist on launching a third world war, it is certain the several hundred million more will turn to socialism; then

> there will not be much room left in the world for the imperialists, while it is quite likely that the whole structure of imperialism will utterly collapse.[18]

Lest one assume that this was a political line unsupported by professional Chinese military officers, Marshal Peng Dehuai, who would later stand up to Mao over the failures of the Great Leap Forward, agreed with the Chairman's arithmetic:

> America possesses atomic weapons and is threatening us with them. But we are not afraid of atomic warfare. Why? Because China has 600 million people. Even if 200 million people were killed by atomic weapons, 400 million people would still survive. Even if 400 million people were killed, 200 million would still survive. Even if 200 million survived, China would still constitute a big country of the world. Furthermore, these 200 million people will absolutely not surrender. Therefore, at the end America will lose the war.[19]

At its most extreme, the hyperbole of Chinese communist propaganda promised impossible rewards for war: "The victorious people would very swiftly create on the ruins of imperialism a civilization thousands of times higher than the capitalist system and a truly beautiful future for themselves."[20] This rhetoric was deeply alarming to the Soviet Union, and explains Moscow's unwillingness to implement nuclear cooperation agreements with Beijing as well as their reluctance to extend a Soviet nuclear umbrella over Beijing in the 1958 Quemoy crisis.[21] From then on, China knew that the Soviet Union could not be relied on for extended deterrence. According to Foreign Minister Chen Yi in 1963, "[W]hat is this Soviet assurance worth? . . . This sort of promise is easy to make, but . . . worthless. Soviet protection is worth nothing to us . . . No outsiders can give us protection, in fact, because they always attach conditions and want to control us."[22]

As a result of these fissures in the Sino-Soviet relationship, open verbal warfare broke out between Moscow and Beijing on the issue of nuclear warfare and the struggle with American imperialism. Moscow openly rejected Mao's political analysis of the bomb, arguing that "the atom bomb does not adhere to the class principle."[23] Moreover, Moscow excoriated the lack of realism in Chinese understandings of nuclear war, arguing that "the Chinese

Communist Party has developed some kind of special aims and interests which the socialist camp cannot support with its military force."[24] Finally, Moscow made the following unsubtle threat to leave Beijing in the cold, warning that "the attempt of any socialist country to rely on its own force in insuring its defense—forces which, moreover, may not be sufficient in all countries—can prove to be a fatal mistake in the age of nuclear arms."[25] In other words, "China might be subjected to massive destruction before the Russians had a chance to intervene."[26]

Shorn of any guarantee of protection from nuclear attack, China returned to its "man over machine" line in 1958:

> Although the absolute control of atomic weapons is now in the socialist camp, it still does not believe that the atomic weapons is the chief factor in determining victory. Atomic weapons and ICBMs are good weapons, but they cannot be substituted for men in warfare. The United States should therefore realize that the Chinese people are no longer frightened by any atomic attack![27]

Beijing also stepped up verbal assaults on the Soviet views of nuclear conflict, rejecting Moscow's contention that mutual deterrence excludes the possibility of war.[28] Instead, China argued that mutual deterrence gave them political and military room to maneuver, especially in national liberation wars and revolutionary civil wars.[29] Beijing responded to Moscow's risk-averse behavior with taunting:

> The crucial point is, what should be the policy in the face of U.S. imperialist nuclear blackmail and threats—resistance or capitulation? We stand for resistance.[30]

> Imperialism, whose doom is sealed, cannot save itself by relying on nuclear weapons, nor can the socialist countries win victory in their struggle against imperialism by relying solely on nuclear weapons . . . The Soviet leaders insist on exaggerating the role of nuclear weapons and trust blindly in them, despise the masses, and have forgotten that the masses are the makers of history, and so they have degenerated into worshippers of nuclear weapons.[31]

> The Chinese believed that Soviet policy—its support of peaceful coexistence, emphasis on the horrors of nuclear war, and downgrading of militancy in national liberation movements—paralyzes the revolutionary process and, consequently, the struggle against imperialism.[32]

Finally, China warned the Soviet Union that its attempts at control in the socialist camp, particularly with regard to the distribution of nuclear technology, were not going to prevent China from pursuing its own capability. As a 1963 government statement forcefully asserts, "the Chinese people will not tremble before U.S. nuclear threats,"[33] and will not "kneel before the nuclear blackmail of the U.S. imperialists."[34] Instead, an official argues that "the one and only way to counter the threat of a nuclear war is for more socialist and peace-loving countries to gain a nuclear self-defense capability."[35]

Views of Nuclear Weapons After Acquisition, 1964-78.

By the early 1960s, China was moving closer to its goal of developing an indigenous weapon, which would serve "as a principal means to remain autonomous from both Soviet and U.S. alliance systems" and the "ultimate guarantor of their national security."[36] While the Chinese believed that even a token capability would deter the United States,[37] Beijing's relentless disparaging of nuclear weapons undermined the credibility of rumors about Beijing's impending atomic and missile capability.[38] However, China's successful detonation of a fission weapon in 1964 was effective "propaganda of the deed,"[39] announcing to the world that Beijing was no longer vulnerable to U.S. "nuclear blackmail."[40] The official statement is a fascinating window into China's conflicted attitude about nuclear weapons. It is riddled with internal contradictions and dialectical mindbenders. It strains credulity, for instance, that the Chinese would have spent an enormous amount of scarce state resources to build a weapon that is explicitly labeled as a "paper tiger." If atomic weapons were a paper tiger, it is difficult to fathom how nuclear weapons will provide "defense" and protect "the Chinese people from U.S. threats to launch a nuclear war." Moreover, the official insistence that China developed nuclear weapons in order to aid in the global disarmament of nuclear weapons seems disingenuous at best. But to question this report's logic misses the point, because it is a testament to ideological correctness. Only Mao's death in 1976 provided an opportunity to strip the bomb of its political character and explore the strategic rationales and possible utility of nuclear weapons in Chinese defense and foreign policy.

After China joined the ranks of the nuclear powers, its views of nuclear weapons underwent some important and understandable modifications. First, the incessant disparaging of nuclear weapons as a "paper tiger" was toned down in favor of trumpeting of China's success in creating a "real tiger," which could deter the country's enemies and boost the morale of the population. At the same time, China stepped up its criticism of the nuclear weapons policies of the Soviet Union and the United States, particularly the superpowers' use of their arsenals to intimidate and bully smaller states. Beijing's fears were confirmed during the chaos of the Cultural Revolution, when a feeler from Moscow to Washington was leaked. The feeler called for a preemptive strike against China's nuclear facilities, but was ultimately disavowed by Kissinger. China sought to differentiate itself from the superpowers by issuing a no first use policy, asserting both negative and positive security assurances,[41] and advocating the proliferation of nuclear-free zones around the world.[42] China also embraced the notion of a minimalist mutual deterrence, arguing that its small, new arsenal would credibly deter U.S. threats to launch a nuclear war. In short, China embraced MAD when it acquired nuclear weapons, as reflected in emerging doctrine and force structure, but for ideological reasons was precluded from explicitly labeling it as such. At the same time, both Russia and the United States abandoned MAD as an official policy, leaving China with a miminalist posture while they racheted up the ladder to a more maximalist position.

Views of Nuclear Weapons After the Death of Mao, 1978-Present.

The death of Mao permitted important changes in Chinese views of nuclear weapons, though the shifts were gradual in scope and timing. Deng Xiaoping, for instance, did not completely abandon the Maoist rhetoric about using nuclear victory over capitalist imperialism, and he was certainly no less cold-blooded in its analysis:

> It is impossible to exterminate the human race by using nuclear weapons. Now there are more than four billion people in the world. If the worst came to worst and more than two billion people died, the other more than two billion people would remain. More than two billion people would live on the globe just the same.[43]

Indeed, official statements about deterrence since the late 1970s have been remarkably consistent, despite wholesale changes in the arsenals of both the United States and the former Soviet Union. In 1983, Deng Xiaoping validated China's minimalist deterrence posture, declaring that the development of nuclear weapons "had forced the superpowers not to use" their arsenals against China, adding that "China only wants to adhere to principle: we have what others have, and anyone who wants to destroy us will be subject to retaliation."[44] In 1986, Defense Minister Zhang Aiping elaborated on this theme, asserting "We have built a powerful national defense and possess a nuclear strike capability. The enemy no longer dares to strike [the first blow] or to underestimate us."[45] These views have survived the end of the Cold War and are still being publicly delivered by officials. In a July 1997 speech to the U.S. Army War College, Lieutenant General Li Jijun, Vice President of the PLA's Academy of Military Science, reiterated China's public position regarding its nuclear posture:

> China's nuclear strategy is purely defensive in nature. The decision to develop nuclear weapons was a choice China had to make in the face of real nuclear threats. A small arsenal is retained only for the purpose of self-defense. China has unilaterally committed itself to responsibilities not yet taken by other nuclear nations, including the declaration of a no-first-use policy, the commitment not to use or threaten to use nuclear weapons against non-nuclear states and in nuclear-free zones . . . In short, China's strategy is completely defensive, focused only on deterring the possibility of nuclear blackmail being used against China by other nuclear powers.[46]

These comments also reveal the ongoing contradictions between China's declared nuclear principles, its changing force structure and doctrine, and important changes in the international security environment during this period, including U.S. and Russian drawdowns, the abrogation of the antiballistic missile (ABM) Treaty, the imminent introduction of theater and national missile defenses, the advent of increasingly accurate conventional precision guided munitions (PGMs), and the emerging weaponization of the Indian arsenal. Indeed, the comments highlight the necessity for a more critical examination of the discontinuities between China's public statements about nuclear weapons, its technical modernization programs, and doctrinal debates, with the goal of developing

a comprehensive understanding of the nature of the force. The question remains as to whether MAD is still an important organizing principle for China's arsenal.

China's currently deployed nuclear forces are incompletely postured for mutually assured destruction, as defined earlier. The small ICBM force (roughly two dozen missiles) is structurally and doctrinally configured for MAD, though its second strike has historically lacked credibility. The deployed continental United States (CONUS)-capable ICBM force is based exclusively in silos. It has no strategic early warning infrastructure to permit launch-under-attack (LUA)/launch-on-warning (LOW). As a result, the operational survivability of China's nuclear retaliatory capability vis-à-vis major nuclear powers was and probably still is open to question, particularly in the context of an all-out preemptive decapitation strike. At best, China's minimalist deterrent was primarily psychological, though the potency of this aspect of the deterrent should not be underestimated. Beijing's concerns about the credibility of its second strike, however, have been exacerbated by the expected deployment of theater and national missiles defenses by the United States, as well as the recognition that U.S. conventional forces have developed the ability to destroy fixed targets like silos with PGMs.

At the same time, the Chinese force has grown to encompass more than simply minimal deterrent forces, including theater and tactical systems. Viewed in its totality, the Chinese nuclear arsenal seems to defy simple categorization as a MAD force. The PRC's multifaceted inventory is made up of strategic, theater, and tactical systems of varying range, accuracy, and yield, reflecting the very different missions it is required to perform. The small ICBM force, anchored by the DF-5 family of missiles, is the heart of the MAD force, composed of a minimally necessary number of missiles with large warheads and CEPs designed to hit countervalue targets like cities. The theater systems, by contrast, are unlikely to be used in a second-strike role following a preemptive strike. Instead, the theater systems look like offensive systems meant to threaten or strike U.S. forces and bases in Asia in order to deter coalition operations or degrade conventional capability. The short-range, ballistic missile forces, which are also nuclear capable, further confuse the situation by serving a variety of conventional warfighting and nuclear

warfighting roles. For the future, the doctrine and force structure of China's Second Artillery must be analyzed at three distinct levels. The first level is a MAD posture of *credible minimalist deterrence* with regard to the continental United States and Russia, the second is a more offensive-oriented, counterforce posture of *"limited deterrence"* with regard to China's theater nuclear forces, and the third is an *offensively-configured, preemptive, counterforce warfighting posture* of "active defense" or "offensive defense" for the Second Artillery's conventional missile forces.

How did the Chinese force evolve into this arrangement? First, the evidence tends to confirm the arguments of Lewis, *et al.,* of the importance of technology as a determinant of Chinese doctrine. The progression of missile systems, with their gradually expanding ranges and capabilities, defined the limits of the possible for the Chinese leadership. Technology alone did not determine the nature of the Chinese nuclear force posture. Central guidance on ranges and payloads, while admittedly vague, appears to conform with strategic-level perceptions of threats and goals in the external security environment, especially when matched with its corresponding logical deployment pattern. Perhaps, the Chinese made a virtue out of necessity in the construction of their nuclear deterrent by accepting the technological constraints of the system and making rational choices under those constraints. Historically, attention has focused on reducing the discontinuity between reality and aspiration, which is oftimes referred to as the "capabilities-doctrine gap."

At the present stage in the Second Artillery's modernization, China is nearing an historic convergence between doctrine and capability, allowing it to achieve credible minimalist deterrence vis-à-vis the continental United States. This represents a convergence of its doctrine and capability that China has not confidently possessed since the weaponization of its nuclear program in the mid-1960s. Indeed, the PRC's current modernization program appears to be a quest to increase the credibility of its deterrence posture by improving the readiness and survivability of the force. Measures being implemented include a transition from volatile liquid fuels to more stable solid fuels, a shift from fixed basing to mobile basing, the introduction of improved guidance systems, and the construction of a robust C4I infrastructure. Currently, the Chinese have not operationally deployed their planned solid-fueled, road-mobile ICBMs, though the

DF-31 seems to be nearing initial operational capability after more than 30 years of work. When these systems come online, the Chinese will have succeeded in fielding a much more credible minimalist deterrent force, whose mobility and readiness theoretically increase the chances that some percentage of the force could survive a first strike and, thus, effectively deter potential attackers. In short, China has nearly put in place a fully-realized MAD force.

But what about the future? In particular, how should one interpret the streams of writings beginning in the late 1980s from PLA strategists that advocate so-called "limited deterrence," and appears to resemble counterforce "flexible response." While these writings are not official declarations of doctrine, the fact that they are written by military analysts and appear in officially-sanctioned military publications gives them a special salience which deserves further scrutiny. In analyzing these writings, Johnston observes the emergence of "more comprehensive and consistent doctrinal arguments in favor of developing a limited flexible response capability" and that "Chinese strategists have developed a concept of limited deterrence . . . to describe the kind of deterrent China ought to have."[47]

These recent Chinese writings call for limited, counterforce, warfighting capabilities "to deter conventional, theater, and strategic nuclear war, and to control and suppress escalation during a nuclear war."[48] According the Chinese analysts, such a posture requires:

> [a] greater number of smaller, more accurate, survivable, and penetrable ICBMs; SLBMs as countervalue retaliatory forces; tactical and theater nuclear weapons to hit battlefield and theater military targets and to suppress escalation; ballistic missile defense to improve the survivability of the limited deterrent; space-based early warning and command and control systems; and anti-satellite weapons (ASATs) to hit enemy military satellites.[49]

Because such a posture requires a significant increase in present Chinese capabilities, Johnston correctly highlights the gap between this proposed doctrine on the one hand, and actual capabilities on the other. As Godwin points out, the lack of any space-based reconnaissance or early warning systems means that Beijing's command and control system does not have the ability in real time to determine the size and origin of the attack, making it difficult to

determine what kind of response is required. This information is an essential component of the more sophisticated versions of limited deterrence found in Chinese military journals.[50] Johnston also notes that achieving such a deterrent posture is not an inevitable outcome, due to several constraints.

There is little empirical basis for questioning the findings of Johnston about internal military writings on nuclear deterrence, especially since there is a the striking disappearance of discussion of the term "minimal deterrence." There are a number of possible explanations. Paul Godwin suggests that Mao Zedong's death in 1976, and the implementation of Deng Xiaoping's military reforms in the late 1970s permitted China's military analysts to explore issues of doctrine and strategy "free from the stultifying requirement to verify everything they wrote with a literal interpretation of Mao's writings and statements."[51] Second, Godwin points to the increased battlefield nuclear weapons threat on the Sino-Soviet border, which "raised the salience of strategic deterrence and nuclear warfighting to a level it had never before achieved." This threat encouraged Chinese military analysts to read extensively in Western theories and journals.[52] Johnston himself offers some additional explanations in the last few pages of his *International Security* article.[53] Many of the PLA authors contrast limited and minimal deterrence, obviating the possibility that they have simply renamed the previous doctrine for bureaucratic purposes. The authors appear to be well-placed to affect the operational doctrine of the Second Artillery, which removes the possibility of a disjuncture between academic and military writings, as occurred between the writings of RAND strategists and the war-winning strategy of General LeMay at Strategic Air Command. If limited deterrence is defined as flexible response, counterforce warfighting, then perhaps limited deterrence is the *aspirational* doctrine for a future Second Artillery.

Three more caveats can be added to interpret the emergence and meaning of an ostensible counterforce doctrine in China. First, assuming a continued adherence by China to its testing moratorium, and the possibility that it will ratify the Comprehensive Test Ban Treaty (CTBT) in the future, it is reasonable to question China's ability to develop smaller, lighter, and more accurate nuclear warheads (including potential multiple reentry vehicle [MRV] and multiple independent reentry vehicle [MIRV] capability) consistent

with the counterforce aspirations described by Chinese analysts in the late-1980s and early 1990s. Second, it is possible that China's previously discussed tripartite system is a confirmation of Johnston's conclusions about limited deterrence, and the analysis has simply come to the same place from a different direction. Perhaps the Chinese, when they looked at the multifunctional force structure they created, felt that minimal deterrence no longer could encompass all of the various defensive and offensive, long-range and short-range systems in their arsenal. Borrowing from Confucius, they may have concluded that harmony could only be restored when the name of the thing matched the nature of thing, and the product of this *zhengming* was "limited deterrence." Third, even if one accepts limited deterrence as an overarching *aspirational* goal of this multifaceted system, the misinterpretation of Johnston's writings by some, such as the Cox Committee, to mean that the Chinese are unquestionably engaged in an aggressive modernization of their missile forces meant to enable counterforce warfighting, must be rejected. Indeed, there are legitimate, alternative explanations for many of the hardware trends in China. Reforms in mobility, readiness, and C^4I infrastructure are readily and more comprehensively explained as an attempt to increase survivability from foreign attack. It may simply represent the long-sought confidence of a credible deterrent, and not necessarily the desire to achieve a warfighting, war-winning strategy. Moreover, as long as the numbers of the force stay beneath a certain level, increases in accuracy and multiple warheads alone do not pose an appreciably greater threat to American and Russian nuclear superiority. American strategic nuclear forces number close to 8,000 deployed on 575 ICBMs, 102 strategic bombers, and 17 SSBNs. A single *Trident* SSBN, carries more missiles (24) than the entire Chinese ICBM inventory.

CONCLUSION: IS CHINA FINALLY GETTING MAD?

In retrospect, Jonathan Pollack's tentative predictions in a 1995 book chapter entitled "The Future of China's Nuclear Weapons Policy" appear prescient:

> Over the coming decade, the asymmetries between China's nuclear forces and those of the major nuclear arsenals seem likely to narrow, perhaps

> appreciably. As the arsenals of the United States and the successor Soviet states diminish, the scale and imputed significance of Chinese nuclear deployments will grow. In addition, the Chinese appear in throes of a transition to a more credible nuclear deterrence, though there are ample uncertainties here as well.[54]

Ironically, since the above publication, more uncertainty was created by Beijing's perceptions of the West than by Chinese behavior. Its growing perception is that the Bush administration is moving away from MAD and deterrence towards a focus on preemption. As a result, Pollack's analysis that "the Chinese presumably feel less subject to strategic pressure than at any point since their emergence as a nuclear weapons state" is certainly no longer true.[55] While the analysis in the previous section suggests that China's deterrent was credible in the psychological rather than technical sense of word, the ongoing development in the United States of a new generation of missile defense systems and the development of a potential capability to decapitate a small, nonmobile nuclear arsenal with conventional, precision-guided munitions undermines Beijing's "'insurance policy' against the prospect of significantly heightened U.S.-Chinese antagonisms."[56] As a result, Beijing has accelerated deployment of a new generation of solid-fueled, road-mobile missiles, and is on the verge of achieving a technically credible deterrent for the first time and restoring some equilibrium in the offense balance with the United States. If one factors in U.S. continuing failures with so-called "Scud-hunting" for mobile missiles, China may soon arrive at a stable equilibrium in the impending world of offense-defense racing, whereby a U.S. preemptive first strike would not be capable of sufficiently degrading China's forces such that the currently planned architecture of missile defenses could reliably catch the stragglers.

It is not clear whether Beijing will be content with the status of its nuclear force modernization once it reestablishes the credibility of its minimalist MAD force, particularly in a world marked by missile defenses, preemption and conventional attack. Indeed, the more interesting implications arise when one contemplates a larger Chinese force structure, combined with continuing reductions in Russian and American arsenals. Here Pollack's musings about the

declining appeal of minimalism and the possibility of trilateral "parity" between the PRC, United States, and Russia are relevant.[57] So are Brad Robert's challenge to the nuclear community to consider what trilateral deterrence at, say, 600 warheads apiece would look like.[58] In its desperation to retain the MAD dynamic, China may build to these levels, though it also permits the PRC to contemplate post-MAD counterforce strategies, such as a *force de frappe* capable of "tearing of an arm" of the adversary. Whether or not this force will ever be large enough to eclipse MAD in favor of counterforce is open to debate. What is clear, however, is that China is one of only two countries (the other being India) that is increasing the number of its forces while the Cold War arsenals of Russia and the United States are being gradually dismantled. Once the mobile DF-31 is deployed, China can be much more confident in its ability to ride out a preemptive strike, and rain down death on the attacker's cities. Assuming that the contradictions between its No First Use policy and the conventional threat result in the eventual scrapping of the policy, one can imagine a future in which China contemplates limited first strikes against an adversary's population centers or strategic forces. In such a violent world, we may dream of the days when China was only MAD.

ENDNOTES - CHAPTER 8

1. See *The National Security Strategy of the United States of America*, Washington, DC: U.S. Government Printing Office, 2002.

2. This definition is drawn from Arthur Steiner's excellent chapter in this book.

3. Alastair Iain Johnston, "China's New 'Old Thinking': The Concept of Limited Deterrence," *International Security* 20, No. 3, Winter 1995/96, p. 19.

4. *Ibid*., p. 20.

5. Alice Langley Hsieh, *Communist China's Strategy in the Nuclear Era*, Englewood Cliffs, NJ: Prentice-Hall, 1962, p. 4.

6. Mao Zedong, "Talks with the American Correspondent Anna Louise Strong (August 1946)," *Mao Zedong Selected Works*, Vol. IV, Beijing: Foreign Languages Press, 1975, p. 100.

7. Lin Biao, "Long Live the Victory of People's War," *Renmin ribao [People's Daily]*, September 3, 1965.

8. Hsieh, *Communist China's Strategy in the Nuclear Era*, p. 4.

9. Rong Zhi, "The Big Powers' Military Strategies and Our Countermeasures by the End of This Century," in *Guoji Xingshi yu guofang zhanlue [The International Situation and Defense Strategy]*, Beijing, 1987, p. 73.

10. Mao Zedong, "On the Ten Major Relationships" (April 25, 1956), in *Selected Works of Mao Zedong*, Vol. 5, Beijing: Foreign Languages Press, 1977, p. 288.

11. "United States Strategy is in a Blind Alley," *Shijie zhishi*, December 5, 1957.

12. *Renmin ribao*, February 21, 1958; *Ta kung pao*, July 5, 1958.

13. Statement of the Government of the People's Republic of China, 16 October 1964, found in John Wilson Lewis and Xue Litai, *China Builds the Bomb*, Stanford, CA: Stanford University Press, 1988, pp. 241-242.

14. *Stuttgarter Zeitung*, May 12, 1958.

15. *Jiefangjun zhanshi*, March 11, 1956.

16. *Ibid*.

17. Mao Zedong, "On the Correct Handling of Contradictions Among the People," *Xinhua*, June 18, 1957.

18. *Ibid*.

19. Peng Dehuai comment to a mission of Japanese military officers visiting the mainland, August 22, 1956.

20. Statement of the Government of the People's Republic of China, 16 October 1964, found in Lewis and Xue, *China Builds the Bomb*, pp. 241-242.

21. Hsieh, *Communist China's Strategy in the Nuclear Era*, p. 136.

22. *Washington Post*, December 8, 1963.

23. Soviet government statement, August 21, 1963.

24. *Ibid*., p. 260

25. *Ibid*.

26. Alice Langley Hsieh, "The Sino-Soviet Nuclear Dialogue: 1963," in Raymond Garthoff, ed., *Sino-Soviet Military Relations*, New York: Praeger, 1966, p. 162.

27. *Jiefangjun bao*, July 17, 1958.

28. Chinese government statement, August 15, 1963.

29. Hsieh, *Communist China's Strategy in the Nuclear Era*, p. 76.

30. Statement of the Government of the People's Republic of China, 16 October 1964, found in Lewis and Xue, *China Builds the Bomb*, pp. 241-242.

31. *Ibid*.

32. Alice Langley Hsieh, "The Sino-Soviet Nuclear Dialogue: 1963," p. 158.

33. Statement of the Government of the People's Republic of China, 16 October 1964, found in Lewis and Xue, *China Builds the Bomb*, pp. 241-242.

34. *Ibid*.

35. Liao Chengzhi speech, *Radio Peking*, August 1, 1963.

36. Jonathan Pollack, "The Future of China's Nuclear Weapons Policy," in Weixing Hu and John Hopkins, eds., *Strategic Views from the Second Tier: The Nuclear Weapons Policies of France, Britain, and China*, New Brunswick: Transaction Publishers, 1995, pp. 157, 164.

37. Hsieh, *Communist China's Strategy in the Nuclear Era*, p. 97.

38. *Ibid*., p.123.

39. An account of this program based on offi cial sources can be found in John Wilson Lewis and Litai Xue, *China Builds the Bomb*, Stanford: Stanford University Press, 1991.

40. Statement of the Government of the People's Republic of China, 16 October 1964, found in Lewis and Xue, *China Builds the Bomb*, pp. 241-242.

41. "China undertakes not to use or threaten to use nuclear weapons against non-nuclear-weapon States or nuclear-weapon-free zones at any time or under any circumstances. This commitment naturally applies to non-nuclear weapon States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons [NPT] or non-nuclear weapon States that have undertaken any comparable internationally binding commitments not to manufacture or acquire nuclear explosive devices." See Lieutenant General Li Jijun, *Traditional Military Thinking and the Defensive Strategy of China*, Letort Paper No. 1, Carlisle Barracks, PA: U.S. Army War College, August 29, 1997, p. 7; and China's white paper entitled *China: Arms Control and Disarmament*, Beijing: Information Office of the State Council, November 1995. The U.S. NSA, by constrast, is conditional in retaining the possibility of nuclear weapons use against non-nuclear weapon states who take part in an attack on U.S. territory, armed forces, or allies.

42. *China: Arms Control and Disarmament*, Beijing: State Council Information Office, November 1995, p. 261.

43. Xia Zhengnan, "On the Political Essence of War and the Atomic Age," *Mao Zedong Sixiang Yanjiu*, No. 2, 1990, p. 111.

44. Li Fumin and Li Dunsong, "A Brief Account of the Growth and Development of Our Country's Strategic Missile Troops," *Junshi Shilin [Military History]*, No.5, 1988, p. 51.

45. Li Jianghe and Hou Aiping, "What We Think About Our Country's Defense Development Strategy," *Junshi Shilin*, No. 5, 1987, p. 9.

46. Lieutenant General Li Jijun, *Traditional Military Thinking and the Defensive Strategy of China*, Letort Paper No. 1, Carlisle Barracks, PA: U.S. Army War College, August 29, 1997, p. 7.

47. Johnston, p. 5.

48. *Ibid*., p. 19.

49. *Ibid*., p. 20.

50. Godwin, "China's Nuclear Forces."

51. *Ibid*.

52. *Ibid*.

53. Johnston, pp. 35-36.

54. Pollack, pp. 157-158.

55. *Ibid*., p. 159.

56. *Ibid*.

57. *Ibid*., pp. 160, 165.

58. Robert A. Manning, Ronald Montaperto, and Brad Roberts, *China, Nuclear Weapons, and Arms Control: A Preliminary Assessment*, New York: Council on Foreign Relations, 2000.

CHAPTER 9

THE BRITISH EXPERIENCE

Michael Quinlan

PRE-HISTORY

For a mix of historical and geographical reasons, the United Kingdom brought to the nuclear revolution a security mindset differing in significant respects from that of the United States. The United States, behind its huge two-ocean moat, enjoyed (despite the outlying Pearl Harbor shock) a sense of continental sanctuary that in some degree endured, at least psychologically if not intellectually, until the impact of September 11, 2001. The combination of island configuration and dominant maritime power had for centuries given Britain a similar sense. With the advent of aircraft, however, able to overpass swiftly the short sea distances that separated Britain from the threats and turbulences of the rest of Europe, the experience of the two 20th-century world wars had unmistakably and irreversibly erased that sense.

In the First World War raids on England by Zeppelin airships began as early as January 1915. The vulnerability of these delivery vehicles led in time to their withdrawal from the bombardment role, but long-range fixed-wing aircraft subsequently entered the attack. Defensive attrition of all these efforts was severe. The direct damage inflicted, a few thousand civilian casualties, was modest in comparison with the carnage of the Western Front. But the disruption of industrial production and the diversion of air power into defence were significant, and the memory of attack lingered in public consciousness. It played some part in the widespread revulsion against the idea of war in the 1930s. The leading political figure of the time warned that "it is well for the man in the street to realise that there is no power on earth that can protect him from being bombed . . . . the bomber will always get through."

The outbreak of World War II in 1939 did not immediately produce the huge homeland bombardment that was initially feared, but during 1940 and 1941 air attack—especially but by no means only

the "blitz" on London—became part of common experience. New dimensions were added in 1944, when attacks began first with the V.1 cruise missile and then with the V.2 ballistic missile. The scale of the damage received did not reach that inflicted upon Germany, or later upon Japan, but it nevertheless was formidable; about 50,000 civilians were killed.

As a result of the British experience of war from 1914 to 1945, the British people and their leaders entered the nuclear age with a vivid awareness of their inescapable vulnerability. At the same time, this awareness was less shocking, because it was less unfamiliar, than it was for the United States.

One other aspect of British experience should be noted. From 1940 until almost the end of the conflict in Europe in 1945, the strategic bombing offensive, primarily against Germany, had been a massive component of the British war effort. (There were heavier losses in action among Bomber Command aircrew in World War II than among British junior officers on the Western Front throughout World War I.) The value-for-resources-used, the impact, and even the morality of the offensive became subjects of debate in postwar appraisal. But the weight and salience of the effort at the time meant that awareness of the practical aspects and issues of long-range "homeland" attack—the realities of targeting, for example—was probably more widespread, not only among professional servicemen but also with political leaders and in public discourse, than in almost any other country. This awareness extended to a recognition (or belief) that such attack should be directed—rather like maritime blockade, a historic form of Britain's military leverage—to sapping an adversary's economic and social strength rather then directly assailing his armed forces.

EARLY YEARS

In the immediate aftermath of August 1945, there were mixed views in Britain about the long-term significance of what had happened to Hiroshima and Nagasaki. Some military voices questioned its revolutionary significance, but air force leaders took a different view. In a remarkable letter in September 1945, only 2

months after succeeding Churchill in office, Prime Minister Clement Attlee argued to President Harry Truman that the new weapons represented a qualitative, not just a quantitative, change in the nature of warfare. Existing conceptions, he said, were now "completely out of date. . . . the only deterrent is the possibility of the victim of such an attack being able to retort on the victor." The idea of deterrence as the only protection against nuclear weapons dominated government thinking from then on, and so in large measure did the belief that the threat posed must be against the enemy's cities. The concern for nuclear-weapon-based deterrence moreover, almost from the outset of the postwar era, was given a sharper edge by perceptions that Soviet conventional-force preponderance in Europe was so massive that without prompt and all-out U.S. participation (not to be assumed until the North Atlantic Treaty Organization's (NATO) creation in 1949, and even thereafter not in prospect on a matching scale) a Soviet assault could reach the English Channel within weeks.

In January 1947, against the background of abrupt U.S. termination of its wartime cooperation on nuclear-weapon development, the UK Government (initially very secretly) made a formal decision to develop a capability of its own. There was, however, no possibility that such a capability could become operational with adequate delivery platforms and a significant stock of weapons before the mid-1950s, and for several years after 1947 there was no firm political guidance on the scale of force provision or the concepts of use. Even the Chiefs of Staff arrived at no clear consensus, despite considerable discussion. They recognized that severe limitations in intelligence about Soviet dispositions compounded the difficulties of any counterforce damage-limitation concept. They came also to accept—after higher initial hopes—that surface-to-air guided weapons did not offer, at least to a country in Britain's geographical situation, any expectation of success in warding off even a Soviet strike capability attenuated by attacks on its launching airfields.

Despite all this—and sitting oddly with its logic, at first look—there emerged at the end of the 1940s a disposition, especially within the Royal Air Force (RAF), to consider damage-limitation as well as counter-valve targeting. The basis for this was a hypothesis that the United Kingdom would be participating in a very large combined

offensive alongside the United States, even though at this stage the United Kingdom knew virtually nothing of U.S. plans. Despite some low-key informal contacts, it was not until well into the 1950s that this ignorance began to be rectified. Within the concept of joint action, the RAF thinking was that, because of its greater proximity to the Soviet Union, the United Kingdom might have different targeting priorities from the United States, and that the V-Force—the *Valiant*, *Vulcan*, and *Victor* strategic bombers which were being developed—should therefore concentrate its attacks upon air bases from which the United Kingdom could most quickly be struck. A planning staff paper in 1954 envisaged that 40 such airfields should be targeted. These concepts continued into the 1960s and played a part in RAF planning for V-Force participation which was progressively incorporated from 1959 onwards into the U.S. Single Integrated Operational Plan (SIOP), with British officers stationed at Strategic Air Command Headquarters in Omaha. This thinking was reflected at ministerial level in a report made to the Cabinet in 1955 by Minister of Defence Selwyn Lloyd.

But starker realities continued to present themselves. In 1955, a major interdepartmental study concluded that as few as ten thermonuclear bombs could virtually destroy the United Kingdom as a functioning society, and the government's major *Defence White Paper* of early 1957 frankly avowed this profound vulnerability. (Judgments of this kind played a part throughout the Cold War. There was an acceptance of the idea that, although civil defense had protected the general population during World War II, its prospects of success in the nuclear age, for a country in the United Kingdom's circumstances, were too thin to warrant massive expenditure.) The implication for strategic targeting policy, that damage limitation was an unfruitful avenue to pursue, was clear. So too, however, seemed the parallel implication that even a modest UK force could inflict a grave wound upon the Soviet Union. Occasionally in official papers from 1952 onwards, there were statements that "superiority in numbers has no meaning" which belong to the same line of analysis. Nevertheless, the roles assigned to the V-Force in the joint SIOP had a hybrid character. It was envisaged that Bomber Command's 1959 capability should be allocated 69 city targets and 37 counterforce ones. In 1962 (when during the Cuban missile crisis all the Command's delivery

systems were brought to heightened readiness), the targeting figures shifted to 16 cities and 82 counterforce. (Even in national planning the notion of damage-limitation understandably died hard. As late as the final decade of the Cold War, the neutralization of Soviet fleet ballistic missile submarines (SSBNs) was still a factor in Royal Navy thinking on the size and tasking of its attack submarine [SSN] hunter-killer force.) However, it became increasingly clear that UK-only nuclear plans could not realistically aspire to damage-limitation effect. These plans had to be countervalue—that is, so everyone at this stage assumed, directed simply at large cities (as shortcomings in intelligence and delivery accuracy, in combination with limited holdings of weapons and delivery systems, effectively dictated).

The scale of countervalue capability evolved rather unsystematically. The original planned size of the V-Force, at 240 front-line aircraft, reflected a broad judgment—scarcely more than a gut feeling—of what would be perceived as a force substantial enough to command caution from the adversary and influence with the major ally. The imprecision of such a rationale made it difficult for the Air Ministry (until 1964 still a full department separate from the Ministry of Defence) to resist progressive cutback of plans to help ease the constant pressure which national economic difficulties imposed upon the defence budget, and frontline numbers never rose beyond 150 aircraft. This diminution, coupled with recognition of the difficulties which the aircraft would have in penetrating Soviet defences in a UK-only strike, steadily reduced assessments of how heavy a countervalue threat the force could pose. This was recognized even though in their heyday these aircraft were at least the equal of U.S. counterparts in most performance dimensions other than range. In the late 1950s, it was variously forecast in official appraisals that the aircraft could knock out (this being defined as inflicting 50 percent destruction) between 30 and 40 cities. By 1962 the figure was down to 15, although still including Moscow and Leningrad. Ministers took the view that this was adequate for the deterrent purpose. The Minister of Defence of the day indeed suggested that 10 would be enough, but the Cabinet settled upon 15 as the benchmark. Logic suggested, and it was occasionally attempted, to start with a judgment of the deterrent required and derive force level from that.

As the above summary indicates, however, the governing methodology amounted to assessing what the existing or intended force could do and then considering whether that sufficed.

Historians of the period have suggested that the differences of concept between a countervalue national plan and a contribution to the U.S. offensive that was at least partly counterforce shows a basic and continuing confusion of thought. For all the oscillation of discussion in the early 1950s, this criticism is not necessarily valid. There was no incompatibility, and therefore no practical need to choose, between having one concept for the UK-alone hypothesis and a different one for participation in a U.S. effort which, because of its massive scale, could have wider objectives. In internal governmental debate, the arguments in favor of maintaining a substantial capability veered between seeking a voice in U.S. plans and decisions and providing a last-resort independent insurance. In logic and practice neither of these justifications excluded the other, or pointed towards divergent provision. That said, by the time of the pivotal events of December 1962, serious thinkers both within and outside the government had come to recognize that the fundamental case for UK capability, and indicators for its character and scale, must be sought in hypotheses of independent action from which the United States stood aside. Though the existence of significant strategic offensive capability based in Britain might be of potential value to the United States by helping to complicate the task facing any Soviet first-strike aspirations, since Britain's eastward location posed an awkward operational dilemma for the Soviets: "simultaneous launch or simultaneous arrival?" In terms of strike weight, however, the U.S. armory was reaching a magnitude that rendered any UK contribution no more than an optional extra. Indeed, for wider reasons, significant elements within the Kennedy administration would have preferred to see the UK's capability fade away.

THE SHIFT TO SLBMS

It had long been understood that V-Force penetrativity in the free-fall delivery mode would decline steadily as Soviet defenses improved. A stand-off air-launched missile code-named Blue Steel was developed and brought into service on a modest scale, but its

limited range and other shortcomings meant that it could not be seen as a long-term solution. A ground-based intermediate-range ballistic missile project, Blue Streak, was abandoned in 1960 largely because of the vulnerability of any land-based second-strike missile within a territory as small as the UK. In 1960 the Eisenhower administration undertook - subject to successful completion of development, which was not guaranteed - to make the *Skybolt* long-range air-launched ballistic missile available to the UK to prolong the life of the V-force. In late 1962, however, the United States decided to terminate the project. A tense meeting at Nassau in the Bahamas in December 1962 between President John Kennedy and Prime Minister Harold Macmillan yielded an agreement that the United States instead would sell to the United Kingdom *Polaris* submarine-launched ballistic missiles (SLBM) (initially envisaged to be the A.2 version, but in the end the A.3 version with three re-entry vehicles not independently targetable). It was envisioned that *Polaris* missiles would be installed in nuclear-propelled submarines designed and built by the United Kingdom.

If anyone in Britain doubted the inescapability of a countervalue targeting concept, this shift erased that doubt. The SSBN fleet—set at four boats, after an initial aspiration of five—could not be sure of sustaining on permanent operational patrol more than one boat with a load of 16 missiles. (Though there were often two boats at sea, and very occasionally three, UK planning always set its benchmarks by worst-case, no-warning scenarios.) Even if the A.3 missile had been capable of high-precision targeting, and even without allowance for a malfunctioning proportion, a salvo of this size could never hope to achieve a significant damage-limiting effect, or to cause enemy leaders any material concern about erosion of their offensive capability.

Almost from the moment the Nassau decision was announced, critics (in Britain and elsewhere) assailed it on the ground that reliance on the U.S. capability implied that UK nuclear independence had ceased to have reality. This had applied equally to the plan to acquire *Skybolt*. The answer to such criticism was (and remains) that the concept of independence has more than one legitimate interpretation, with different implications and markedly different price-tags. Given

the formidable size, diversity and quality of the U.S. inventory the strategic case for any ally to maintain a separate capability rested on a hypothesis that in some circumstances the U.S. armory might not be promptly available. If, hypothetically, the United States became deeply alienated and withdrew from its materiel-support commitments to its allies, the allies would need independence of procurement. Except for a few items, such as tanker aircraft, France chose this sort of independence, at high financial and opportunity cost within its defense budget. If, however, the hypothetical situation involved the United States merely being unwilling (or thought likely to be unwilling) to stand fully by its allies in time of acute crisis and mortal danger, a narrower form of insurance would suffice. Independence then need mean no more than the ability to make one's own operational decisions; that is, to be free to launch nuclear strikes whether or not the United States chose, or wished its allies, to do so. It was the latter form of independence, with its much lower costs and therefore less damaging repercussions on other aspects of defense effort, that United Kingdom decisionmakers saw themselves as choosing.

The first *Polaris*-carrying boat became operational in 1968. In the following year, the strategic nuclear role was formally transferred from the Royal Air Force to the Royal Navy. Some squadrons of V-bombers were kept in service until the early 1980s in a supplementary or "sub-strategic" nuclear role. Both the *Polaris* missiles and the remaining V-bombers were declared to NATO and notionally tasked by NATO military staffs in plans for General Nuclear Release, though amid the vast plethora of systems available there was a good deal of artificiality about finding targets to assign to them. For UK staffs, national plans that tasked *Polaris* in the countercity role were the prime focus of attention. The V-bombers also continued for some time to be seen for national purposes as simply participating in an all-out countercity assault. From 1967 onwards, NATO developed its flexible-response strategy, including the idea of carefully-limited nuclear strikes as an option to convey war-termination imperatives. In 1975 U.S. Secretary of Defense James Schlesinger presented a similar concept of Limited Nuclear Options for U.S. strategic forces. Such doctrines, however, were transmitted and absorbed

only slowly between UK policy and operational staffs. It was not until 1978 that their applicability was recognized and reflected in UK national plans for the V-bombers and for other aircraft that later offered deep-strike potential. (The national tasking of shorter-range aircraft and maritime systems equipped with UK nuclear weapons is not considered here.).

Though the *Polaris* force remained the United Kingdom's key strategic nuclear delivery resource until well into the 1990s, two issues soon impelled governments to reconsider the concepts and needs of deterrence. The first issue concerned what stance the United Kingdom should take, both in respect of its own direct interests and as a member of NATO, about the strategic arms limitation process which the United States and the Soviet Union began in 1969. The second—in some degree related—was how to deal with the threat to UK penetration capability posed by Soviet defenses against ballistic missiles.

The United Kingdom had concerns about the Strategic Arms Limitations Talks (SALT). The main ones were that the scale of its own modest force provision should not be "counted in" on the U.S. side; that the United States should not bind itself in any way that would constrain its future freedom to help allies again on the lines of previous cooperative acts such as the 1962 Nassau bargain, and that Soviet antiballistic missile (ABM) defences should be constrained to the lowest level attainable (ideally zero, though it was swiftly recognized that this was not on the cards). In the earlier years of the SALT/Strategic Arms Reduction Treaty (START) processes, UK staffs sought to think the issues through on a broader basis as a leading member of the collective Alliance and to provide a useful "second opinion" for the United States. The UK believed that (1) two-way deterrence, underpinned by manifest capability for mutual assured destruction not as preference but as ineluctable fact, had to be accepted; (2) the prime aim of the negotiations should be to maintain deterrence in as stable a form and at as low a cost as possible; (3) precise numerical equality in systems was not important at the magnitudes involved; and (4) attempts to establish neatly-symmetrical category-by-category equivalences amid the asymmetries of the East/West confrontation might damage NATO strategy and deterrence.

The soon-evident fact that the Soviet Union could not be convinced not to have ABM defenses around Moscow clearly affected the ability of the UK's *Polaris* A.3 missiles to pose a threat to the Soviet capital. The A.3 missile was judged highly vulnerable to exo-atmospheric interception by the Soviet *Galosh* system, and the UK force was not large enough, especially in the one-boat case, to rely (as the United States always could) on saturating the defence shield, even at the 100-interceptor limit set by the 1972 ABM treaty. Discussion of what to do about this, and then of the development of countermeasures, was taken forward very secretly. The matter was closely held within government, and there was virtually no public debate or even awareness until an announcement was made in 1980, when the chosen countermeasure was close to entering operational service. Deliberations were premised on the assumption that the ability to target Moscow effectively ("the Moscow criterion") was important for deterrent credibility. The argument for action noted the constant possibility, at least in theory, that the Soviet Union might one day choose to break out of the ABM treaty to provide protection for a wider range of assets. Additionally, an exo-atmospheric ABM system (such as the Soviet Union had deployed) could generate a defended "footprint" (its precise size and shape depending on the azimuth and trajectory of incoming missiles) covering a much larger area than just the city of Moscow itself.

The solution chosen, code-named *Chevaline*, was to fit a much-changed front-end to the A.3 missile. The highly sophisticated technology incorporated in this new front-end aided penetration at the expense of reducing the warheads carried from three to two. The warheads were still not independently targetable. The project (designed and paid for by the United Kingdom, though it had some U.S. antecedents and U.S. industrial participation) was technically demanding and proved much more costly than was originally foreseen. As a result the need for it, and the related value placed upon the "Moscow criterion," was challenged. But the Government of Prime Minister James Callaghan decided against cancellation, partly because the disclosure of abandoning such a major endeavour in mid-development would detract from UK credibility in the nuclear field.

Trident

Despite the imminence of the Chevaline improvement, it was evident by the end of the 1970s that, given project lead-times, the question of whether and how to replace the *Polaris* fleet could not be deferred. The arguments bearing upon the scale and character of threat capability needed for adequate deterrence in the UK-only setting ("second centre of decision") were revisited in internal Government studies more systematically than had been done at most earlier junctures, but without radical change of outcome in either the basic concept of countervalue strike or the order of magnitude judged necessary.

Though a substantial range of delivery system options was dutifully examined, the *Trident* sea-launched ballistic missile (SLBM) system emerged unsurprisingly as the clear preference, and in 1980 the United States agreed to sell it. Purely in weight of strike potential, the United Kingdom could have been content with less than *Trident* could offer, even in the C.4 version originally chosen (let alone the D.5 version to which the United Kingdom switched in early 1982, when it became clear that the United States was committed to proceeding with its acquisition and deployment). The original choice and the switch were driven in large measure by the long-term financial and logistic benefits of commonality with the United States. After the end of the Cold War, the United Kingdom announced a series of discretionary reductions in warhead load to well below what *Trident* was capable of carrying.

The 1980 decision to acquire *Trident* was explained in a special memorandum published by the Ministry of Defence (Defence Open Government Document 80/23). This is of particular interest for the present survey because it included the fullest—or, perhaps more accurately, the least meagre—statement made by any UK Government over the years about the sizing and targeting of strategic nuclear capability. The relevant section of the memorandum merits extended quotation:

> The "Second-Centre" Role:
>
> 9. If Britain is to meet effectively the deterrent purpose of providing a second centre of decisionmaking within the Alliance, our force has to be

visibly capable of posing a massive threat on its own. A force which could strike tellingly only if the United States also did so—which plainly relied, for example, on U.S. assent to its use, or on attenuation or distraction of Soviet defences by United States forces—would not achieve the purpose. We need to convince Soviet leaders that even if they thought that, at some critical point as a conflict developed, the United States would hold back, the British force could still inflict a blow so destructive that the penalty for aggression would have proved too high.

10. There is no way of calculating exactly how much destruction in prospect would suffice to deter. Clearly Britain need not have as much power as the United States. Overwhelming Britain would be a much smaller prize than overwhelming the United States, and a smaller prospective penalty could therefore suffice to tilt his assessment against starting aggression that would risk incurring the penalty. Indeed, one practical approach to judging how much deterrent power Britain needs is to consider what type and scale of damage Soviet leaders might think likely to leave them critically handicapped afterwards in continuing confrontation with a relatively unscathed United States.

11. The Soviet Union is a very large and powerful state, which has in the past demonstrated great national resilience and resolve. Its history, outlook, political doctrines, and planning all suggest that its view of how much destruction would constitute intolerable disaster might differ widely from that of most NATO countries. Appalling though any nuclear strike would be, the Government does not believe that our deterrent aim would be adequately met by a capability which offered only a low likelihood of striking home to key targets; or which posed the prospect of only a very small number of strikes; or which Soviet leaders could expect to ward off successfully from large areas of key importance to them. They might even be tempted to judge that if an opponent equipped himself with a force which had only a modest chance of inflicting intolerable damage there might be only a modest chance that he would have the resolve to use it at all.

12. Successive United Kingdom Governments have always declined to make public their nuclear targeting policy and plans, or to define precisely what minimum level of destructive capability they judged necessary for deterrence. The Government however thinks it right now to make clear that its concept of deterrence is concerned essentially with posing a potential threat to key aspects of Soviet state power. There might with changing conditions be more than one way of doing this, and some flexibility in contingency planning is appropriate. It would not be helpful to deterrence to define particular options further. The Government, however, regards the considerations noted in paragraphs 10 and 11 above as important factors in deciding the scale of capability we need.

The reference to posing a threat to "key aspects of Soviet state power" is worth noting since it signalled, even if lightly and indirectly, a new strand of thought in official utterances on strategic nuclear issues. The phrase was intended to imply targeting concepts which, while still countervalue and not promising to exempt cities or in particular Moscow, would not be exclusively or primarily directed at the destruction of cities. The impulse behind this was ethical, and reflected in some degree vigorous public debate in Britain on the moral tolerability of striking at populations. It was recognized within Government defence circles that *Polaris*—with high-yield warheads, not independently targetable, and mediocre accuracy—was not well-suited to providing more discriminate options, but that more flexible options might become available with the advent of *Trident*. Considerations of this kind continued to be voiced internally from time to time, but nothing further was said publicly, and it is not known outside Government how much adjustment of planning resulted.

AFTER THE COLD WAR

Since the end of the Cold War, there has been little debate about the United Kingdom's strategic nuclear capability. The capital investment in the *Trident* force was well-advanced by 1989, and nearing full commitment by the time the Soviet Union broke up. Argument over whether the United Kingdom should remain in the nuclear-deterrence business at all—against what possible adversaries, with what targeting concept—could have been stimulated afresh, but it had lost the impulsion of large savings available to be made or of new decisions forced upon public attention. Despite the longstanding antinuclear tradition on the Left, the incoming Labour Government excluded the *Trident* force (as it did no other component of the defence programme) from reexamination in its 1998 *Strategic Defence Review*. The Government, continuing the preceding Conservative government's initiatives without elaborating on strategic rationale, announced a reduction in the force's holding of operational warheads to 200 or less, with no more than one boatload of 48 warheads (that is, an average of three per missile) to be at sea at any one time. In

addition, the Government completed the phasing out of all other nuclear-weapon capabilities, and is configuring the *Trident* force to provide "substrategic" options. This has been conjectured to mean that some missiles might have only a single warhead, and that warhead might have reduced explosive yield.

The United Kingdom has declared, as have the United States and Russia, that its remaining nuclear weapons are not in normally targeted at anyone. No indication has been given of how they might be targeted—at what adversaries, against what types of objective—in time of crisis. Considerations of sparing populations that emerged in the 1980s are surely still prominent, but nothing has been said or is to be expected. It is likely that UK Governments would regard that as now even less necessary, and even more undesirable, than it was thought during most of the Cold War. "[I]t has been the preference of Governments to allow [adversaries] to draw their own conclusions rather than to describe precisely what our plans and capability would be in terms of targeting policy."[1] There is no basis for speculation on what contingency planning may secretly be undertaken within the Ministry of Defence or operational headquarters. It is possible, given now the very general "to-whom-it-may-concern" character of UK nuclear deterrence, that there is currently little or no such planning in specific terms.[2]

ENDNOTES - CHAPTER 9

1. Ministry of Defence witness in evidence to House of Commons Defence Committee, November 4, 1980.

2. Under the "30-year rule" applying to the release of most categories of UK Government papers, files relating to the period up to the end of 1972 are available (though still with significant exceptions on continuing security grounds) in the National Archives. For most of this early period, the survey in this chapter draws extensively on the study of the files reflected in "Ambiguity and Deterrence: British Nuclear Strategy 1945-1964" by Professor John Baylis, Oxford: Clarendon Press, 1995. It is indebted also to the recollections of Mr. Peter Hudson, who occupied senior planning posts in the Air Ministry. UK strategic nuclear targeting policy beyond the 1960s is little discussed in the open literature, and, because of the sustained reticence of successive Governments, such material as exists is mostly either speculation or based on sources of uncertain authenticity. There is, however, a useful survey in Professor Lawrence Freedman, "British Nuclear Targeting," in *Strategic Nuclear Targeting*, Ball and Richelson, eds., Ithaca, NY: Cornell University Press, 1986, pp. 109-126.

PART III

MOVING BEYOND MAD

CHAPTER 10

SMALL NUCLEAR POWERS

Mark T. Clark

INTRODUCTION

Why might it be useful to examine how small nuclear powers (SNPs) consider nuclear deterrence and use? Much of the burgeoning literature on SNPs is concerned primarily with the effects on nuclear proliferation. It focuses on how the behavior of SNPs (testing, development, deployment, and nuclear trade) may adversely affect the antiproliferation norms, treaties, and regimes established over the last 30 years. The new domino theory addresses how SNPs may encourage or compel other states to acquire or develop nuclear weapons. As important as that literature is, however, deterrence failures would have more catastrophic effects. This chapter evaluates how SNPs may use nuclear weapons for deterrence and, should deterrence break down, in actual military operations. The four SNPs under consideration here are Israel, India, Pakistan and South Africa (while it had them).

Most of the remaining literature assumes that SNPs adhere to a similar deterrence policy. While not always specific, the assumption seems to be that SNPs must have developed a variation on a minimum deterrence policy, based on a smaller, more limited version of Mutual Assured Destruction (MAD), a mini-MAD.[1] Since SNPs invariably have relatively small nuclear arsenals, or at least small in comparison to superpower arsenals or second tier nuclear powers like France, Britain, and China, they are constrained to adopt a mini-MAD deterrent. That is, they have adopted nuclear policies that demand countervalue, city-busting targeting simply as a last resort, if even that. Some suggest that the mere possession of nuclear weapons by a SNP confers "existential deterrence," a de facto deterrence realized through the mere potential for, or possession of, nuclear weapons.

Uncritical acceptance of the idea of mini-MAD produces myopia about how SNPs may use nuclear weapons. Oddly enough, deterrence theorists who hold to some form of MAD may be too optimistic about the improbability of war, precisely because of its potential catastrophic consequences. The opposite approach, believing that war is inevitable and will entail nuclear warfighting, produces its own myopia about how SNPs consider nuclear deterrence. A better approach to the subject is based on prudence. As Owen Harries noted some time ago:

> Both a consistent worst-case and a consistent best-case mentality interfere with the ability to see things as they are. But there is a difference. The characteristic error associated with the former is the taking of unnecessary measures to meet problems which do not arise (though, even then, there is always the question of whether they would have arisen had not action been taken). The characteristic error associated with best-case thinking, on the other hand, is the failure to take measures to cope with problems that *do* arise [emphasis in original]. The first is likely to be wasteful; the latter may be fatal.[2]

MAD may have problems when applied to SNPs. Assured Destruction (AD), as viewed by Robert McNamara during the 1960s, imposed fairly heavy requirements for nuclear forces in deterring a Soviet attack. U.S. nuclear forces were required to absorb a well-executed surprise attack and respond with unacceptable damage on the Soviet Union. That level of unacceptable damage was calculated to be the destruction of nearly 50 percent of Soviet industry and casualties of up to 25 percent of the Soviet population. The calculus of damage was based on the United States having 400 equivalent megatons available for delivery on Soviet cities after degradation from the surprise attack and accounting for the reliability of delivery systems and their ability to penetrate Soviet defenses. AD was mutualized (MAD) for similar levels of destruction on both sides. However, it is unlikely SNPs will ever get to those levels of destruction. Even in the worst case of an all-out Indian-Pakistan nuclear exchange, terrible as it would surely be, the level of destruction fails to come even remotely close to the expected level of destruction under MAD.[3]

Deterrence policies have another problem. States that announce a deterrence policy do so in order to convince their opponents not

to initiate war in the first place. That is to say, deterrence is largely a psychological phenomenon.[4] However, deterrence policies are public declaratory policies, and often differ substantially from the targeting plans a military force develops for the use of nuclear weapons in war (the action or employment plans). For instance, late in the Johnson administration, after McNamara had enshrined MAD as U.S. policy, only about 7 percent of U.S. nuclear weapons were targeted on Soviet cities.[5] In other words, despite the public rhetoric about destroying tens or hundreds of Soviet cities in a nuclear annihilation, Soviet cities were (a) only a small fraction of the target set, and (b) targets of last resort. There are good reasons to believe that SNPs are struggling with the same gap between their public policies and their internal military plans.

While commentators frequently acknowledge that it is too simplistic to impose Cold War ideas of nuclear deterrence on emerging nuclear powers, it is a hard habit to shake. Viewing SNPs through the prism of MAD and/or related deterrence ideas has its problems. Such theories tend to be deductive in form.[6] Theories of deterrence hold axiomatically to the Rational Actor assumption about state behavior and choices with respect to nuclear weapons. Rationality assumes a pure "cost/benefit" analysis with perfect information that ignores or downplays individual differences among states.[7] According to "rationality" in deterrence theory, the costs of nuclear use will always outweigh any conceivable gains. While not disparaging of the utility of such an assumption, by definition it ignores how individual state leaders, bureaucracies, beliefs, and ideologies shape nuclear strategies. Indeed, it imposes a uniform calculus on very different actors with very different strategic "personalities."[8] Further, an assumption of rationality is, by definition, not necessarily true. The criterion for employing such theoretical assumptions is whether they are useful. The usefulness of the assumption of rationality has been challenged.[9]

If it is problematic to view SNPs through the prism of western deterrence theory, it is not a problem that SNPs make, though they make a share of their own. Frequently, analysts, politicians, and strategists for SNPs assure us that they have learned much from our literature and experience, and will not make similar "mistakes." It

therefore behooves us to first understand how policymakers in SNP countries understand themselves, their deterrence requirements, and their articulation of plans.

The approach taken here is primarily inductive rather than deductive. A series of questions guides the review of how SNPs are talking about themselves, their deterrence requirements, and their deterrence postures. The questions are designed to tease out the different ideas SNPs have considered in designing their deterrence preferences. Rather than assuming a uniform deterrence calculus based on "rationality," this approach tries to capture the preferred values that key policymakers and military strategists see for their own nuclear forces.

The questions are:

> How do SNPs perceive their own views on deterrence and nuclear use? What kind of deterrence doctrine, if any, has been publicly established?
>
> Does the emerging SNP literature on nuclear weapons envision a continuum for nuclear weapons use? If so, what is it?
>
> What are the threats to the SNPs, and how do those threats impact the development of nuclear weapons?
>
> Does it matter whether a particular state has civilian or military control over nuclear weapons?
>
> What are the research and development trends for the delivery of nuclear weapons that may signal changes in deterrence posture?

The results of this study are suggestive, not conclusive. This is due in no small measure to the absence of enough data to make determinations with a high degree of certainty. Another difference from the Cold War is found here. During the Cold War, the data on the respective arsenals, the doctrines that guided them, and public declaratory statements (along with publicly available records on arms production at least for the United States), made calculations of the deterrence relationship fairly simple. If that seems odd, given the enormity of the nuclear arsenals and variety of delivery systems of the United States and the Soviet Union during the Cold War, consider that with the exception of the Republic of South Africa, we have no certain data on the number of nuclear weapons by the other three SNPs considered here. Debate still rages over how many weapons, if actually produced and weaponized, are deliverable. Moreover,

the delivery systems for the most part are far less advanced, and their reliabilities therefore are more difficult to calculate. Only India published a draft nuclear doctrine and subsequently an "operationalized" nuclear doctrine, but it contradicts its officially declared deterrence policy. Israel's official nuclear policy remains opaque. Finally, whereas Pakistan's nuclear policy is India-centric, India argues that its nuclear forces are primarily for China; Israel has—and South Africa had—no nuclear neighbors. There can be no mutuality (the M in MAD) without nuclear neighbors.

Nonetheless, some hypotheses may be proposed. First, it seems clear that these four SNPs all hold to a richer view of nuclear deterrence than a simple mini-MAD deterrent theory suggests. Second, all four see a use for nuclear weapons that is at least as broad as that viewed by the superpowers during the Cold War, though adapted to local conditions. Third, all have some idea of how they might use nuclear weapons on the battlefield, or at least have considered their use. This last hypothesis most directly contradicts the mini-MAD deterrence paradigm. While it does not prove that SNPs will use nuclear weapons on the battlefield, or that deterrence will necessarily break down, it at least suggests that Western observers ought not ignore how SNPs view themselves. In crises, political leaders tend to turn to those ideas and habits developed in calmer times. There is little to suggest that SNPs would do otherwise.

It does suggest, however, that non-nuclear powers should look skeptically on the acquisition of nuclear weapons. While some deterrence theorists argue that acquiring nuclear weapons brings greater security and peace of mind, the short history of small nuclear powers tells a different story. Acquiring nuclear weapons means acquiring a whole host of new problems, even greater than the problems of not having them. Trying to figure out how to secure them, use them, or lose them are among only a few of the numerous problems that attend such weapons. More importantly, having nuclear weapons means having to consider how to defend against them, and how to rebuild society should deterrence fail; neither consideration is easy.

THE REPUBLIC OF SOUTH AFRICA

The Republic of South Africa's (RSA) nuclear program is an oddity in international politics. It remains the only state that developed nuclear weapons and subsequently dismantled them.[10] Though there is still debate on exactly when the RSA decided to produce militarily useful nuclear weapons (sometime in the early to mid-1970s), there is no doubt as to when it officially gave them up. By all official accounts, the RSA completely dismantled its nuclear weapons and related infrastructure by June 1991. On July 10, 1991, the RSA acceded to the Treaty on the Non-Proliferation of nuclear weapons (NPT), and by September 16, signed full-scopes safeguards with the International Atomic Energy Agency (IAEA). For many, RSA's actions are a model for reversing proliferation.[11]

Scholars debate why the RSA got into the nuclear business.[12] Some argue that the RSA's security situation is sufficient to explain its decision. Others believe that the regime's internal weaknesses also contributed. Still others argue that nuclear capability development was based on Pretoria's belief that South Africa was part of the western European security culture. When Europe and America began to distance themselves from South Africa's apartheid policies, the regime's sense of insecurity increased dramatically. Without settling the differences in scholarly approaches to the subject, or the peculiar theories employed to prove them, it is sufficient to note that all of the factors above helped shape the regime's decision.

The mid-1970s were troubling for South Africa. The security situation of South Africa grew more complicated when Portugal withdrew from Africa after the 1974 Lisbon coup. Subsequently, communist governments emerged in Angola and Mozambique. At the same time, western governments began disassociating themselves from the RSA's policy of apartheid, particularly the United States, under the administration of President Jimmy Carter. Finally, Soviet support for regional enemies through the use of proxy forces rattled Pretoria's leadership as well. Former State President of South Africa Mr. F. W. de Klerk testified:

> The decision to develop this limited [nuclear] capability was taken . . . against the backdrop of a Soviet expansionist threat in Southern Africa, as well as prevailing uncertainty concerning the designs of the Warsaw Pact members.

> The build-up of the Cuban forces in Angola from 1975 onwards reinforced the perception that a deterrent was necessary, as did South Africa's relative international isolation and the fact that it could not rely on outside assistance should it be attacked.[13]

By the late 1980s, however, South Africa's security situation had improved considerably. De Klerk noted that when he became president in 1989, a cease-fire in Angola had been agreed upon. In December 1988, a tripartite UN agreement provided for the withdrawal of 50,000 Cuban troops from Angola. And, finally, the Cold War began winding down with the destruction of the Berlin Wall and the collapse of the Warsaw Pact. As de Klerk's administration began reforming its policy of apartheid and sought greater cooperation with neighboring African states, it determined that "a nuclear deterrent had become not only superfluous but, in fact, an obstacle to the development of South Africa's international relations."[14]

In 1993, de Klerk testified to Parliament of South Africa's secret nuclear weapons program. He indicated that the RSA had dismantled its nuclear weapons program and acceded to both the NPT and IAEA inspections. The RSA's original nuclear objective had been to develop seven nuclear devices, though only six were developed by the time the decision was made to dismantle them. De Clerk also averred that no advanced nuclear weapons, such as thermonuclear devices, had ever been developed. He also spelled out the RSA's limited nuclear deterrence policy. In the event of a dire threat to South Africa's existence, the RSA would confidentially inform the major powers, presumably including the United States, of its nuclear program in order to elicit (or provoke) intervention on its behalf.[15]

Waldo Stumpf, director of the RSA's Atomic Energy Corporation, explained the three phases of the nuclear deterrent policy:

> Phase I: Strategic ambiguity. The RSA would develop its indigenous nuclear weapons and prepare for any contingency, and would neither confirm nor deny its capability.
>
> Phase II: Covert acknowledgement. Should the situation deteriorate significantly, say by threats to South Africa's territory by Warsaw Pact

> countries through surrogate Cuban forces, the RSA would consider covertly acknowledging its nuclear deterrent to international powers, particularly the U.S.A.
>
> Phase III: Overt acknowledgement. Should covert acknowledgement fail to induce or provoke a major power to intervene on behalf of the RSA, the government would consider publicly acknowledging its nuclear deterrent or demonstrating it by an underground nuclear test.[16]

This "strategy" seems to have evolved from an ambiguous three-fold recommendation by a key military adviser to then Defense Minister P. W. Botha in mid-1978. Botha had requested a study on nuclear deterrence by South African Defense Force (SADF) Chief of Staff for Planning, Army Brigadier John Huyser.[17]

The actual "strategy" was a bit more nuanced. In 1983, Andre Buys, a senior scientist with Armaments Corporation (Armscor), chaired a working group of senior scientists and politicians. The group conducted war games, reviewed deterrence literature, and developed a nuclear doctrine. Phase I remained the same. However, Phase II included not only privately acknowledging RSA's nuclear deterrent, but also inviting scientists of the skeptical countries to privately examine its nuclear weapons capability and, if the guests remained skeptical, threaten to detonate a nuclear device underground. Phase III was the most ambitious, involving three steps itself. The first step would be to publicly declare its nuclear deterrent or conduct an underground test. The second step, should the first fail to elicit the desired response, would be to detonate a nuclear weapon 1,000 kilometers south over the ocean. The last step, if all else failed, would be to threaten to use nuclear weapons tactically on the battlefield.[18]

Senior RSA officials declared that in actual practice the RSA never got—nor ever intended to get—beyond Phase I.[19] They argue that the only reason for the weapons in the first place was for deterrence, however ambiguously defined. Most admitted that the actual use of nuclear weapons would be suicidal, politically and militarily, since the Soviet Union could have responded with a devastating riposte.[20] Some scholars believe the weapons were simply for blackmail diplomacy, designed solely to keep the West, especially the United States, in place as an ally in the event of dire emergency.

To support their contention, they point out that the weapons were never deployed militarily or integrated into the country's military doctrine.[21] As importantly, Buys mentioned that he and the other Armscor scientists who developed the bomb and recommended its strategy were aware of the allegations that Israel used nuclear weapons during the 1973 Yom Kippur War in order to obtain U.S. assistance. According to one scholar, Buys later wrote:

> [The Armscor working group was] aware of the alleged use by Israel of its nuclear capability . . . during the 1973 war. We had no proof that this was factual. . . . The allegation probably subconsciously influenced our thinking. We argued that if we cannot use a nuclear weapon on the battlefield (as this would have been suicidal), then the only possible way to use it would be to leverage intervention from the Western Power by threatening to use it. We thought that this might work and the alleged Israel-U.S. case gave some support to our view.[22]

Still another scholar of South Africa's nuclear program believed that South Africa's nuclear weapons "were developed without a strategic rationale."[23]

The threats to South Africa were amorphous; its possible nuclear targets were hard to imagine. South Africa had no nuclear neighbors. Its defense forces could defeat any conceivable invasion threat conventionally, even an improbable Soviet invasion force of airborne, air assault, and naval infantry forces. General Jan Geldenhuys, chief of the South African Defense Forces (SADF) from 1985 to 1990, testified that he saw no need for nuclear deterrence because such threats to invade were seen as slight probabilities.[24] About the only conceivable targets were nearby cities and Soviet naval forces offshore, since South Africa lacked capability to strike any targets at very great range.[25]

ISRAEL

Israel's nuclear policies are *sui generis*. From the beginning, Israel has kept its nuclear program a tightly held secret, even among its political leadership.[26] Its nuclear program was born and developed at a time when Arab states backed by the Soviet Union posed threats to its existence. As importantly, Israel has kept its nuclear posture

opaque to foreign observation and inspection. Observers have called it a policy of "deliberate ambiguity" or one of "opacity," though a better description may be that its nuclear program is "translucent." Enough is known about Israel's nuclear capability to conclude that it provides credible deterrence, but without enough certainty to provoke unwanted reactions.

Unlike other small nuclear powers, Israel has never given any official declaration of its nuclear policies. In fact, according to most scholars, by remaining ambiguous about its nuclear arsenal—as well as any nuclear targeting plans or nuclear doctrine—Israel reaps most of the rewards of a declared nuclear deterrent but avoids its costs.[27] The reward of translucence is existential deterrence; that is, the deterrence of a major Arab invasion of Israel proper. The costs of going public, however, could be heavy. They could include forcing the United States to reverse its nonproliferation policy or to distance itself from Israel and perhaps compel Israel to disarm. An announcement might also propel Arab states to overtly pursue nuclear weapons.

Given Israel's deliberate ambiguity, its nuclear doctrine and plans for nuclear use must be inferred from circumstantial evidence. Despite this, a number of scholars of Israel's strategic deterrent are adamant that the only purpose for Israel's nuclear weapons are for weapons of last resort—that is, a mini-MAD deterrent.[28] Others see more subtlety to its putative doctrine, including the use of nuclear weapons diplomatically, politically, and militarily, as well as a last resort.[29] The available evidence suggests that however deficient Israeli official policy pronouncements may be, the latter seems more realistic.

Of all small nuclear powers, Israel's nuclear capabilities are the most robust, advanced, and diverse. The U.S. intelligence community suspected Israel of having some 25 nuclear weapons by the early 1980s. To the community's surprise, evidence from a walk-in defector, either an Israeli scientist or technician, gave the United States its first look inside the Israeli nuclear production facility at Dimona some 5 years before the defection of Mordechai Vanunu. It is reported that the walk-in had photographs that suggested Israel had more than four times the original estimate, some 100 nuclear bombs, and that Israel had a very sophisticated program far more advanced

than originally believed. More importantly, the data the defector brought with him about the delivery systems suggested that Israel could deliver nuclear warheads with accuracies that were the equal of anything the United States or the Soviet Union had.[30] If close to true, it is fairly remarkable. In the early 1980s the United States was capable of delivering nuclear warheads to within a hundred meters of its intended target at intercontinental ranges, and to within tens of meters at intermediate ranges.[31]

By the mid-1980s, the Israeli program had advanced even further. According to a 1986 article in the London Sunday Times, a technician from Dimona—Mordechai Vanunu—provided evidence and photographs of the Israeli program. According to the expose, Vanunu's data indicated that Israel had about 200 nuclear warheads, with boosted fission devices and the capability for thermonuclear weapons. Some weapons were considered to be capable of several hundred kilotons of explosive power. Further, other scientists who evaluated the evidence believed Israel was capable of building neutron bombs (enhanced radiation warheads) and suggested that Israel had F-16 deliverable warheads and warheads that could fit on its *Jericho* missile system. Finally, Vanunu's product showed that Israel's underground plutonium separation facility produced several times more plutonium than originally thought. The sophisticated designs revealed in the photographs suggested that Israel may be capable of building nuclear bombs with as little as 4 kilograms of plutonium, which increased the estimates of Israeli stockpiles.[32]

Israel has fairly sophisticated delivery systems. According to widely acknowledged sources, Israel originally designed its long-range delivery system around the F-4.[33] Since then its strategic delivery systems have come to include the F-16, F-15, *Jericho* I and II ballistic missiles, and a variation on a cruise missile launched from a submarine. Notably, the *Jericho* II is considered to be essentially a knockoff or replica of the U.S. *Pershing* II missile deployed in Europe in the early 1980s. The *Jericho* II has an inertial guidance system, an advanced radar terminal guidance system, elements of a solid fuel propellant, and the shell of the missile itself.[34] The testing and development of the *Jericho* II in the late 1980s prompted Moscow to warn Israel that it posed a direct threat to the Soviet Union.[35] As Table 1 shows, Israel has a robust Triad of nuclear delivery systems.

	Delivery system	IOC	Range
Air-based	F-16 A/B/C/D/I	1980	1,600 km
	F-15 I	1998	4,450 km
Land-based	Lance (tactical use only)	1975	130 km
	Jericho I	1972	1,200 km
	Jericho II	1984-1985	1,800-4,000 km
Sea-based	Dolphin-class submarine	2000-2000	350-1,500 km
			—Popeye Turbo SLCM

Table 1. Israel's Tactical and Strategic Forces.[36]

Israel also has its own space-based satellite reconnaissance capability, the *Offeq* satellite, launched aboard the Shavit Space Launch Vehicle (SLV). Many believe that the first two stages of the Shavit SLV make up the *Jericho* II missile. The Shavit's capabilities are robust, and if deployed as a ballistic missile, it is capable of delivering a 775 kg payload a distance of some 4,000 km. Such a range provides the Israelis with coverage for the entire Middle East/Persian Gulf region, as well as a large part of the former Soviet Union.[37]

Israel's quest for nuclear weapons began in earnest during the 1950s. The Warsaw Pact, via Czechoslovakia, provided Egypt with a substantial arms package in 1955. Although Israel began nuclear energy research in 1948, the failure of Israel's allies in the 1956 crisis, coupled with an implicit Soviet nuclear threat,[38] convinced Israeli leaders they could not rely on others for their security. It was not until 1967, just 2 weeks before the 6-Day War, that Israel manufactured its first crude, undeliverable nuclear weapon.[39] By 1973, Israel had the capability of targeting its Arab enemies with the *Jericho* I missile and F-4 *Phantom* fighter aircraft. In fact, during the Yom Kippur War, Israel reportedly alerted its nuclear forces on two separate occasions.[40] The first alert reportedly occurred during the early phase of the war when Israeli leaders doubted whether Israel could survive the Arab attack. The second occurred soon after a report (later deemed false) of nuclear-tipped SCUD missiles being sent to Egypt.

Since these events are not publicly documented in Israel, there remains some doubt as to their exact details. Israelis familiar with

the alerts maintain they were simply to prevent their nuclear forces from being overrun by advancing Arab armies. Other officials maintain that the alerts were designed to catch the attention of either Soviet or American reconnaissance satellites, and so provide implicit warning to both the Soviet Union as well as the Arab armies, particularly Egypt's, of Israeli nuclear capabilities. Still others believe Israel demonstrated its resolve to U.S. officials in order to elicit U.S. intervention on its behalf with conventional munitions.[41] Egyptian officials acknowledge that Soviet officials warned them of Israel's alert, but emphasize it did not change their military plans.

Analysts believe that for years Israel considered the Soviet Union the biggest threat to its existence.[42] Israeli officials believed that without Soviet support, no alliance of Arab armies would dare threaten—or would be capable of threatening—to invade Israel and wipe it out. Thus, early in its nuclear history Israel wanted the capability to target the Soviet Union. By various accounts, Israel had a rudimentary capability to attack the Soviet Union by the early 1970s, though whether the capability was conventional or unconventional remains unclear.[43] When the Israeli Air Force received U.S.-made F-16s in the early 1980s, its capability for striking the southern Soviet Union with aerial refueling increased dramatically, though many doubted whether Israeli aircraft could have penetrated Soviet air defenses. By the late 1980s, with the initial testing of the *Jericho* II, Israel began to acquire increased capability to attack the Soviet Union, a threat which Soviet leaders clearly understood. The missile was not deployed operationally until 1994, however, too late for the Gulf War or for countering the Soviet threat.

Throughout this period, Israel's strategic forces were vulnerable to Soviet—later Russian—nuclear strikes. As recently as 1997, overhead imagery of the *Jericho* II missile base at Zachariah, located several miles southeast of Tel Aviv, showed that it was vulnerable to Russian and Chinese missiles, as well as to crudely-aimed, nuclear-tipped ballistic missiles by other powers. Apparently, there are no silos for the missiles on the lightly armored transporters, only shallow caves in limestone. According to analysis for *Jane's*:

> [A missile containing a] 20 kiloton warhead detonated 2,200 [meters] above and 1,000 [meters] away from its intended target within Zachariah, the surface target would still sustain severe damage from heat, radiation,

> and blast effects. 2 kilometers from ground zero, the shock . . . would be powerful enough to destroy unreinforced buildings and unprotected TELs [transport-erector-launchers], while the thermal radiation . . . would be enough to ignite combustible materials. If the base were hit with missiles having the accuracy of the M-9 [Chinese missile with a 300 meter accuracy], even reinforced underground caves would be seriously damaged by a ground burst.[44]

Close to Zachariah are a number of underground bunkers believed to house nuclear weapons for Israel's nuclear-capable Air Force units. The problem according to the report above is that because Israel's strategic assets remain vulnerable, analysts believe Israel must have adopted a doctrine of preemption, knowing full well that it had "use-it or lose-it" forces.[45] Recent improvements in its passive and active defenses, including Arrow missile defenses, may help some, but probably not enough against very long range ballistic missiles.[46]

The threats to Israel's existence have substantially changed since the beginning of its nuclear program. It seems clear that Israel's conventional superiority, backed by nuclear prowess, has stymied threats to Israel's existence from a combined Arab assault through conventional means. And after the collapse of the Soviet Union, any similar coalition would be without a superpower patron. However, Israel's predominance has not precluded what scholars call the stability/instability paradox. Though Israel enjoys stability against a major conventional threat to its existence, it does not enjoy such stability at lower levels of conflict. For example, the *intifada* has increased suicide bombing inside Israel. Despite the change in the overall threat, there has been no discernible change to Israel's nuclear posture.

No certainty may be given to Israel's nuclear doctrine. If one exists, it is known among the political elite and remains a closely held secret. Some scholars argue that the doctrine must be one of last resort (i.e., a mini-MAD) for a variety of reasons. It has been called by a number of observers the "Samson Option," based on the Biblical hero Samson who uses his strength to take out his Philistine captors. It stands in contrast to Masada, where several hundred Israelites preferred suicide to Roman conquest.[47] Some observers believe only in the "Samson Option" because it is impossible for

them to conceive that anyone could think otherwise about nuclear use.[48] Others believe it is so because nuclear forces have never been integrated into Israeli military training, or publicly into its military doctrine.[49] The problem with that view is that many Israeli military officers did their training in the United States, where U.S. forces were trained for tactical use of nuclear forces in crowded Europe.

Israel must have given some thought to nuclear use below the threshold of "existential" threats.[50] Some Israelis are concerned that under certain conditions, its threat of countervalue attacks (mini-MAD) may not be credible.[51] In addition, because Israel's nuclear arsenal is far more robust, diverse, and advanced than seems necessary for last resort alone, it is likely that Israeli leaders considered battlefield use of tactical nuclear weapons. Indeed, the only purpose for enhanced radiation warheads—if they truly exist—is for use in crowded conditions to keep collateral damage to a minimum.[52] The *Lance*, *Jericho* I, F-16, and submarine-launched nuclear forces may be configured for in-theater use against a combined-arms offensive.

Between nuclear warfighting and as weapons of last resort, there are a number of other uses for Israel's nuclear arsenal:

1. To deter a large conventional attack;
2. To deter all levels of unconventional (chemical, biological, nuclear) attacks;
3. To preempt enemy nuclear attacks;
4. To support conventional preemption against enemy nuclear assets;
5. To support conventional preemption against enemy non-nuclear (conventional, chemical, biological) assets;
6. For nuclear warfighting;
7. The "Samson Option" (last resort).[53]

It is also argued that, given Israel's spectacular 1981 raid on the Osiraq nuclear reactor in Baghdad, it actively supports a policy of conventional, if not nuclear, preemption of emerging Arab nuclear capabilities.

Others have added that Israel's nuclear arsenal may be used as leverage to keep the United States interested in Israel's survival. It was reportedly used in this way during the Yom Kippur War.[54] South African nuclear scientists and strategists believed that this

was Israel's motivation when they prepared South Africa's nuclear policy.[55] They believed that Israel's potential for massive retaliation in the Yom Kippur War provoked the United States to provide Israel with the conventional arms and diplomatic support needed to preclude Israel's destruction. Whether the Israelis purposely intended their alerts to result in U.S. intervention in the Yom Kippur War, or whether this was an unintended, but welcome, result remains unclear.

INDIA

Of all SNPs, India's nuclear policy has been the most publicly discussed. A little more than a year after India tested nuclear weapons at Pokhran, an unofficial version of a nuclear doctrine was reported. On August 17, 1999, Indian National Security Adviser Brajesh Mishra announced the Draft Report of the National Security Advisory Board on Indian Nuclear Doctrine.[56] The draft Indian nuclear doctrine called for several things:

- A minimum credible deterrent force based on adequate retaliatory capability, should deterrence fail;
- A dynamic configuration of its nuclear arsenal, based on changes in India's strategic environment, technological capabilities, and national interests;
- A design for "punitive retaliation" using nuclear weapons in the event of any nuclear attack on India;
- A nuclear force "based on a triad of aircraft, mobile land-based missiles and sea-based assets," that are to be survivable, "enhanced by a combination of multiple redundant systems, mobility, dispersion and deception;"
- A shift from peacetime deployment to fully employable nuclear forces in the shortest possible time;
- A robust and survivable command, control, communications, computing, intelligence and information (C4I2) system, with release authority in the hands of the Prime Minister or his designated successor(s);

- A no first use pledge; and
- A well-maintained and "highly effective conventional military capabilit[y]" to raise the threshold for the outbreak of conflict, whether nuclear or conventional.

The draft report was promulgated to encourage public debate over India's nuclear doctrine, but no public debate occurred. By early 2003, India announced its official "operationalized" nuclear doctrine, differing very little from the draft version. In it, India added that it would retaliate massively against any nuclear assault on its armed forces, or any chemical or biological attack against India or its armed forces.[57]

The draft nuclear doctrine was heralded by Indian officials for its remarkable display of restraint in the teeth of its nuclear-armed neighbors.[58] The doctrine's no first use (NFU) pledge indicated that India was willing to absorb a first strike before retaliating and that India's resulting nuclear posture should therefore not provoke an arms race. However, as many Indian and non-Indian scholars have noted, the draft and final doctrine are ambiguous documents. The Advisory Board that promulgated the draft doctrine held no official standing in the Indian government. Its committee members consisted of former diplomats, bureaucrats, and chiefs of the three military services. Members' ideologies reflect the whole spectrum of thinking on nuclear policy, from "disarmament doves" to "nuclear warfighting hawks."[59] It is no wonder that many people see in the doctrine what they want to see.

Few seem to agree what the doctrine means.[60] Even among scholars at India's oldest defense think tank, the Institute for Defence Studies and Analysis, there is no consensus.[61] The doctrine expressly calls for deterrence by the threat of punitive retaliation. However, one scholar argues that the doctrine reflects a strategy of deterrence by denial.[62] According to another scholar, there is a problem. Deterrence by denial is a doctrine for nuclear warfighting, a doctrine that he claims is impossible for a SNP. He argues that even deterrence based on the punishment that SNPs could inflict would be difficult to gauge against larger nuclear powers. Thus, he believes that India's nuclear doctrine is better suited for a policy of

"existential deterrence;" that is, deterrence by the threat of a small, survivable nuclear retaliatory force.[63] Yet a third scholar argues that India's nuclear doctrine only looks like it is primarily countervalue because the nuclear forces are so small.[64] One acerbic commentator, retired Rear Admiral of the Indian Navy Raja Menon, argues "in India scholars define their idea of deterrence against China and Pakistan with no scientific method and odd figures pulled out of a hat."[65]

As well, no one seems to agree on what state poses the biggest threat to India. It is not clear whether China, Pakistan, or the United States based in Diego Garcia, or some combination or all of the above, threatens Indian interests the most. For China,[66] the 1995 Report of the Indian Parliamentary Committee on Defence is clear:

> China has also continued to be the main source of major weapons, including missiles and allied technology, to Pakistan, a very hostile neighbour, causing disquiet to India. Despite warming relations with China, China is, and is likely to remain, the primary security challenge to India in the medium and long terms. Its enhancement of missile capabilities and its immense help to Pakistan in the missile programme are serious security concerns to India.[67]

Others argue that the main threat is from Pakistan, and others include the United States.[68] As recently as 1996, former Indian Prime Minister I. K. Gujral suggested the biggest threats emanated from both China and the United States:

> In the east, there is China, a full-fledged nuclear power. In the south, there is Diego Garcia, a major American naval base for its nuclear submarines as well as aircraft carriers. In the west, the Gulf region is nuclearised by the United States. Is it possible for any government in India to remain indifferent to this gigantic array of nuclear arms across its eastern, southern, and western borders?[69]

Although it may seem irrelevant to nuclear deterrence, the shape and size of the nuclear arsenal, as well as the type of delivery systems, depend largely on the nature of the principal threats. As Indian scholars have noted, SNPs may be able to deter each other with very small though survivable nuclear arsenals, but deterring a larger power, not to mention a superpower, requires far more capability.

Even so, whether SNPs can deter each other depends critically upon whether one or the other is a status quo or a revisionist power.[70]

India's doctrine is ambiguous about how large its nuclear arsenal should become. The Indian government has given no public guidance. The draft doctrine simply left it open to the dynamics of evolving threats, technology, and India's national interests. The formal doctrine says nothing. The suggested number of nuclear weapons varies considerably among analysts. Former Army Chief of Staff General Krishnaswami Sundarji argued for a relatively small nuclear force. He believed that to deter other SNPs, the arsenal should consist of about 20 warheads of 20 kilotons (KT) each; to deter larger nuclear powers (presumably China), an arsenal of 50 warheads of 20 KT each should suffice.[71] Others put the arsenal at anywhere from 100 to 400 nuclear weapons, though the precise configuration remains a mystery.[72]

The size of India's current arsenal also remains unclear. Estimates vary from the low 30s, between 60-80, to as many as 150 nuclear weapons.[73] In addition, there is little certainty about how advanced its weapons are. This problem stems from the series of nuclear tests done in May 1998. The Indian Atomic Energy Commission reported that this series of five nuclear tests involved both fission and fusion designs. On May 11, three nuclear devices were detonated simultaneously. Reportedly, one was a thermonuclear device at about 43-60 KT, another was a fission device at about 12 KT, and still another a sub-kiloton device. Two days later, two more nuclear weapons were detonated simultaneously, both low-yield, sub-kiloton devices. A number of nuclear scientists believe that the largest explosions were much smaller, as much as by a factor of four, than reported by Indian scientists. Indeed, some believe that the thermonuclear device fizzled.[74] Indian scientists reportedly answered the skeptics adequately.[75] War gamers recently estimated that in all-out countervalue exchanges, the respective arsenals of India and Pakistan may produce anywhere from hundreds of thousands to as many as 12 million deaths, with many more injured.[76] Regardless, at the time many Indians celebrated the tests as a success. Prime Minister Shri Atal Bihari Vajpayee exulted in Parliament that:

> India is now a nuclear weapon state. This is a reality that cannot be denied. It is not a conferment that we seek; nor is it a status for others to

> grant. It is an endowment to the nation by our scientists and engineers. It is India's due, the right of one-sixth of human-kind.[77]

India's weapon designs suggest a paradox. While India claims its nuclear doctrine is a minimum credible deterrence based on punitive retaliation, the tested devices suggest something quite different.[78] One Indian scholar boasted that the tests demonstrated India's ability to develop a "wide-ranging arsenal of low-yield, sub-kiloton nuclear munitions for artillery shells, boosted fission weapons, and city-busting thermonuclear weapons."[79] Sub-kiloton munitions for artillery rounds imply that Indian nuclear scientists have created battlefield nuclear weapons. Indeed, the "father" of India's nuclear program, R. Chidambaram, indicated that the sub-kiloton devices were for tactical, battlefield use.[80] Moreover, the Chairman of the Indian Atomic Energy Commission argued that Indian scientists were now capable of building enhanced radiation (neutron) warheads, though apparently there are no current plans to develop them.[81]

India's nuclear delivery systems also support the thesis that India considered nuclear warfighting capabilities to be important. An Indian foreign ministry official revealed in 2000 that India's no first use "policy does not mean India will not have a first-strike capability."[82] Analysts concede that India will not be able to field a truly effective triad for at least a decade or more. Since India's nuclear-capable aircraft and current land-based missiles lack the reach to attack targets in eastern China, India may be pursuing an Intercontinental Ballistic Missile (ICBM) capability, based on either its Surya Space Launch Vehicle (SLV) or a new design. A sea-based ballistic missile may take longer still, despite the fact that almost everyone concedes they are the most stabilizing systems.[83]

In the interim, India has several options for delivery of nuclear weapons at short ranges, sufficient to target all of Pakistan and penetrate deeply into China. India's nuclear weapons are deliverable mainly by aircraft, the *Mirage* 2000, MiG 27, and possibly the Su-30. Ballistic missiles have been produced as well for nuclear missions. Shorter range, nuclear-capable missiles include two types of the Prithvi with ranges of 150-250 km, and a potential sea-based Prithvi variant.[84] More than any other system, the Prithvi causes Pakistan to disbelieve Indian strategists when they claim that China is their main

concern. India's main intermediate missile, the *Agni*, is believed to have three variants with ranges of anywhere from 750 to 3,500 km. The first two have been tested. Whereas the *Agni* I was liquid-fueled and required at least a day or more preparation for launch, the *Agni* II is based on solid-fuel propulsion and requires only 15 minutes preparation.

The *Agni* II, with an estimated range of about 2,500 km, is intriguing. It can carry a payload of about 1,000 kg, sufficient for a nuclear warhead. In addition, Indian scientists reported greatly increased accuracy with the *Agni* II, as much as by a factor of three or more. In fact, in one test of about 2,200 km in "operational configuration," scientists claimed to have achieved an accuracy of 100 meters, and in another test, was reported to have achieved an accuracy of 40 meters.[85] Such accuracies are unnecessary for countervalue, city-busting attacks. A Circular Error Probability (CEP) of 40-100 meters is a substantial achievement. It could mean that a 12 KT warhead with a CEP of 100 meters (0.054 nautical miles) could destroy a high-value, nuclear-hardened military target with a high degree of confidence in a single shot kill probability (SSPK).[86] Were the warhead to be thermonuclear, it could take on some of the most hardened military targets in the world. A nuclear-armed *Agni* II missile would be India's preferred weapon of choice to attack military targets in a nuclear warfighting role.[87]

India's draft and formal nuclear doctrine call for robust, survivable C4I2 assets. The military controls the delivery systems, while the nuclear scientists maintain control over the nuclear warheads. Not until late 2002 or early 2003, however, did India establish a nuclear command system headed by the Prime Minister.[88] No details have been forthcoming, so it remains uncertain how the Indians maintain positive and negative controls over nuclear weapons apart from the dual control system established earlier. While some Indian strategists despair over the lack of military involvement, others believe that India will consider nuclear preemption should the military service gain operational control over nuclear weapons.[89] Ever since the 1987 Indian military exercise Brasstacks, its Army and Air Force have assumed the need to fight in a nuclear environment against Pakistan and have prepared accordingly. In one adaptation, the Indian Air Force changed its targeting plan from having to attack Pakistan's nuclear installations to attacks on Pakistan's delivery

systems so as to avoid collateral damage.[90] India and Pakistan have since signed a joint agreement to avoid attacking each other's nuclear infrastructure.[91] And because the borders are heavily populated, only military installations are targeted for nuclear missions.[92] Reportedly, there is no political or military directive to the nuclear scientists specifying the targets to be destroyed.[93]

PAKISTAN

Unlike India, Pakistan's nuclear strategy or doctrine has not been officially announced. Few political or military officials in Pakistan have discussed openly how Islamabad may consider using nuclear weapons for deterrence or in the event of a deterrence failure. One of the first public statements regarding the use of nuclear force was by Foreign Minister Abdul Sattar in late 1999:

> Minimum nuclear deterrence will remain the guiding principle of our nuclear strategy. The minimum cannot be quantified in static numbers. The Indian build-up will necessitate review and reassessment. In order to ensure the survivability and credibility of the deterrent Pakistan will have to maintain, preserve and upgrade its capability. But we shall not engage in any nuclear competition or arms race.[94]

In addition to the vaguely worded minimum nuclear deterrence, in contrast to India, Pakistan did not rule out a "first strike." It argues that because India is much larger, has greater conventional military capabilities and has a more robust economy, Pakistan must have resort to first use of nuclear weapons to preclude an Indian military victory by conventional means, let alone by nuclear means.[95] In fact, many Pakistani strategists argue that Pakistan's nuclear posture towards India is comparable to NATO's nuclear posture towards the Soviet Union during the Cold War. It must compensate for numerical conventional inferiority by relying on early resort to nuclear weapons.

A retired military officer writing in Pakistan's premier military journal provided the most comprehensive analysis of Pakistan's putative nuclear doctrine. Lieutenant General Sardar F. S. Lodi analyzed the doctrinal requirements for Pakistan in early 1999, which Indian analysts seem to accept as official Pakistani doctrine.[96] After tracing NATO's reliance on early use of nuclear weapons and briefly

analyzing the evolution of U.S. nuclear doctrine over the years, he relates how these doctrinal developments inform Pakistan's nuclear requirements:

> During any future Indo-Pak armed conflict India's numerical superiority in men and conventional arms is likely to exert pressure beyond endurance. In a deteriorating military situation when an Indian conventional attack is likely to break through our defences or has already breached the main defence line causing a major set-back to the defences, which cannot be restored by conventional means at our disposal, the government would be left with no other option except to use Nuclear Weapons to stabilize the situation. India's superiority in conventional arms and manpower would have to be offset by nuclear weapons. The political will to use nuclear weapons is essential to prevent a conventional armed conflict, which would later on escalate to nuclear war.
>
> Pakistan's Nuclear Doctrine would therefore essentially revolve around the first-strike option.[97]

The first-strike option is as important as how Pakistan may use nuclear weapons against an initial Indian attack. Lodi borrows from American strategy what is called an "option-enhancing policy" for possible use of nuclear weapons. This "option-enhancing policy" envisions a staged escalation of nuclear use in response to an Indian attack. At any point, either side may then choose to de-escalate the conflict. The stages include the following:

> Stage One: A public or private warning of nuclear use;
>
> Stage Two: A demonstration explosion of a small nuclear weapon on Pakistan's own soil;
>
> Stage Three: The use of a few nuclear weapons on its own soil against Indian attacking forces;
>
> Stage Four: Counterforce strikes "against critical but purely military targets" on Indian soil, probably "in thinly populated areas in the desert or semi-desert, causing least collateral damage"; and,
>
> Stage Five: Weapons in reserve for a countervalue attack plan.[98]

Over time, improvements would create more options and greater flexibility for Pakistan "to employ nuclear weapons if attacked yet cause the least civilian casualties and damage to infrastructure."

Commentators note that Pakistan needs a robust nuclear strategy because:

> India's earlier rhetoric of 'minimum credible (nuclear) deterrence' has been replaced by an 'effective, credible nuclear deterrence and adequate retaliatory capability should deterrence fail' [based on its change from early pronouncements to its draft nuclear doctrine], implying that a massive arsenal of nuclear weapons that would give India an offensive nuclear capability.[99]

More recently, some hint of Pakistan's nuclear doctrine was given by an active official. According to an American analyst in a Pakistani newspaper, General Khalid Kidwai, Chief of the Strategic Plans Division of Pakistan's nuclear command and control system, Pakistan's nuclear arsenal is aimed "'solely at India' and 'will be used only if the very existence of Pakistan as a state is at stake'."[100] Kidwai further enumerated the triggers for Pakistani nuclear use under a variety of circumstances:

> (a) India attacks Pakistan and conquers a large part of its territory (space threshold);
> (b) India destroys a large part either of [Pakistan's] land or air forces (military threshold);
> (c) India proceeds to the economic strangling of Pakistan (economic threshold);
> (d) India pushes Pakistan into political destabilization or creates a large scale internal subversion in Pakistan (domestic destabilization).[101]

In arguing for early use of nuclear weapons, Pakistan is posed with a problem of credibility. Though Indian analysts agree that Pakistan may gain temporary tactical advantages by early first use, they also point out that Pakistan would suffer a devastating retaliation.[102] Another retired Pakistani military officer argues that it is precisely that degree of uncertainty—even apparent "irrationality"—that lends credibility to its deterrence policy. Writing in Pakistan's premier military journal, Air Commodore Jamal Hussain argues:

> A deterrence doctrine that spells out use of first strike (nuclear) option in case enemy's conventional forces are about to achieve their strategic aim is based on a degree of irrationality . . . If the aggressor comes to the

> conclusion that it is not dealing with a mad nation, it may be tempted to disregard the nuclear deterrence of its enemy calculating that it is unlikely to unleash its nuclear arsenal, as it would in all probability end up in mutual destruction of both the contestants. Nuclear deterrence would then have failed.
>
> While commission of suicide by itself may be an act of insanity, many sane persons have committed it under what at best can be termed as temporary or momentary insanity. Mutual suicide or kamikaze acts by a human or a nation when pushed beyond a limit is in the realm of possibility. To lend credibility to its nuclear deterrence against conventional attacks by superior foes, a nation like Pakistan would like to give the impression that it would not hesitate to protect its honour, dignity, sovereignty and vital interests through mutual suicide, if all other options are closed. . . .
>
> In nuclear deterrence doctrine, everyone will be bluffing, but just how far is difficult to determine.[103]

Hussain rejects the "rational actor" assumption of nuclear deterrence, arguing instead that deterrence is largely "psychological."

The public side of Pakistan's nuclear program reflects this view. Pakistan's public policy is devised to concede nothing to Indian technological or scientific prowess, apparently fearing that to do so would portray a failure of resolve and thereby weaken deterrence. Pakistan has followed a policy of tit-for-tat.[104] For every Indian test, demonstration, or public announcement, Pakistan reciprocates with one of its own. When India explodes nuclear devices, Pakistan follows suit. When India evaluates its *Prithvi* or *Agni* ballistic missiles, Pakistan reciprocates with tests of its *Hatf* or *Ghauri* missiles. When an Indian official suggests nuclear threats, Pakistan responds with threats of its own. As one Pakistani scholar put it, "Every landmark in Pakistan's nuclear weapons program is closely linked to its troubled relationship with India and to India's nuclear aspirations."[105]

The nuclear weapons required for Pakistan's deterrence policy, because it is India-specific, are lower than India's. Whereas India may require up to 150 nuclear weapons, Pakistan may require only half of that, and maybe less. At the time of Pakistan's retaliatory nuclear weapons tests in late May 1998, Pakistani nuclear scientists

estimated that Pakistan would require 60-70 nuclear devices.[106] Current estimates of Pakistan's nuclear inventory range from 30 to as many as 50 nuclear weapons.[107] Although Pakistani officials reported detonating boosted fission, fission, and sub-kiloton nuclear weapons in May 1998, American and Indian scientists dispute the number of weapons detonated and the size of the yields. Most believe that the explosive yields were substantially less than officially reported, in some cases by an order of magnitude.[108]

Although the sub-kiloton nuclear tests suggest battlefield nuclear weapons, it is not clear how Pakistan plans to incorporate them into its nuclear doctrine. The key is how the analysts think about tactical battlefield use. According to General Kidwai's interview, "no tactical nuclear rungs are placed down in the India-Pakistan nuclear escalation ladder."[109] However, the commentator interprets this as the General not saying tactical nuclear weapons are ruled either in or out. Indeed, the doctrinal analysis by General Lodi implies tactical nuclear use at the lower rungs of the escalation ladder and General Kidwai's "triggers" for nuclear use suggest tactical nuclear weapons against Indian conventional military forces. And according to other Pakistani analysts, Pakistan "lacks spatial depth and therefore cannot afford the luxury of distinguishing between tactical and strategic, within a nuclear context."[110] On the website for the Pakistan Institute for Air Defence Studies, a page is devoted to two illustrations depicting how tactical battlefield nuclear weapons may be deployed by fighter aircraft. The "Over-the-Shoulder" method of delivery depicted allows the fighter to escape the effects of the nuclear detonation. No other commentary is attached to this depiction.[111] The following three sets of targets for nuclear missions have been suggested: "Nuclear-related targets such as missile silos, nuclear airfields, etc.; other military targets (OMT) including non-nuclear military forces, bases, installations, etc.; and, political and military command centers, economic targets and populations."[112] Some of these targets require tactical nuclear weapons.

Although Pakistan is not as technically sophisticated as India, Pakistan has a strong indigenous program for missile development. In addition, Pakistan's nuclear weapons and ballistic missile programs have been assisted by outside sources. China has helped Pakistan's nuclear weapons program, including missile development and the miniaturization of nuclear weapons.[113] North Korea has

helped Pakistan with its ballistic missile development, most notably by means of its *Nodong* missile, which is believed to be the basis for Pakistan's *Ghauri*.[114] The *Ghauri* has a range of 1,500 km (about 900 miles), giving it full coverage of almost all of India, including naval bases in the east. Pakistan's American made F-16s also contribute to its nuclear attack capability.

Unlike the other three SNPS, Pakistan's military has remained firmly in control of its nuclear program throughout its life. Indeed, the military bureaucracy has marginalized its political leadership.[115] Former Prime Minister Benazir Bhutto said that she could never get control of the nuclear decisionmaking infrastructure. Indeed, "[a]fter her dismissal as prime minister, she revealed that she had not been in charge of Pakistan's nuclear program and that during the 1990 Kashmir crisis, Pakistan had crossed the 'Red Line' without her knowledge," though she never explained what the "Red Line" was.[116] Even before India, Pakistan announced the formation of a National Command Authority (NCA), located with its Joint Strategic Headquarters, which had overall responsibility for policy, strategy, and employment of strategic forces.[117] Reports suggest that Pakistan maintains its nuclear forces in an "unconstituted state" for safety reasons.[118] That is to say, the fissionable cores of nuclear weapons are kept separate from their non-nuclear assemblies, and the warheads are unmated to their delivery systems. Some analysts suggested that because survivability of Pakistan's nuclear forces is crucial in the face of superior Indian conventional and nuclear capabilities, the NCA should predelegate nuclear release authority to military commands in the event of a decapitating strike. The predelegation of nuclear release authority has never been confirmed.[119]

CONCLUSION

After examining the literature on these four nuclear powers, it is clear that all of them have a richer view of nuclear deterrence than one might otherwise think. Indeed, according to the public announcements on nuclear doctrine, or reports on technological advancements, or testimonies from defectors and retired military officers, the idea that SNPs are limited to some form of mini-MAD deterrent seems unreasonably optimistic. The optimism rests on the notion that because MAD, even its mini-version, would be so

catastrophic that its realization is exceedingly remote, if not a virtual impossibility. The optimistic conclusion is that nuclear war may not occur. But as Table 2 demonstrates, these four SNPs consider nuclear use for a variety of pre-war and wartime uses. Of course, the benefit of talking about nuclear use in this way is that it adds to a country's strengthening of its peacetime deterrent posture.

	Pre-War Use			War-time Use			
	Covert capability	Overt capability	Threat to use/ Provoke Intervention	Demon-stration Shot	Tactical strikes	Counter-force strikes	Counter -value strikes
RSA	√		√	√			
Israel	√		√		√	√	√
Pakistan		√		√	√	√	√
India		√			√	√	√

Table 2. Nuclear Deterrence/Threat/Use Continuum.

All four SNPs have considered how to employ nuclear weapons. This is natural, given that responsible public officials must consider what may happen should deterrence fail. All have tried to avoid the "all-or-nothing" approach of total annihilation found in a mini-MAD nuclear deterrent. Unlike with tenured academics, theirs is a position of trust and great responsibility for the safety and well-being of millions of citizens. As other scholars in this volume attest, you may resign yourself to nuclear deterrence, but it is not something you strive to obtain. This will be true for SNPs, or at least for those with nuclear neighbors.

Of course, this does not mean that SNPs will necessarily engage in nuclear warfighting. It may be that although our theories of nuclear deterrence are problematic, short of "existential threats" to SNPs, nuclear restraint may continue. But policymakers and strategists should not blindly ignore the potential for wars in which nuclear weapons may be used, even when short of all-out attacks.

APPENDIX 1

CALCULATING WEAPONS EFFECTIVENESS

1. Calculating Single Shot Kill Probability (SSPK)

SSPK = $1 - 0.5^{CMP/(H/16)^{2/3}}$

Where:

CMP = Countermilitary Potential
(A measure used for calculating military utility of a weapon)

CMP = $\frac{YMT^{2/3}}{CEP^{2/3}}$

Where Y = Yield in Megatons
CEP = Circular Error Probability, in nautical miles (nm)
(CEP is a measure of accuracy of ballistic missile)

H = the hardness of a given target, expressed in pounds per square inch (psi) atmospheric overpressure (from blast)

2. Indian weapon system

Agni II, 100-meter = 0.054 nm
Warhead = 12 KT (kilotons), or .012 MT (megatons)
Notional bunker complex in Pakistan hardened to 1,000 psi.

CMP = $\frac{0.012^{2/3}}{0.054^2}$ CMP = 17.97

SSPK = $1 - 0.5^{17.97/(1000/16)^{2/3}}$

$1 - 0.5^{17.97/62.5)^{2/3}}$

$1 - 0.5^{17.97/15.75}$

$1 - 0.5^{1.140952381}$

$1 - 0.45346$

SSPK = 54.5%

ENDNOTES - CHAPTER 10

1. Michael Krepon, "Moving Away from MAD," *Survival*, Vol. 43, No. 2, Summer 2001, pp. 82-84.

2. Owen Harries, "Best-Case Thinking," *Commentary*, May 1984, p. 28.

3. See Natural Resources Defense Council, "The Consequences of Nuclear Conflict between India and Pakistan," from internet: *www.nrdc.org*, accessed February 19, 2003.

4. For a good discussion of this and related problems, see Keith B. Payne, *Deterrence in the Second Nuclear Age*, Lexington: University Press of Kentucky, 1996.

5. Jeffrey Richelson, "PD-59, NSDD-13, and the Reagan Strategic Modernization Program," in P. Edward Haley, David M. Keithly, and Jack Merritt, *Nuclear Strategy, Arms Control, and the Future*, Boulder: Westview Press, 1985, p. 123.

6. For a good discussion of theoretical approaches, see Shibley Telhami, *Power and Leadership in International Bargaining: The Path to the Camp David Accords*, New York: Columbia University Press, 1990, especially chapter 2, pp. 18-42.

7. For the most parsimonious characterization of the assumption of rationality, see Kenneth N. Waltz, "More May Be Better," in Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate*, New York: W. W. Norton & Company, 1995, pp. 1-46; for the most concise critique of the assumption of rationality, see Payne, *Deterrence in the Second Nuclear Age*.

8. A good discussion of strategic personality and nuclear deterrence may be found in Caroline F. Ziemke, Philippe Loustaunau, and Amy Alrich, *Strategic Personality and the Effectiveness of Nuclear Deterrence*, project for the Defense Threat Reduction Agency, DTRA, IDA Document D-2537, Alexandria, VA: Institute for Defense Analysis, November 2000.

9. See Steve Fetter and Devin T. Hagerty, "Nuclear Deterrence and the 1990 Indo-Pakistani Crisis," Correspondence, *International Security*, Vol. 21, No. 1, Summer 1996, pp. 176-185; see also my critique of Kenneth Waltz's use of the assumption in Mark T. Clark, "Proliferation in the Second Nuclear Age," *Orbis*, Vol. 41, No. 1, Winter 1997, pp. 133-136.

10. Ukraine, Kazakstan, and Belarus inherited sizeable nuclear arsenals from the collapse of the Soviet Union and voluntarily gave them up. For a brief overview, see J. W. de Villiers, Roger Jardine, and Mitchell Reiss, "Why South Africa Gave Up the Bomb," *Foreign Affairs*, Vol. 72, No. 5, November/December 1993, pp. 98-109.

11. Indeed, the case was repeatedly cited by some officials in the George W. Bush administration as evidence why Iraq was not dismantling its weapons of mass destruction infrastructure. In the case of the RSA, the government not only helped IAEA inspectors but suggested ways the inspectors could improve their research; precisely the opposite occurred with the Iraqi regime under the constraints of Security Council Resolution 1441.

12. This section is based, in part, on Peter Liberman, "The Rise and Fall of the South African Bomb," *International Security*, Vol. 26, No. 2, Fall 2001, pp. 45-86; see also Correspondence between Helen E. Purkitt and Stephen F. Burgess with Peter Liberman in "South Africa's Nuclear Decisions," *International Security*, Vol. 27, No. 1, Summer 2002, pp. 186-194; Frank V. Pabian, "South Africa's Nuclear Weapon Program: Lessons for U.S. Nonproliferation Policy," *The Nonproliferation Review*, Fall 1995; William J. Long and Suzette R. Grillot, "Ideas, Beliefs, and Nuclear Policies: The Cases of South Africa and Ukraine," *The Nonproliferation Review*, Spring 2000, pp. 24-40. See also the presentation by the former director of the RSA's Atomic Energy Corporation, Waldo Stumpf, who headed the RSA's dismantlement effort, as "Birth and Death of the South African Nuclear Weapons Programme," on the web site of the Federation of American Scientists at *http://www.fas.org/nuke/guide/rsa/stumpf*, accessed January 15, 2003.

13. Text of statement by State Presdient F. W. de Klerk, "Matters Relating to Nuclear Nonproliferation Treaty, Violence, Negotiation and the Death Penalty," in *Debates of Parliament*, 5th Session, 9th Parliament, Vol. 8, cols 3576 to 3574, March 24, 1993, p. 3467.

14. *Ibid*., pp. 3468-3469.

15. De Klerk, testimony, pp. 3466-3472.

16. Stumpf, "Birth and Death."

17. Liberman, "Rise and Fall," p. 53.

18. *Ibid*.," pp. 55-56; and footnotes 34-36.

19. De Klerk, testimony, pp. 3468.

20. Stumpf, "Birth and Death," p. 5; Liberman, "Rise and Fall," p. 57; Long and Grillot, "Ideas, Beliefs, and Nuclear Policies," p. 28.

21. Long and Grillot, "Ideas, Beliefs, and Nuclear Policies," p. 27, 31.

22. Liberman, "Rise and Fall," p. 62; and footnote 61.

23. Mitchell Reiss, *Bridled Ambition*, Baltimore: Johns Hopkins University Press, 1995, p. 29.

24. Liberman, "Rise and Fall," p. 59; and footnote 50.

25. Warren H. Donnelly, "South Africa and Nuclear Weapons," *CRS Issue Brief*, Congressional Research Service, the Library of Congress, June 27, 1991, p. 7.

26. For an interesting insight into how the secret is kept, see Fuad Jabber, *Israel and Nuclear Weapons: Present option and future strategies*, London: Chatto & Windus for the International Institute for Strategic Studies, 1971, pp. 123-125.

27. The author calls it a culture of opacity in Avner Cohen, *Israel and the Bomb*, New York: Columbia University Press, 1998, p. 343; Robert Harkavy, "The Imperative to Survive," in Louis Rene Beres, *Security or Armageddon: Israel's Nuclear Strategy*, Lexington, MA: D. C. Heath, 1986, pp. 117-118; see also Edwin S.

Cochran, "Deliberate Ambiguity: An Analysis of Israel's Nuclear Strategy," *The Journal of Strategic Studies*, Vol. 19, No. 2, September 1996, pp. 321-339.

28. Shai Feldman, *Israeli Nuclear Deterrence: A Strategy for the 1980s*, New York: Columbia University Press, 1982); similarly, see Yair Evron, *Israel's Nulcear Dilemma*, Ithaca, NY: Cornell University Press, 1994, p. 244; Cochran, "Deliberate Ambiguity, p. 327; see also Gerald M. Steinberg, "Re-examining Israel's Security Doctrine," *RUSI International Security Review, 1999*, UK: Royal United Services Institute for Defence Analysis, pp. 215-224; from internet: *http://faculty.biu.ac.il/~steing/arms/doctrine*, accessed December 12, 2002.

29. Admittedly, even this is harder to tell since most of the literature on Israel's nuclear weapons treats the history of the program as well as the types of weapons that may have been developed, and devote little attention to actual plans for use. See, for example, Cohen, *Israel and the Bomb*; Warner D. Farr, "The Third Temple's Holy of Holies: Israel's Nuclear Weapons," *Counterproliferation Paper No. 2*, USAF Counterproliferation Center, Air War College, Maxwell Air Force Base, Alabama: Air University, September 1999, from internet: *www.fas.org/nuke/guide/israel/nuke/farr.htm*, accessed January 8, 2003; Robert E. Harkavy, *Spectre of a Middle Eastern Holocaust: The Strategic and Diplomatic Implications of the Israeli Nuclear Weapons Program*, Monograph Series in World Affairs, Denver: University of Denver Press, 1977; and Harkavy, "The Imperative to Survive," pp. 97-118.

30. Seymour M. Hersh, *The Samson Option: Israel's Nuclear Arsenal and American Foreign Policy*, New York: Random House, 1991, p. 291.

31. Peter Vincent Pry, *The Strategic Nuclear Balance. Vol. 1: And Why It Matters*, NY: Crane Russak, 1990, pp. 145-155.

32. For the expose, see "Revealed: The Secrets of Israel's Nuclear Arsenal," *The Times*, London, Issue: 8,461, October 5, 1986, pp. 1, 4-5; see also Farr, "The Third Temple's Holy of Holies." Hersh explains that the discovery of Israel's capability for constructing enhanced radiation warheads comes from weapons designers at both Los Alamos and Lawrence Livermore who studied Vanunu's photographs. See Hersh, p. 199.

33. Federation of American Scientists, Weapons of Mass Destruction, "Strategic Doctrine," from internet: *www.fas.org*, accessed December 11, 2002.

34. Seth Carus and Dov Zakheim, "North Africa/Israel," Appendix II: Unclassified Working Papers, *Report of the Commission to Assess the Ballistic Missile Threats to the United States*, Pursuant to Public Law 201, 104th Congress, July 15, 1998, from internet: *www.fas.org*, accessed April 17, 2003; see also *The Risk Report*, "Israel: How Far Can Its Missiles Fly?," Vol. 1, No. 5, June 1995, from internet: *www.wisconsinproject.org*, accessed April 11, 2003.

35. "Armaments Battle of Jericho," *Time*, August 10, 1987, from internet: *www.time.com*, accessed April 11, 2003.

36. Based on the Nuclear Resources Defense Council (NDRC) Nuclear Notebook, "Israeli nuclear forces, 2000," from internet: *www.thebulletin.org*,

accessed April 11, 2003, and Federation of American Scientists, Weapons of Mass Destruction, "Popeye Turbo," from internet: *www.fas.org*, accessed December 11, 2002.

37. Federation of American Scientists, Weapons of Mass Destruction, "Jericho 2," from internet: *www.fas.org*, accessed December 11, 2002.

38. Farr, "The Third Temple's Holy of Holies."

39. Avner Cohen, "Cairo, Dimona, and the June 1967 War," *The Middle East Journal*, Vol. 50, No. 2, Spring 1996, pp. 190-210.

40. Avner Cohen, "Nuclear Arms in Crisis under Secrecy: Israel and the Lessons of the 1967 and 1973 Wars," in Peter R. Lavoy, Scott D. Sagan, and James J. Wirtz, *Planning the Unthinkable: How New Powers will Use Nuclear, Biological, and Chemical Weapons*, Ithaca: Cornell University Press, 2000, pp. 104-124.

41. Mark Gaffney, *Dimona, the Third Temple? The Story Behind the Vanunu Revelation*, Brattleboro, VT: Amana Books, 1989, pp. 144-149.

42. Hersh, *The Samson Option*; Farr, "The Third Temple's Holy of Holies."

43. Much speculation surrounds whether Israel could have used its limited air assets to attack southern cities in the Soviet Union or would have had to rely on small nuclear devices smuggled into the Soviet Union.

44. Harold Hough, "Could Israel's nuclear assets survive a pre-emptive strike?," *Jane's Intelligence Review*, January 9, 1997, from internet: *www.janes.com*, accessed April 4, 2003.

45. *Ibid*.

46. Steinberg, "Re-examining Israel's Security Doctrine."

47. Robert Harkavy, "The Imperative to Survive," p. 112; The "Samson Option" is also the title of the book by Seymour Hersh.

48. There are strong parallels with the debate over nuclear use in American and Soviet doctrine throughout the Cold War as most commentators on Israel's nuclear program are schooled in that same tradition. Without an open public debate in Israel, however, it seems presumptuous to assign a position to Israeli military and political figures with absolute certainty; it is more likely that different leaders hold different views, just as different American leaders did.

49. Steinberg, "The Future of Nuclear Weapons: Israeli Perspectives," presented at the Ninth Amaldi Conference: Security Questions at the End of the Twentieth Century, Geneva, November 21-23, 1996, from internet: *http://faculty.biu.ac.il/~steing/arms/amaldi.htm*, accessed April 4, 2003.

50. For a discussion of the different approaches taken by different Israeli leaders, see Shlomo Aronson, *The Politics and Strategy of Nuclear Weapons in the Middle East: Opacity, Theory, and Reality, 1960-1991: An Israeli Perspective*, New York: State University of New York Press, 1992, pp. 167-184.

51. Efraim Inbar and Shmuel Sandler, "Israel's Deterrence Strategy Revisited," *Security Studies*, Vol. 3, No. 2, Winter 1993/94, pp. 342-343.

52. Harold Hough, "Israel reviews its nuclear deterrent," *Jane's Intelligence Review*, November 1998, pp. 11-13.

53. See Louis Rene Beres, "Israel's Bomb in the Basement: A Revisiting of 'Deliberate Ambiguity' vs. 'Disclosure', in Efraim Harsh, ed., *Between War and Peace: Dilemmas of Israeli Security*, London: Frank Cass, 1996, pp. 113-133.

54. The earliest discussion of this possibility is found in Robert W. Tucker, "Israel and the United States: From Dependence to Nuclear Weapons?" *Commentary*, November 1975, p. 41.

55. See the discussion in the section on South Africa's development of the nuclear weapon.

56. "The Draft Report of National Security Advisory Board on Indian Nuclear Doctrine," Embassy of India, Washington, DC, from internet: *www.indianembassy.org*, accessed November 27, 2002.

57. "Indian Statement of 'Operationalisation' of Nuclear Doctrine, January 4," in *Disarmament Documentation*, The Acronym Institute, from internet: *www.acronym.org.uk*, accessed May 14, 2003.

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59. Waheguru Pal Singh Sidhu, "India's Nuclear Use Doctrine," in Peter R. Lavoy, Scott D. Sagan, and James J. Wirtz, *Planning the Unthinkable: How New Powers Will Use Nuclear, Biological, and Chemical Weapons*, Ithaca: Cornell University Press, 2000, p. 127.

60. Ashley Tellis takes on this problem in Ashley J. Tellis, *India's Emerging Nuclear Posture: Between Recessed Deterrent and Ready Arsenal*, Santa Monica: RAND, 2001, pp. 296-366, though he believes strongly that India's nuclear forces are countervalue only.

61. The Institute, based in New Delhi, was established in 1965 and is funded by the Ministries of Defence and External Affairs. According to its web page, Institute scholars remains independent of the government. From internet: *www.idsa-india.org*.

62. Gurmeet Kanwal, *India's Nuclear Doctrine and Policy*, Vol. XXIV, No. 11, February 2001, Institute for Defence Studies and Analysis, New Delhi, from internet: *www.idsa-india.org*, accessed November 27, 2002.

63. Rajesh Rajagopalan, *Nuclear Strategy and Small Nuclear Forces: The Conceptual Components*, Vol. XXIII, No. 7, October 1999, Institute for Defence

Studies and Analysis, New Delhi, from internet: *www.idsa-india.org*, accessed December 9, 2002.

64. Brahma Chellaney, "India's Nuclear Planning, Force Structure, Doctrine and Arms Control Posture," *Australian Journal of International Affairs*, Vol. 53, No. 1, 1999, p. 66.

65. Raja Menon, *A Nuclear Strategy for India*, New Delhi and London: Sage Publications, 2000, p. 148.

66. P.M. Kamath, *Indian National Security Policy: Minimal Nuclear Deterrence*, Vol. XXIII, No. 8, November 1999, Institute for Defence Studies and Analysis, New Delhi, from internet: *www.idsa-india.org*, accessed December 9, 2002; see also Chellaney, "India's Nuclear Planning," p. 67.

67. Cited in Kamath, *Indian National Security Policy*.

68. Amit Gupta, "India's Draft Nuclear Doctrine," *The Round Table*, Vol. 355, 2000, p. 358.

69. Cited in Kamath, *Indian National Security Policy*.

70. Menon, *A Nuclear Strategy for India*, pp. 146-147.

71. Kamath, *Indian National Security Policy*. Arguably, Sundarji was India's greatest strategist according to Menon, *A Nuclear Strategy for India*, p. 98.

72. Gupta, "India's Draft Nuclear Doctrine," p. 355. According to the author, in the 1980s Indian analysts called for about 150 weapons; after the nuclear tests of 1998, for about 400.

73. For comparison, see "India's Nuclear Forces, 2002," NRDC Nuclear Notebook, *Bulletin of the Atomic Scientists*, Vol. 58, No. 2, March/April 2002, p. 70, from internet: *www.nci.org*, accessed January 20, 2003; see also "India's Nuclear Weapons," Weapons of Mass Destruction, Federation of American Scientists, from internet: *www.fas.org*, accessed December 11, 2002; for the higher number, see "India Establishes a Nuclear Command System," *New York Times*, January 5, 2003, from internet: *www.nytimes.com*, accessed January 6, 2003.

74. "India's Nuclear Forces, 2002," NRDC Nuclear Notebook and "India's Nuclear Weapons," Weapons of Mass Destruction.

75. Menon, *A Nuclear Strategy for India*, p. 114.

76. Paul D. Taylor, "India and Pakistan: Thinking about the Unthinkable," *Naval War College Review*, Vol. LIV, No. 3, Summer 2001, pp. 40-51; see also "12 Million Could Die at Once in an India-Pakistan Nuclear War," *New York Times*, May 27, 2002, from internet: *www.nytimes.com*, accessed January 28, 2003.

77. "Suo Motu Statement by Prime Minister Shri Atal Bihari Vajpayee in Paliament," May 27, 1998, from internet: *www.fas.org*, accessed December 11, 2002.

78. American scholar Ashley Tellis hotly contests any claims to warfighting for India's nuclear forces. See Ashely J. Tellis, *India's Emerging Nuclear Posture:*

Between Recessed Deterrent and Ready Arsenal, Santa Monica: RAND, 2001, especially Chapter Four, pp. 251-476.

79. Sidhu, "India's Nuclear Use Doctrine," p. 125.

80. Chellaney, "India's Nuclear Planning," p. 66.

81. Kamath, "Indian National Security Policy," especially note 20.

82. Cited in "India's Nuclear Forces," NRDC Nuclear Notebook.

83. Menon, *A Nuclear Strategy for India*, p. 167.

84. The CIA reportedly believes of the two land-based versions, only the *Prithvi* I has a nuclear role. See "India's Nuclear Forces," NRDC Nuclear Notebook.

85. *Ibid.*; see also Michael Kraig, "The Indian Drive towards Weaponization: the *Agni* Missile Program," report to the Federation of American Scientists, from internet: *www.fas.org*, accessed December 11, 2002.

86. Appendix I for calculations of the *Agni* II SSPK.

87. Critics are right to note that one test does not a system make. However, it remains intriguing that the Indian military that tested the system was interested in promoting its capabilities. Whether hyperbole or no, the fact remains that some officials found it important to "signal" their capability for nuclear warfighting, and we should not dismiss their claims outright.

88. "India Establishes a Nuclear Command System."

89. For military involvement see Menon, *A Nuclear Strategy for India*; for concern that military control would lead to a doctrine of preemption, see Sidhu, "India's Nuclear Use Doctrine," p. 157.

90. See the discussion in Sidhu, "India's Nuclear Use Doctrine," pp. 128-152.

91. See text of "Agreement Between Pakistan and India on the Prohibition of Attack Against Nuclear Installations and Facilities," signed December 31, 1988, from internet: *www.pnnd.org*, accessed February 19, 2003.

92. Kamath, "Indian National Security Policy."

93. Menon, *A Nuclear Strategy for India*, p. 130.

94. "Pakistan's response to the Indian Nuclear Doctrine," Foreign Minister Abdul Sattar's Inaugural Address to the Seminar organized by the Islamabad Council on World Affairs and the Institute of Strategic Studies," November 25, 1999, from internet: *http://missions.itu.int/pakistan*, Pakistan's Permanent Mission in Geneva, accessed March 5, 2003.

95. Samina Ahmed, "Pakistan's Nuclear Weapons Program: Moving Forward or Tactical Retreat?," Kroc Institute Occasional Paper #18:op:2, February 2000, Harvard University: John F. Kennedy School of Government, p. 5.

96. For Indian acceptance, see Gurmeet Kanwal, *India's Nuclear Doctrine and Policy*, Vol. XXIV, No. 11, February 2001, Institute for Defence Studies and

Analysis, New Delhi, from internet: *www.idsa-india.org*, accessed November 27, 2002.

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99. Ahmed, "Pakistan's Nuclear Weapons Program," p. 24.

100. Rodney W. Jones, "Is stable nuclear deterrence feasible?," *The Friday Times*, February 22-28, 2002, Vol. XIII, No. 52, from internet: *www.thefridaytimes.com*, accessed February 22, 2003.

101. *Ibid*.

102. Kanwal, *India's Nuclear Doctrine and Policy*.

103. Air Commodore (Retd) Jamal Hussain, "Dynamics of Nuclear Strategy in South Asia," *Defence Journal*, October 2002, from internet: *www.defencejournal.com*, accessed December 11, 2002.

104. "Pakistan's response to the Indian Nuclear Doctrine," Foreign Minister Abdul Sattar; see also Zafar Iqbal Cheema, "Pakistan's Nuclear Use Doctrine and Command and Control," in Peter R. Lavoy, Scott D. Sagan, and James J. Wirtz, *Planning the Unthinkable: How New Powers Will Use Nuclear, Biological, and Chemical Weapons*, Ithaca: Cornell University Press, 2000, passim.

105. Ahmed, "Pakistan's Nuclear Weapons Program," p. 5.

106. Anthony H. Cordesman, "The Threat of Pakistani Nuclear Weapons," November 8, 2001, Washington, DC: Center for Strategic and International Studies, p. 6.

107. Natural Resources Defense Council, "The Consequences of Nuclear Conflict between India and Pakistan," from internet: *www.nrdc.org*, accessed February 19, 2003; Gaurav Kampani, "Safety Concerns About the Command & Control of Pakistan's Strategic Forces, Fissile Material, and Nuclear Installations," September 28, 2001, Monterey: Monterey Institute of International Studies, from internet: *http://cns.miis.edu*, accessed March 5, 2003.

108. Federation of American Scientists, "Pakistan Nuclear Weapons," from internet: *www.fas.org*, accessed December 11, 2002.

109. Jones, "Is stable nuclear deterrence feasible?"

110. Shireen M. Mazari, "Formulating a Rational Strategic Doctrine," *Pakistan Institute for Air Defence Studies*, n.d., from internet: *www.piads.com.pk*, accessed March 5, 2003.

111. See the artist's rendition of the method at *www.piads.com.pk/users/piads/nuke.html*, accessed April 29, 2003.

112. Mazari, "Formulating a Rational Strategic Doctrine." See also Natural Resources Defense Council, "The Consequences of Nuclear Conflict between India and Pakistan" for a similar list of expected targets.

113. Farzana Shaikh, "Pakistan's nuclear bomb: beyond the non-proliferation regime," *International Affairs*, Vol. 78, No. 1, January 2002, pp. 33-34; Federation of American Scientists, "Pakistan Nuclear Weapons"; and Cordesman, "The Threat of Pakistani Nuclear Weapons," pp. 3-4.

114. Federation of American Scientists, "Pakistan," from internet: *www.fas.org*, accessed December 11, 2002; Cordesman, "The Threat of Pakistani Nuclear Weapons," pp. 9-10. According to Samina Ahmed in "Pakistan's Nuclear Weapons Program," pp. 14, fn. 35, the Pakistani government has repeatedly denied that the Ghauri is based on North Korean technology.

115. Ahmed, "Pakistan's Nuclear Weapons Program," p. 6

116. Cheema, "Pakistan's Nuclear Use Doctrine," p. 163.

117. Cordesman, "The Threat of Pakistani Nuclear Weapons," p. 6. Another unverified source places the development of some kind of Command and Control much earlier. See See Cheema, "Pakistan's Nuclear Use Doctrine," p. 172.

118. Kampani, "Safety Concerns About the Command & Control of Pakistan's Strategic Forces."

119. Lodi, "Pakistan's Nuclear Doctrine."

CHAPTER 11

NUCLEAR AND OTHER RETALIATION AFTER DETERRENCE FAILS

Tod Lindberg

This chapter discusses whether or not the United States is likely to launch a nuclear retaliatory attack against an enemy that has used weapons of mass destruction (WMD) against U.S. interests and whether or not the United States *should* launch such a nuclear counterattack or retaliate by conventional means.[1]

The term "weapons of mass destruction" clearly has utility as a shorthand way of referring to nuclear, biological, and chemical weapons. It has certainly caught on. To the extent that it leads to the conclusion that nuclear, biological, and chemical weapons are essentially the same, and in a different category from everything else, it can be misleading as well.

A nuclear weapon is not the same as a biological weapon or a chemical weapon. Several Americans died in October 2001 as a result of an anthrax attack through the U.S. mail. While this constituted the use of a WMD and while the result created widespread fear and some loss of life, one cannot fairly call the attack "mass destruction." At the same time, al Qaeda's use of airplanes on September 11, 2001, as fuel-air bombs against skyscrapers resulted in the deaths of some 3,000 people. Surely this was "mass destruction" as an effect. Recognizing this effect, some commentators have said that the airplanes were "turned into" WMD, and officials have taken security measures to prevent airplanes from again being turned into such weapons. The same surely is true at nuclear power plants and chemical factories. In these cases, one might say that things have the "potential" to become WMD. But this is complicated, too, because insofar as mass destruction is concerned, a WMD in the sense of a nuclear, biological, or chemical weapon is something that exists only as potential until it is used. But before such a weapon is used, it nevertheless *exists*, and its existence has an effect on people that is very different from the effect of airliners, nuclear power plants, and chemical factories.

It is important to see the ways in which things are similar, but not at the expense of seeing the ways in which they differ. And one must always avoid the deformative temptation of theory, namely, to take a particular situation in the here-and-now, to describe it abstractly, and to suppose that it thereby poses broad abstract and general questions.

So if the question is what to do with or about nuclear weapons or other WMD, we should closely examine the categories of situations we may face—what is known to be possible—before venturing any general conclusions.

Here, then, are some possibilities:

1. Actions involving nonstate actors and/or state actors acting covertly:

1.1. A conventional bombing attack against U.S. interests abroad, killing: 1) many people but few Americans; or 2) hundreds of Americans.

1.2. A conventional bombing attack against the United States homeland killing 1) a few Americans; or 2) hundreds of Americans.

1.3 A non-WMD attack against the United States homeland killing thousands of Americans.

1.4. A biological attack somewhere in the world sickening/killing 1) hundreds/dozens including a few Americans; 2) thousands/hundreds including some Americans; 3) tens of thousands/thousands including many Americans.

1.5. A biological attack on the United States homeland sickening/killing 1) hundreds/dozens of Americans; 2) thousands/hundreds of Americans; 3) tens of thousands/thousands of Americans.

1.6. A chemical attack somewhere in the world killing 1) many people including a few Americans; 2) thousands of people including hundreds of Americans.

1.7 A chemical attack on the United States homeland killing 1) a few Americans; 2) hundreds of Americans; 3) thousands of Americans.

1.8 Detonation of a radiological weapon immediately killing a number of Americans and causing an unknown number of excess future cancer deaths.

1.9 Detonation of a single small nuclear weapon somewhere in the world killing 1) thousands including hundreds of Americans 2) tens of thousands including thousands of Americans.

1.10 Detonation of a single small nuclear weapon on the United States homeland killing 1) thousands of Americans 2) tens of thousands of Americans.

1.11 Detonation of a series of nuclear weapons including some on the United States homeland and killing hundreds of thousands.

2. Actions taken openly by state actors (acts of war).

2.1 Use of chemical or biological weapons against U.S. forces, killing 1) a few Americans 2) hundreds of Americans 3) thousands of Americans.

2.2 Use of conventional weapons against U.S. civilians at home, killing 1) hundreds 2) thousands.

2.3 Use of chemical weapons against U.S. civilians at home, killing 1) hundreds 2) thousands.

2.4 Use of biological weapons against U.S. civilians at home, sickening/killing 1) hundreds/dozens of Americans 2) thousands/hundreds of Americans 3) tens of thousands/ thousands of Americans.

2.5 Detonation of a radiological weapon immediately killing a number of Americans and causing an unknown number of excess future cancer deaths.

2.6 Detonation of a small nuclear weapon against U.S. forces, killing thousands.

2.7 Systematic attack using battlefield nuclear weapons against U.S. forces, killing 1) thousands 2) tens of thousands.

2.8 Detonation of a single nuclear weapon in a U.S. city, killing tens of thousands.

2.9 Systematic attack using strategic nuclear weapons against counterforce targets in the United States, killing hundreds of thousands.

2.10 All-out assault using strategic nuclear weapons against counterforce and countervalue targets in the United States, killing scores of millions.

This catalogue of horrors illustrates the variety of potential attacks the United States faces and is not an exhaustive list. For example, it

does not enumerate certain plausible combinations, such as wartime use of chemical weapons on the battlefield and detonation of a single nuclear weapon in the homeland as a demonstration for purposes of coercion. It is also possible that during wartime, an attack on the homeland might occur without certain knowledge of who was responsible for it. I would also note that notwithstanding the specificity of the list above, the scenarios still remain abstract. A nerve agent attack on a subway system is a chemical attack in accordance with 1.7.1-3 or 2.3.1-2, but so would the poisoning of a city's water supply, even though they are very different problems. Policymakers facing situations in any one of these enumerated categories will face very real particular cases; yet in advance of the fact, the only real possibility is to think in terms of categories of attack.

I would suggest that this list poses two questions: What should we do to prevent these things from happening? And, what should we do if one or more of them happens anyway?

We come, then, to the most common answer to both questions; in a word, deterrence. We will threaten action so devastating in response the eventualities, including but not limited to those listed above, that no one will take such actions for fear of unleashing the promised response. This is the doctrine of Mutual Assured Destruction, according to which a nuclear power strives to maintain an "assured second-strike capability" that allows it to annihilate an enemy who has launched even a massive nuclear surprise attack. Short of MAD, we seek to deter the use of even a single nuclear weapon by the possession of nuclear weapons capable of reaching any nation from which an attack might come. The prospect that the United States might "incinerate" an attacker keeps everyone in line.[2]

For the moment, let us assume the truth of MAD's premise that the possession of nuclear weapons deters others from using nuclear weapons. This has obvious application to cases 2.6-10 above. But what about the other cases? Is deterrence operating in those cases, and if so, where does it come from? What is doing the deterring?

To begin with, it is clear that whatever may be deterring the use of biological weapons or chemical weapons, it is not the biological or chemical weapons capability of the United States. Earlier in the 20th century, the United States incorporated in-kind deterrence

in its defense policies, insofar as President Roosevelt articulated a policy not of "no first use" of chemical weapons, implicitly allowing for retaliation in-kind. But now, the United States is a party to the Biological and Toxin Weapons Convention of 1972, and the Chemical Weapons Convention of 1993, each intended to ban the stockpiling and use of these forms of WMD. In the 1925 Geneva Convention, parties foreswore the use of chemical and biological agents, but research and development continued, perhaps in the context of deterrence, though perhaps simply in pursuit of military advantage on the battlefield. The 1972 and 1993 conventions effectively foreclosed the pursuit of such military advantage as well as in-kind deterrence, at least among those willing to be bound by their international undertakings. Senior Bush administration officials previewing a mid-September 2001 Afghanistan options briefing intended for the president came upon a slide that said "Thinking Outside the Box—Poisoning Food Supply." They were appalled and ordered it deleted.[3]

There is also the question of achieving deterrence through the threat of a nuclear response to a chemical or biological attack.[4] The attempt to deter by this means is very much an open question. For example, on the eve of the first Gulf War, Secretary of State James A. Baker III delivered a note to Iraq's Foreign Minister Tariq Aziz, warning the Saddam regime that any use of chemical or biological weapons by Iraq against coalition forces could bring nuclear retaliation. The name subsequently given to this policy was "calculated ambiguity." There was, no use of such weapons by Iraq in 1991.

Although officials of the second Bush administration discussed reiterating the threat "to use any means at our disposal to respond to any use of WMD" in the aftermath of the 9/11 attack,[5] one should perhaps be cautious about concluding too much from the 1991 episode. The Baker message also warned Iraq that setting oil wells on fire could provoke a nuclear response. Should this be an addition to our catalogue of WMD possibilities, a conventional attack against vital economic interests of the United States? Perhaps not, in that Saddam did burn the wells but was not penalized for it.

But it is further possible that Saddam refrained from using chemical weapons against coalition forces in response to the threat of nuclear retaliation. The psychology here is somewhat complicated.

If the threat of nuclear retaliation deterred Saddam from doing something he would otherwise have done, namely, using chemical weapons, why didn't the same threat of nuclear retaliation deter him from torching the oil wells?[6]

One could perhaps argue that Saddam concluded that the United States was bluffing on the oil wells—that there was no way the United States could seriously think that a nuclear response to burning oil fields was warranted, appropriate, acceptable to the international community, etc.—but that the United States was deadly serious about its warning on the use of chemical weapons. Certainly, the latter warning was more emphatic. This argument is certainly possible, though not without difficulty on its own terms. If Saddam Hussein would be deterred by the threat of nuclear retaliation, he also would be deterred, according to most applications of deterrence theory, by the mere possibility of nuclear incineration, i.e., the possibility that the United States is not bluffing. It's hard (though not impossible) to argue that the same threat of retaliation both deterred him and failed to deter him. The proposition that Saddam rationally calculated our true intentions correctly is no better founded than the claim that the Baker ultimatum had no effect on Saddam's calculations, and that he simultaneously decided a) not to use chemical weapons, and b) to burn the oil wells for reasons largely unrelated to the U.S. nuclear threat.

Speculation about Saddam's rational calculation of true U.S. intentions is further complicated by the contention after the fact by senior Bush administration officials that they were bluffing—that they had no intention of responding to the use of chemical or biological weapons against U.S. forces with a nuclear strike against Iraq.[7] If Saddam concluded that he faced nuclear annihilation over chemical or biological weapons usage but not over setting oil fires, he concluded wrongly.

And this leads to the final problem. In general, the threat of using of nuclear weapons in response to attack is at best a "declaratory policy." Even if Bush administration officials had been sincere when they issued their threats rather than engaged in a bluff, we do not know what the response to the use of chemical weapons by Iraq would have been. The notion that Saddam was deterred by the U.S. threat raises the age-old problem of how to prove deterrence

worked. This is usually framed as a matter of the impossibility of proving a negative, namely, that someone didn't do something because of a warning about consequences. I would like to embellish the problem by suggesting that "consequences" here is very heavily freighted for something with no actuality. We are asked to equate the *threat* "If A, then B" with the *reality* of "If A, then B," when the proposition is never tested by A (or in the case of the oil wells, where it was tested only to have the actuality turn out to be "If A, then not B"). The point is that notwithstanding anything and everything that has been said beforehand, "A" would give rise to a *decision-point* at which one would choose "B" or "not B." If "A" does not arise, there is no basis for assuming that the decision is "B" rather than "not B." (The assertion that the "mere possibility" of "B" deters "A" is an attempt to wiggle around this difficulty.)

At most, one can know that one *is* bluffing, that one will not do what one says one will do if provoked, having ruled it out (that is, having reached the decision point in advance).[8] But in the absence of the provocation, one does not reach the moment of decision, and so one cannot be said to have decided. "Declaratory policy" is not policy, in the strong sense of established practice; it is declaration.[9]

Deterrence is generally thought to be an exercise in which one party tries to persuade another party not to undertake a particular action by making the perceived potential costs of the action unacceptably high.[10] The deterring party promises to sufficiently annul the benefit of the action by counteraction to make the action pointless. Thus there is a substantial literature on what it takes to make a deterrent credible in the eyes of the party that one is seeking to deter.[11]

This focus of attention is important. It reminds us that there is no sense in which the possession of a "deterrent" automatically deters. We must inquire into the mind of the party we wish to deter in order to determine whether deterrence is working.[12] But in another sense, the focus is incomplete. Before we spend too much time on the mind of the party meant to be deterred, we should focus on the details of what's going on in the mind of the party trying to do the deterring.

If a deterrent works better because it is more credible, then the exercise of proving it credible to the party one wishes to deter begins

with the effort to persuade *oneself* that it is credible. Credibility begins at home. So we ask ourselves the following question: What would we do if someone launched an all-out nuclear attack on us? Or, what would we do in certain horrendous circumstances short of all-out nuclear attack? The answer we proffer is that we would unleash fury in return, up to the limit case, the complete annihilation of our enemy.

And we do a number of things to demonstrate our intention, *first of all to ourselves.* We build an arsenal of vast power. We ensure that the inevitable vulnerabilities of any given component of it are offset by capabilities in other components. We have the "triad;" the ability to deliver strategic nuclear weapons by land-based missile, by long-range bomber, or by submarine-based missile. We develop weapons systems across a wide range of potential utility, from short-range nuclear artillery shells to intermediate-range missiles to multiwarhead long-range missiles. We have explosive power at our disposal in all magnitudes of which nuclear weapons are capable, from small charges for the local battlefield to the behemoth city incinerators of Armageddon.[13] We have sought and achieved greater and greater precision in our targeting, enabling us to reduce the size of our warheads while still ensuring that the targets we are seeking will be destroyed. And we have "hardened" our nuclear facilities as well as command-communications-control (C3) links to the national command authority in order to withstand the worst an enemy offers and yet be able to strike back.[14]

This is not just a matter of hardware, of course. There is an extensive body of military doctrine on how use the weapons effectively. War games simulate every imaginable contingency to test these doctrines. The U.S. Strategic Command headquarters at Offutt Air Force Base in Nebraska, one of nine unified commands world wide, has 2,500 personnel and coordinates the nuclear warfighting capability of personnel and equipment ranging in location from the White House and the Pentagon to *Minuteman* missile silos in Wyoming, Montana, and North Dakota, to strategic submarine bases in Georgia and Washington, to communications satellites miles overhead.[15] The literature of military affairs journals takes up warfighting questions at the unclassified level and the Pentagon is

full of classified studies on the subject, from the January 10, 2002, "Nuclear Posture Review" on down.

Beyond the capacity to wage nuclear war in response to a nuclear or other attack, the United States approaches the subject with a certain élan as well. Consider the mythos that has grown up around the "football," the satchel containing the nuclear attack codes that is carried by a military officer who shadows the president of the United States at all times in case of surprise attack. Or consider further the psychological testing of military personnel who have nuclear warfighting responsibilities. We do not want a madman in close proximity to these weapons. Neither do we want someone unwilling, in a pinch, to unleash incineration when ordered.

All of this is very real. There is no doubt that the United States *could* unleash all-out nuclear war. One day the drill *could* turn out to be the real thing and the hardware, personnel, doctrine, and élan ("yes, sir, it is necessary, lawful, and just to fire this missile") *could* come together as planned. The worst-case *scenario* of planners' nightmares could simply be the worst case—global devastation. We have ensured that all of this is entirely possible.

We set out to persuade others about what we would do. But the first order of business in doing so is to persuade *ourselves*. It is not surprising that we were able to do so, nor is the fact that we have done so very illuminating. Whenever we found something that was less than convincing in our nuclear weaponry or our doctrine, we tried to replace it or improve upon it. The problem is that while the apparatus is real, in relation to the central question—what would the United States do if attacked in certain ways?—it is only a simulacrum, an elaboration of a central contention that could never be proved by the apparatus because the construction of the apparatus presupposes it, namely, that we would retaliate with everything we have.

The conceptual problems of nuclear deterrence get worse. Once we have satisfied ourselves that we know what we will do (even though we don't), we turn the inquiry to whether our adversary is, in fact, persuaded. All too often, this is a neglected aspect of assessing nuclear deterrence. It is tempting to conclude that the deterrent—the vast apparatus of nuclear retaliation we have constructed—deters in itself. But it is not the deterrent, the thing, that deters. What deters is

the *idea* that the deterrent is effective in the mind of the party whom we are seeking to deter. So we have to inquire whether our effort to deter has the effect of deterring.

This is problematic for two reasons. First, a party may refrain from taking an action, in particular an action from our list above, for any number of reasons. Consider the case of the United States and the United Kingdom. It is not meaningful to suggest that the reason the UK has refrained from undertaking a nuclear attack on the United States is that the UK fears massive retaliation in return. Surely, the bonds of friendship between the two peoples count for something. This friendship is far more than an epiphenomenon concealing the underlying reality that the UK is deterred by the nuclear weapons of the United States and that the United States is deterred by the UK's. One could make a similar point about why Canadian intelligence services are unlikely to launch covert terrorist attacks from the menu above against the United States.[16] If it is not nuclear deterrence in the form of the fear of massive retaliation that is working in these cases, we are clearly unjustified in ascribing the work of deterrence to *all* cases in which matters do not come to blows. "Peace" is no proof that deterrence is working. "Peace" is no more than a precondition for the question of whether it is deterrence or something else that has kept the peace.

The second problem is that the assessment of whether our adversaries are persuaded that we would retaliate is actually not much different from the question of whether we have persuaded *ourselves* that we would retaliate. Faced with evidence, for example, that an adversary doubted our willingness to retaliate, we might redouble our efforts to persuade. And no doubt we would continue until we were persuaded that our adversaries were persuaded—which is to say, we are once again engaged in an exercise in persuading ourselves that we would act in the manner we want to believe we would act. This is not a hard sell.[17]

The reason we set out to persuade ourselves that we would retaliate massively if necessary is that we know that unless we convince ourselves that we were prepared to wage all-out nuclear war in the limit case, we have little hope of persuading our adversaries of the same. In other words, our real purpose is and has always

been to deter. It turns out that we have never been interested in the question "What would we do if . . .?" Our question all along has been, "How do we persuade our potential adversary not to attack us?" Our answer from the beginning has been "by persuading him that the benefit of attacking us could never outweigh the cost" and, at the limit, "by persuading him that we will annihilate him." Our persuasive power has been assumed from the beginning to rest on our belief that we would retaliate. The purpose of our belief is to persuade. Unfortunately, the disclosure of this fact, which we knew perfectly well all along to have been true but which we, in effect, chose to disregard, colors our inquiry significantly. We have taken one possible answer to the question "What would we do if . . .?" and maintained it, not because we know it to be our answer, but because we think it would be best for us if others believe it is our answer.

We therefore maintain the position we do in order to ensure that the result is what we desire, namely, a peace that we ascribe to deterrence—a situation in which we are not attacked.[18] Without an intention to deter, in fact, what we are doing makes no sense.[19] Since we do not as a general rule believe that our intentions are expansionist and aggressive, we are clearly not acquiring a nuclear arsenal for offensive purposes. (Whether everyone else shares this interpretation is another question, as is the question of whether these weapons have served a coercive purpose short of detonation.) No, the apparatus exists for the purpose of persuading ourselves that we have persuaded others that, at the limit, they risk massive nuclear retaliation if they attack us. We have a nuclear arsenal not for the purpose of fighting nuclear wars but for the purpose of demonstrating the capability of assured destruction to any potential adversary. This is a product of our desire to persuade our adversaries not to attack us, which in turn we measure by how persuaded we are that they are persuaded. If we think that they *don't* think that they risk annihilation, we take further action to demonstrate that they face that possibility. We enhance our capabilities in the pursuit of credibility. This in turn comes down to the question of whether we are persuaded that we will do what we say we will do, namely retaliate massively at the limit. This, we demonstrate to ourselves through the acquisition of the capability of assured destruction. Nuclear deterrence, and at the limit the doctrine of mutual assured

destruction, is thus a closed circle of self-persuasion that coexists with nuclear weapons not going off.

Let us now disrupt the equilibrium of deterrence by returning to the catalogue of horrors above. What could trigger nuclear retaliation? In the first place, it seems highly unlikely that any sort of conventional attack would result in a decision to retaliate with nuclear weapons. The record on the subject is clear. The oil field fires in the first Gulf War did not trigger such retaliation despite a warning to that effect from the United States. The United States did not respond to terrorist attacks traceable to Muammar Qaddafi's Libya in the 1980s with a nuclear attack, but rather with a conventional strike (and one that fell well short of any serious attempt at "regime change.") Moreover, in the wake of the destruction of 9/11, no one seriously proposed the use of nuclear weapons. This cannot be said to have been solely a product of the problem of what to do against terrorist organizations, which are not state actors.[20] Very quickly, the United States determined to take action to topple the Taliban government, but the use of nuclear weapons was never part of the planning, even against al Qaeda targets, for example around Tora Bora.[21] If a nuclear strike against a legitimate military target, such as a concentration of al Qaeda and Taliban fighters in an area remote from civilians, is out, a retaliatory strike for 9/11 aimed at a civilian population or at a military target located near civilians is hard to imagine.

In the second place, as we have discussed above, if it seems inconceivable that a chemical or biological attack would be met in kind, it is hard to see how such an attack would be met with nuclear retaliation. Nuclear weapons are generally agreed to be the most severe WMD in terms of their lethality and the horror they arouse. Retaliation for a chemical or biological attack by nuclear weapon would be seen as an escalation. It seems far more likely that the United States in such a case would settle on a course of defeating the responsible parties militarily, whether in a conventional war against a state actor or against a state harboring nongovernmental terrorist actors. The goal might be punishment in the form of limited military action, but it would more likely be regime change for the state in question and the eradication of the terror network in a manhunt to the death.

A radiological attack would constitute the use of a "nuclear" weapon because it disperses radioactive material. Even here, however, it seems more likely that the response would be he same as it would be to a chemical, biological, or a massive conventional attack: regime change and manhunt.

We come now to the nuclear scenarios, ranging from a single limited blast up to an all-out assault by a Cold War-sized arsenal. We know what we have said we would do, but we said this for a specific reason: to deter. Our purpose was to try to prevent what we are now hypothesizing was not prevented. Another way to put this is that we have failed in our effort to deter. The threat of nuclear retaliation and at the limit, assured destruction, has not prevented nuclear attack. Now what?

It is entirely clear that the parties responsible for unleashing a nuclear attack on the United States must be counterattacked and, if possible, destroyed. There would be at least three compelling reasons for doing so: first, punishment; second, incapacitation, so that the same parties could not undertake future attacks; third, deterrence again—to send a message to any persons contemplating similar action that they face death if they proceed.

It is possible that a retaliatory nuclear strike would be effective in achieving the desired destruction. In the case of state actors, destruction is near-certain.

This is the decision-point. We could retaliate with nuclear weapons. But would we really want to do that? This is an important question across the range of reasons for counterattacking.

In relation to *punishment*, whom would we be punishing? First of all, we would hope to eliminate members of a regime or a terrorist group within the zone of total destruction. But we also eliminate many innocent persons, specifically, civilians. It is hard to see what the justification for punishing the civilians would be, unless populations are somehow to be held accountable for the rulers they have. Such a doctrine would run counter to a century's worth of international effort to distinguish civilians from soldiers in order to protect the former.[22]

What is true of nuclear punishment is also true of nuclear *incapacitation*. We would destroy the capacity of the attackers to repeat their actions, but at the cost of the lives of many people who

did not participate in the attack and who would not be agents in any future attack. One presumes that the decision to launch a nuclear attack on the United States was not put to a plebiscite. The actual number of persons involved in such a decision would be tiny, yet the number of the dead following a retaliatory nuclear strike would be very high.

Finally, *deterrence*. The temptation is to think of a nuclear counterstrike as a "restoration" of deterrence. But there are problems here. We might say that we have to *do* now what we *said* we would do before—namely, launch a retaliatory strike up to the limit case of complete destruction—in order to establish that we meant business in the first place. Except that we said we would retaliate to try to prevent what occurred, namely a nuclear attack.

"Deterrence" cannot be said to have completely failed because of the attack. It is possible that some parties refrained from attacking the United States with nuclear weapons solely because they believed that we would do what we said and destroy them. If we fail to retaliate, there is a risk that such a party would conclude that it could "safely" launch a nuclear attack now. But a party that would be deterred in the first case would in all likelihood consider the totality of the U.S. response in calculating whether it should remain deterred or attack. Such a party would likely remain deterred by the prospect of violent regime change or manhunt to the death, because avoidance of those outcomes led the party to decide to be deterred by the prospect of nuclear retaliation in the first place.

But if we decide to launch a retaliatory nuclear strike, we should not do so under the illusion that we are "restoring" deterrence. Our deterrent, in the case of an attacking party, did not deter, and so "deterrence" cannot be said to have ever described the relationship between the United States and the state or party launching the nuclear attack. *And it is the emergence or existence of such parties that is the problem.* Launching a nuclear counterattack against an undeterrable party may reinforce the seriousness of our purpose in relation to *deterrable* parties—the ones who never doubted the price they would pay for attacking the United States would be too high. But nuclear retaliation will do nothing to restore "deterrence" in relation to undeterrable actors—those who would risk violent regime change or manhunt to death in order to attack us with nuclear weapons.

But what about the limit case—an all-out nuclear surprise attack on the United States killing perhaps 100 million people?[23] What then?

It is reasonable to begin by asking whether this question is anything but entirely theoretical. The obvious counterclaim vis-à-vis the United States in the 21st century is China. Several comments here will have to stand in for a full discussion of the subject, which is beyond the scope of this chapter. First, to the extent that China needs to be deterred from attacking the United States (or perhaps Taiwan), the United State currently enjoys overwhelming conventional military superiority that would likely deter any deterrable party. Second, China may have the potential to become a rival to the United States on the scale of the Soviet Union, but there is no reason to assume it will become such a rival nor is there reason to act now as if it is such a rival. Third, it is difficult to imagine a government developing a Soviet-sized nuclear capability, which would require formidable economic resources, without also developing a certain bourgeois attachment to the preservation of its own society. Some argue that the Soviet example disproves this proposition, since Soviet military planners contemplated fighting and winning a nuclear war.[24] But what military planners are contemplating is not necessarily identical to what political leaders are contemplating. As it turned out, the Soviet external empire and then Russia's "near abroad" fell away without the arrival of a nuclear crisis-point. One might reasonably hope that any such future arsenal would have deterrence as its purpose just as the U.S. arsenal has deterrence as its purpose.

But hope is not policy. One could resort to a literal reading of the adage, *Fiat justicia, pereat mundus* ("Let justice be done, though the world should perish"). But for many decades now, presidents and senior officials have chafed for options other than all-out nuclear war. As Henry Kissinger noted of his initial review of strategic doctrine when he became National Security Advisor to newly-elected President Richard Nixon in 1969:

> It was all very well to threaten mutual suicide for purposes of deterrence, particularly in case of a direct threat to national survival. But no President could make such a threat credible except by conducting a diplomacy that suggested a high irrationality. . . . And if deterrence failed and the

> President was finally faced with the decision to retaliate, who would take the moral responsibility for recommending a strategy based on the mass extermination of civilians?[25]

Kissinger sought a doctrine of "strategic sufficiency" based on "not only the destruction of civilians but of military targets as well."[26]

Over time the bias has shifted markedly from the destruction of civilians and some military targets besides, to the minimization of civilian casualties in all military operations. This is consistent with treaty obligations and doctrinally enshrined in the military rules for the conduct of war. On March 5, 2003, a senior defense official from U.S. Central Command offered a remarkable Pentagon briefing on "Targeting and Collateral Damage" setting out current U.S. practices: "[O]ur intent is to have a process that not only looks to determine the target's validity, if you will, but then find a means to strike that target to gain the desired military effect without creating an undue effect on noncombatants or surrounding structures."[27]

Some within the military take this argument to lengths that would no doubt astound general officers of generations past: "A military commander is morally obligated to do as much as he can to preserve the lives of all noncombatants, even if significantly increasing the risk to his own soldiers."[28] It is also fair to say that to the extent that "state practice" shapes international law, the recent practice of the United States in such conflicts as the Kosovo air campaign, the war in Afghanistan, and the second Iraq war has established that the United States feels obligated to be mindful of civilian casualties and refrains from attacking legitimate military targets where the military benefit would not outweigh the risk to civilians. Massive nuclear retaliation against civilian targets would be difficult to square with this pattern of practice, even in extremis. It is not entirely clear that an order to launch a retaliatory strike—the planned or anticipated result of which would be tens to hundreds of thousands or millions of civilian deaths—would be lawful and therefore binding.

Nuclear stockpiles worldwide have been shrinking, from a peak level of over 65,000 warheads in 1986 to about 20,000 in 2002.[29] Under the 2002 Strategic Offense Reductions Treaty (the Moscow Treaty), the United States and Russia pledge to reduce the total number of warheads on each side to 1,700-2,200 by 2012.[30] The quantities remaining are sufficient on the *pereat mundus* question,

at least insofar as their general detonation would likely create a world in which many of the survivors would envy the dead. This reduction in arsenals is related to the concern for civilian welfare in conventional warfare. The yields of nuclear weapons also have been reduced as the accuracy of their delivery systems has increased. At one time in the history of strategic thinking about nuclear weapons, war planners considered that civilian casualties were desirable as "a 'bonus'" when going after military targets. Henry S. Rowen noted in 1975, "[C]ollateral damage is now being seen increasingly as a 'minus.'"[31] Yield reduction was by no means a necessary corollary of increased accuracy.

But increased accuracy in delivery systems is obviously something with broader application. It is an indication of the multiplicity of conventional options military planners and policymakers have at their disposal. A detailed discussion of these changes is beyond the scope of this chapter.[32] Suffice it to say that conventional U.S. military power, as displayed in Afghanistan and Iraq, is capable of extraordinarily swift victory in effecting "regime change"—and with minimal U.S. casualties and civilian casualties.

As Nathan Leites once asked, in the context of an argument against "assured destruction"-style nuclear retaliatory strikes, "[W]ill the enemy's attack on us not have revealed him as one with whom we would not like to continue cohabiting the world?"[33] That such an enemy must be defeated is certain. What has changed is the means we have at our disposal to remove that enemy from the world. These means are by no means exclusively nuclear.

As Leites dryly notes, "beginning another effort at establishing a peaceful world with huge destruction without obvious reason might not increase the chance of success."[34] In all but cases 2.9 and 2.10 above, those scenarios involving large-scale nuclear attack on the United States by a state actor, U.S. nuclear weapons have little plausible deterrent value because the United States would be highly unlikely to use them. The response against such an aggressor would be regime change and manhunt to the death, the prospect of which will sufficiently deter all those who are deterrable by the threat of nuclear retaliation. Moreover, the threat of nuclear retaliation may even be counterproductive, insofar as such threats distract military planners from preparing and using non-nuclear military options.[35]

Cases 2.9 and 2.10 invite the question of whether a nuclear counterattack would be more effective than a non-nuclear counterattack in terms of both defeating the enemy and "establishing a peaceful world." Under no circumstances would an all-out, "assured destruction" counterattack meet these criteria. It is conceivable that limited nuclear strikes against military targets would be sufficiently more effective than non-nuclear attacks and justify the ensuing greater "collateral damage," i.e., the civilian casualties. It is also possible that further research will result in mini-nukes whose effective use against military targets would generate no civilian casualties. If developed, they may come to be accepted as unexceptional and legitimate weapons for use in wartime—though it seems just as likely that the norm of nonuse of nuclear weapons would persist. And for now, nuclear weapons have a well-entrenched place, indeed pride of place, in the odious category of WMD.

We have sufficient conventional power to deter those susceptible to being deterred. It is doubtful that our assertion that we are prepared to use nuclear weapons targeting civilians across a broad range of contingencies adds much to our efforts to deter. It also seems likely that such threats will be revealed as empty once a decision point arrives. We might be better off by ceasing our efforts to persuade ourselves we will go nuclear, putting the weapons in deep freeze, and augmenting our ability to deal death to precisely those whom we need to kill, and no others.

ENDNOTES - CHAPTER 11

1. Note that the questions under consideration here are posed not generally but specifically with regard to the United States in the international environment at the present moment. It would be a misuse of the conclusions here to apply them without substantial further examination to historical situations, to other countries at the present moment, or to a future international environment that differs markedly from the present.

2. Mearsheimer and Walt use this term in making the case that Saddam Hussein would have remained effectively deterred from smuggling a nuclear weapon to a terrorist network by the possibility of nuclear retaliation. John J. Mearsheimer and Stephen M. Walt, "An Unnecessary War," *Foreign Policy*, January/February 2003, pp. 50-59. The discourse of nuclear deterrence often employs evocative language. Glaser and Fetter, for another example, refer to a "rogue state" risking "complete annihilation" by attacking with a nuclear weapon. Charles L. Glaser and Steve Fetter, "National Missile Defense and the Future of U.S. Nuclear Weapons

Policy," *International Security*, Vol. 26, No. 1, Summer 2001, pp. 40-92. One possible explanation for this is that those undertaking the discussion do not wish to be accused of euphemism in relation to the horror of nuclear war. Another, however, is that the florid language is itself meant to further the project of deterrence. Imagine not just death but "incineration," not just destruction or annihilation but "complete annihilation." The case that the language is not descriptive but rather proffered for political reasons is strengthened by the fact that scenarios envisioning all-out countervalue nuclear war, mutually assured destruction (MAD), nevertheless anticipates many millions of survivors in addition adds to the many millions of dead. See, e.g., endnote 23 below. Payne cites a 1979 Office of Technology Assessment estimate of what he calls "extreme circumstances" resulting in 160 million dead. Keith B. Payne, *Deterrence in the Second Nuclear Age*, Lexington, Kentucky: University Press of Kentucky, 1996, p. 6. The Census Bureau pegs U.S. population as of July 1 that year at just over 225 million., This figure is available at *http://www.census.gov/population/estimates/nation/popclockest.txt*.) In this "extreme" scenario, then, 65 million would have survived, or more than a quarter of the U.S. population at the time.

3. Bob Woodward, *Bush at War*, New York: Simon and Schuster, 2002, pp. 100.

4. Gompert, for example, advocates explicitly threatening a nuclear response to a chemical or biological attack. David G. Gompert, "Sharpen the Fear," *Bulletin of the Atomic Scientists*, Vol. 56, No. 1, January/February 2000, pp. 22-23.

5. Woodward, p. 218. Woodward is paraphrasing the formulation offered by Vice President Dick Cheney. According to a report in the Washington *Times,* January 31, 2003, the classified National Security Presidential Directive 17, the public version of which was released as "National Strategy to Combat Weapons of Mass Destruction" and is available at *http://www.whitehouse.gov/news/releases/2002/12/WMDStrategy.pdf.* It included the sentence: "The United States will continue to make clear that it reserves the right to respond with overwhelming force—including potentially nuclear weapons—to the use of [weapons of mass destruction] against the United States, our forces abroad, and friends and allies."

6. Sagan notes, in opposition to the conclusion that the nuclear threat deterred Saddam, "[I]t is crucial to remember that the January 9, 1991, Bush letter . . . did not threaten a devastating response only in retaliation to Iraqi use of chemical or biological weapons; Bush also listed Iraqi support for terrorist activities or the destruction of the Kuwaiti oil fields as actions that would cause the U.S. public to 'demand the strongest possible response.' Although Iraq did not use chemical or biological weapons during the war, Saddam Hussein did order terrorist attacks against U.S. targets, and Iraqi special forces did set fires throughout the Kuwaiti oil fields. It is therefore by no means self-evident that U.S. deterrent threats were effective in January 1991, because two of the three actions that Bush said the United States would 'not tolerate' were actually taken by Iraq during the last days of the Gulf War." Scott D. Sagan, "The Commitment Trap," *International Security*, Vol. 24, No. 4, Spring 2000, pp. 85-115.

7. See the discussion in Payne, pp. 81-87.

8. This contention may also be problematic. I posit a decision point in advance of the possible occurrence of "A" at which decision makers conclude "if A or if not A, then not B"—or, more simply, "in relation to A, not B." Sagan argues that the threat of nuclear retaliation in response to a chemical or biological attack may make such retaliation more likely, whether leaders think they are bluffing or not, because they create a "commitment trap, in which U.S. leaders would feel compelled to use nuclear weapons after a biological or chemical attack because they believe that adversaries and allies perceive that the U.S. reputation for honoring its commitments was at stake." As will be clear from my argument here, I am less concerned about this danger than Sagan, because in my view such threats are not credible. But insofar as I am posing a normative question as well, namely, what the United States *should* do under certain circumstances, I certainly agree with Sagan that the United States *should not* issue such threats because it *should not* act to make good on them.

9. "What cannot be used, cannot deter. Then policy reveals itself as only declaratory." Paul Ramsey, *War and the Christian Conscience,* Durham, NC: Duke University Press, 1961, p. 244.

10. Similarly, "Deterrence works, if it does, by persuading a potential aggressor that the risks of retaliation attached to the contemplated act of aggression outweigh its benefits." Gregory V. Kavka, *Moral Paradoxes of Nuclear Deterrence,* Cambridge: Cambridge University Press, 1987, p. 48. The etymology of "deter" gives rise to a common but in my view inadequate definition, namely, to dissuade through fear, specifically, of punishment. Fear is one reason one might be dissuaded, but it is not the only possible reason, except in a very weak sense. Party A might be deterred from doing X simply because it would be difficult or expensive, having been made the more so by B. If this is fear, it does not rise to the level of existential fear of the sort one associates with nuclear weapons. Another definitional issue is that the term "deterrence" is commonly used in two senses. On one hand, "deterrence" describes the *effort* on the part of the would-be deterrer to deter. On the other, "deterrence" describes the condition said to result from such a successful effort. That we try to deter is not in doubt. In this sense, deterrence has actuality. But its actuality in this sense tells us nothing about whether deterrence has actuality in the second sense.

11. See the discussion in Patrick M. Morgan, *Deterrence Now,* Cambridge: Cambridge University Press, 2003, pp. 15-20, 101-105.

12. See my extended discussion in Tod Lindberg, "Deterrence and Prevention," *Weekly Standard*, Vol. 8, No. 20, February 3, 2003.

13. For a brief description of the current U.S. arsenal, see Robert S. Norris, *et al.*, "U.S. Nuclear Forces, 2003," *Bulletin of the Atomic Scientists*, Vol. 59, No. 3, May/June 2003, pp. 73-76.

14. "The USSTRATCOM Command Center is a specially-designed, two-level, 14,000-square-foot reinforced concrete and steel structure containing the critical

information management and communication systems to provide the commander of USSTRATCOM an assured capability to manage forces world wide. In time of war, the underground would be sealed off. An underground emergency power supply, a well supplying an emergency water source, and rations would allow continuous operations without outside support for an extended period of time. Electromagnetic pulse protection is provided for critical command, control and communications equipment as well as supporting utilities. This allows the USSTRATCOM Commander to continuously exercise command over USSTRATCOM forces, even in the disturbed electromagnetic environment which would follow a high altitude nuclear burst." U.S. Strategic Command Office of Public Affairs, Fact File, "Command Center," Offutt Air Force Base, Nebraska. Available at: *http://www.stratcom.mil/factsheetshtml/commandctr.htm*.

15. This information is available at the U.S. Strategic Command website, *http://www.stratcom.mil/*.

16. My argument here and throughout is constructivist in character, as against the realism or neorealism typically underlying nuclear deterrence theory. "Would it be rational today for Canada to assume the worst about U.S. intentions? Or even France about German ones?" Alexander Wendt, *Social Theory of International Politics*, Cambridge, UK: Cambridge University Press, 1999, p. 109.

17. "Because nuclear threats could be controlled and adjusted by changing the force structure, it was considered relatively easy to identify how to adjust the forces as necessary to ensure deterrence stability. Consequently, the effectiveness of U.S. deterrence policy could be maintained with confidence." Payne, p. 71.

18. As Walzer notes, "The strategy [of deterrence] works because it is easy. Indeed, it is easy in a double sense: not only don't we do anything to other people, we also don't believe that we will ever have to do anything. The secret of nuclear deterrence is that it is a kind of bluff. Perhaps we are only bluffing ourselves. . . ." Michael Walzer, *Just and Unjust Wars*, Second Edition, New York: Basic Books, 1992, p. 271.

19. See Kavka's discussion of "deterrent intentions," "those *conditional intentions* whose existence is based on the agent's desire to thereby deter others from actualizing the antecedent condition of the intention [emphasis added]." Kavka, p. 20. Kavka's concern is the morality of making a threat that one knows it would be immoral to carry out, what he calls a "Special Deterrent Situation", p. 16). My main difference with Kavka concerns the ontological status of a "conditional intention." I don't think a "conditional intention" can properly be called an "intention" when there is *no* intention to actualize it no matter what the conditions.

20. See Tod Lindberg, "How to Fight a Superpower," *Weekly Standard*, Vol. 7, No. 16, December 31, 2001.

21. To my knowledge, no public accounts of internal Bush administration deliberation about war plans in response to the 9/11 attack have mentioned the contemplation of use of nuclear weapons. More generally, some have discussed

the possibility of use of battlefield nuclear weapons by the United States if the latter found itself in danger of losing a major strategic objective, i.e., in military extremis. Also, the Pentagon proposes developing so-called "mini-nukes" with yields of less than five kilotons as a supplement to the B61-11 "bunker buster," and the Bush administration proposed a substantial 11.4 percent increase in the nuclear weapons research and development budget from Fiscal 2003 to Fiscal 2004. See *Physics Today*, Vol. 56, No. 6, May 2003, pp. 27-28, 33. But would the United States actually use such weapons? No bunker has, after all, come under attack by the B61-11. McKivergan argues that the United States should have the capability of preemptively destroying a hardened underground production facility for WMD. Daniel McKivergan, "The No-Nukes Party," *Weekly Standard*, Vol. 8, No. 37, June 2, 2003. But such an attack would amount to a preemptive nuclear first strike of the sort that the nuclear-armed United States did not launch, for example, against the infant Soviet nuclear program. As Sagan notes, "The first use of any nuclear weapon in combat since World War II would be a norm-shattering event throughout the world."

22. For an overview, see the "International Humanitarian Law" section of the International Committee of the Red Cross's website at: *http://www.icrc.org/web/eng/siteeng0.nsf/iwpList2/Humanitarian_law*.

23. "[T]he emphasis in [Secretary of Defense Robert] McNamara's statements on nuclear forces and doctrine shifted after 1963 to that of Assured Destruction. The doctrine held that a nuclear exchange would, with high probability, result in over 100 million fatalities in both the United States and the U.S.S.R. . . . The principal test of the adequacy of the U.S. strategic force came to be the ability of our programmed force to produce civil damage, even against a greater than expected threat. The damage criterion settled on by McNamara for determining the size of the strategic force was the destruction of 20-25 percent of the Soviet population and 50 percent of its industrial capacity." Henry S. Rowen, "Formulating Strategic Doctrine," Part III of Vol.4, Appendix K to *The Report of the Commission on the Organization of the Government for the Conduct of Foreign Policy*, Washington, DC: U.S. Government Printing Office, 1975, p. 227.

24. Richard Pipes, "Why the Soviet Union Thinks It Could Fight and Win a Nuclear War," *Commentary*, Vol. 64, No. 1, July 1977, pp. 21-34. Another possible exception to my generalization here might be a government rich enough in exploitable natural resources to afford a large-scale nuclear program without acquiring the bourgeois habits that typically underlie sufficient national wealth for such programs.

25. Henry Kissinger, *White House Years*, New York: Little, Brown, 1979, p. 216.

26. *Ibid*., p. 217.

27. As one of many examples the official proffered during the briefing: "[A] Hellfire missile has only about a 40-pound warhead. So the circle that it might cause damage is relatively small: 60 or 70 feet. On the other hand, a 2,000-pound bomb

will create about 90 percent of its effect out to about 600 feet of the target. And so, depending on the kinds of weapons you would use, you would place a circle over the target and then look to see what's in the circle. In the case of our example here, we see a civilian housing structure, a hospital, and a mosque. And those are, 1) noncombatant facilities, and in the case of a mosque or hospital, 2) a protected facility. And so we want to make sure that we don't inadvertently cause damage to those facilities while we're striking that target. . . . Can we make that circle smaller, for example? Can we mitigate the effect of the weapon?" The briefing transcript is available at: *http://www.defenselink.mil/news/Mar2003/t03052003_t305targ.html*.

28. Michael A. Carlino, "The Moral Limits of Strategic Attack," *Parameters*, Vol. 32, No. 1, Spring 2002, pp. 15-30. At the time of publication, the author was a major in the U.S. Army.

29. Robert S. Norris and Hans M. Kristensen, "Global Nuclear Stockpiles, 1945-2002," *Bulletin of the Atomic Scientists*, Vol. 58, No. 6, November/December 2002, pp. 103-104.

30. The treaty text is available at: *http://www.state.gov/p/eur/rls/or/2002/10471.htm*.

31. Rowen, p. 221.

32. For an overview, see Bruce Berkowitz, *The New Face of War: How War Will Be Fought in the 21st Century,* New York: Free Press, 2003. For a consideration of the effect of the "revolution in military affairs" on deterrence, see Morgan, pp. 203-237.

33. Nathan Leites, "Once More About What We Should Not Do Even in the Worst Case: The Assured Destruction Attack," California Seminar on Arms Control and Foreign Policy Discussion Paper, June 1974, p. 10.

34. *Ibid*.

35. "[T]he current policy of calculated ambiguity—with its over-reliance on the nuclear 'big stick'—is a cop-out. America is paying full price for this half-policy, the result of which is that the Armed Forces may be strategically unprepared to respond when the time comes." Harry W. Conley, "Not with Impunity: Assessing U.S. Policy for Retaliating to a Chemical or Biological Attack," *Essays 2001: Chairman of the Joint Chiefs of Staff Strategy Essay Competition*, Washington, DC: National Defense University Press, pp. 23-37. The paper includes an excellent discussion of "calculated ambiguity."

CHAPTER 12

TAKING PROLIFERATION SERIOUSLY

Henry D. Sokolski

With America's departure from the Anti-Ballistic Missile (ABM) Treaty late in 2002, Bush officials have claimed that America has begun to lead the world away from security policies based on mutual assured destruction (MAD). The administration's decision to deploy a national missile defense system in Alaska certainly is a clear refutation of MAD-based opposition to such protection. What's less clear, however, is how America's rejection of MAD might affect U.S. nuclear weapons policies beyond missile defense. Specifically, does America plan to stem the spread of nuclear weapons or to use nuclear weapons in certain circumstances?

MAD AND THE NONPROLIFERATION TREATY (NPT)

To an extent not generally appreciated, U.S. and international nonproliferation policies have had a fairly tight relation to MAD. During the Cold War, the most popular view concerning nuclear weapons reflected the MAD view that having a nuclear force capable of killing large numbers of civilians afforded nations basic security against attack. There also was a MAD fear that any attempt by nations to go beyond the finite force levels needed to attack undefended cities would lead to war-prone arms races.

The thinking here was that if the superpowers targeted more than their opponents' vulnerable cities, they would be forced to develop ever-quicker, more accurate nuclear delivery systems (necessary to evade or destroy opposing weapons). They also would have to place their weapons on hair-trigger alert and risk deploying them tactically to an ever-growing number of military commanders. All of this, it was argued, would only increase the chances of nuclear war.[1]

These views certainly were common during the mid-1960s and were quite prevalent among those negotiating the Nuclear

Nonproliferation Treaty (NPT). Thus, by the late 1960s, most of those crafting the NPT argued that the real proliferation danger emanated not so much from the spread of nuclear weapons to more nations as from as the superpowers' own never-ending arms race. This rivalry, these diplomats argued, was more likely to result in world wide destruction than smaller states' "independent manufacture" of nuclear weapons.[2] They agreed that all nations had a *right* to acquire nuclear weapons to defend themselves not only against possible nuclear neighbors, but as a hedge against the superpowers if they refused to curb their own nuclear arming. But if nonweapons states ("because of higher considerations of the interests of mankind") decided not to exercise this right, they were equally convinced that these states deserved to be compensated.[3]

Under the NPT, nonweapon states compensation consisted of: (1) having an "inalienable right" to acquire all forms of nuclear energy technology (Article IV); (2) the demand that the superpowers engage in good faith negotiations on "effective measures relating to the cessation of the nuclear arms race" (Article VI); and (3) the right of nonweapons states to withdraw from the NPT and develop nuclear weapons "if extraordinary events . . . have jeopardized the[ir] supreme interests" (Article X).

For nearly 30 years, this "grand bargain" was interpreted in a manner that focused greatest attention on the need for the superpowers to end the arms race--i.e., to stop nuclear innovation through nuclear testing and to reduce the size of their arsenals to levels no larger than needed to absorb an attack (a few hundred weapons) and yet be able to target other countries' undefended cities. Thus, the NPT's preamble calls for "the cessation of the arms race" and of nuclear weapons production and testing. The treaty's negotiating record, meanwhile, speaks approvingly of restraints on national missile defenses (later to become the ABM Treaty) and on nuclear missile delivery systems (later to become Strategic Arms Limitations Talks [SALT] and Strategic Arms Reduction Treaty [START]). As such, the various NPT review conferences that have been held on almost an annual basis since the NPT came into force have focused on these issues almost exclusively.

Finally, throughout the past 3 decades, members of the NPT have pushed for ever-freer access to civilian nuclear energy technology.

The view is almost identical to that voiced at the time of the NPT's signing: If a state forswears exercising its right to acquire nuclear weapons, it nonetheless retains a natural right to all forms of nuclear technology for peaceful purposes. This right has been interpreted to stockpiling large quantities of nuclear weapons-usable plutonium and highly enriched uranium, and developing nuclear weapons implosion and gun assembly devices that do not have nuclear weapons material cores.

All that was required of non-weapons states to engage in these activities, besides signing the NPT, was to afford NPT's nuclear watchdog agency or its equivalent in the European Atomic Energy Community (EURATOM) occasional access to monitor declared nuclear facilities to ensure that no special nuclear material was unaccounted for. If a nation's amount of special nuclear material (including even large amounts of nuclear weapons-usable material) was what it should be, the International Atomic Energy Agency (IAEA) would issue a clean bill of health and protect whatever it knew about the amounts of these nuclear weapons-usable materials from being sought or shared.[4] It was understood that, consistent with the treaty, members of the NPT could develop a nuclear weapons breakout capability. As the U.S. State Department's own policy planning staff explained in an internal study in 1968:

> After the NPT, many nations can be expected to take advantage of the terms of the treaty to produce quantities of fissionable material. Plutonium separation plants will be built; fast breeder reactors developed. It is possible that experimentation with conventional explosives that might be relevant to detonating a nuclear bomb core may take place. In this way, various nations will attain a well-developed option on a bomb. A number of nations will be able to detonate a bomb within a year following withdrawal from the treaty; others may even shorten this period.[5]

Under this interpretation of the NPT, adherence to the treaty required only minimal enforcement or monitoring. The key protection against proliferation, after all, was the willingness of nations signing the treaty to forswear exercising their natural right to acquire nuclear weapons. This also meant that the nonproliferation secured by the treaty was potentially quite fragile.

NPT AFTER THE COLD WAR

Despite these shortcomings, the NPT until recently was heralded as a clear success. Following the fall of the Berlin Wall in 1989, achievement of the NPT's ultimate goals actually seemed within reach. South Africa and Ukraine renounced their possession of nuclear weapons and joined the NPT. Similarly, Brazil and Argentina gave up their nuclear weapons programs and became NPT members. In 1995, the NPT, which was up for a 25-year review, was extended indefinitely. Also, Russia and the United States began to reduce their deployment of nuclear weapons systems dramatically. By 2001, both had agreed to reduce their strategic nuclear weapons deployments to less than 4,400 weapons. This is in stark comparison to their deployments at the height of the Cold War when both had deployed a total of well over 60,000 strategic and tactical nuclear weapons.

After the mid-1990s, though, the NPT and its MAD-inspired interpretation began to falter. First, whatever limited utility MAD thinking may have had to describe or channel the Cold War competition between the Soviet and U.S.-led alliances, it was a tolerable view only so long as the two superpowers actively kept nations under their influence from acquiring nuclear weapons. During the Cold War, to a great extent, this worked. The Soviets kept Eastern Europe from going nuclear, and the United States and the North Atlantic Treaty Organization (NATO) curbed the nuclear ambitions of most of Western Europe and much of the Middle East and Asia.

With the end of the Cold War competition, though, nations had a greater incentive to go their own way and MAD and finite deterrence arguments only tended to make this impulse stronger. Indeed, if acquisition of a relatively few nuclear weapons targeted against an adversary's undefended cities was a sure guarantee against being attacked by a neighbor or a larger outside power, why wouldn't most nations choose to go nuclear? In 1998, India and Pakistan's nuclear tests seemed to validate this view. Both nations essentially affirmed that they felt more secure with bombs of their own than they did with any military, political, or economic support they might get from others.

Second, after the Cold War several NPT members exploited the generous nuclear compensation that a MAD-inspired view of the NPT required. North Korea, which became a member of the NPT in 1985, managed to secure all the nuclear assistance it needed to generate and separate plutonium for bombs and launch a covert uranium enrichment program. Although it only allowed the IAEA to inspect its facilities in 1992, Pyongyang was able to remain a member of the NPT even *after* it was found in violation of its safeguards agreement in 1993. IN 2003, even after North Korea claimed it had withdrawn from the treaty, it remained a NOT member.

Iran, meanwhile, acquired virtually the entire fuel cycle--fuel fabrication plants, uranium enrichment facilities, a large light water reactor, a heavy water production facility--*without* being found in violation of either the NPT or its IAEA safeguards agreement. Now there is that Tehran, in little more than 30 months, could be within weeks of having a nuclear arsenal of 50-75 weapons and still be a member of the NPT in good standing.

Third, after the Cold War, enforcement of the NPT was tested and found wanting. In the case of Iraq, it was only after its defeat in Operation DESERT STORM that the United Nations (UN) voted to restrict Iraq's full access to nuclear energy technology. At no time prior to the war was Iraq ever found in violation of its IAEA safeguards obligations. North Korea, meanwhile, was able to evade the NPT requirement that it permit IAEA inspections of its facilities 18 months after signature and did so for almost 5 more years with no repercussions. Then in 1993, when the UN finally found North Korea in violation of its safeguards agreement, no action was taken.

Rather than sanction North Korea, the United States, its allies, and the UN allowed Pyongyang to evade inspection under the NPT for yet another decade. The reason was a U.S.-formulated deal to give North Korea two large, modern light water reactors in exchange for its *eventual* compliance with its IAEA safeguards agreement. Even after Pyongyang made it clear that it had violated this agreement and withdrew from the NPT, no enforcement action was taken against it. The promised reactors are still being built.

North Korean officials recently suggested that they might export their nuclear weapons to other states. As a state that has withdrawn

from the NPT, this is a perfectly legal thing for North Korea to do. It could even export warheads to an NPT nonweapons state membe. If the warheads remained under North Korean control--as the United States currently maintains control of its nuclear weapons in Germany--no provision of the NPT would be violated.

WHAT'S MAD THAT REMAINS

Given this worrisome review of the NPT's current implementation, one can only hope that the popularity of MAD-inspired views of the treaty might finally give way to a safer set of policies. This is conceivable, but only if the United States and its allies are willing to drop their attachment to MAD thinking and MAD-inspired nonproliferation. This will require much more than the United States merely backing out of the ABM Treaty.

First, the United States and its allies would have to further reduce their security reliance on forms of nuclear retaliation that still entail the killing of large numbers of people. American officials are now openly raising doubts about the deterrent value of our nuclear forces against rogue states and terrorist organizations. Yet they still claim that retention of 1,700 to 2,200 deployed nuclear weapons is needed to deter "mature" or "advanced" states (e.g., Russia and China). Use of large numbers of these weapons to target Russia's weapons capabilities, however, could kill several million civilians. How well retaining such an "option" accords with moving away from MAD is unclear.

Also, the threatened use of such weapons is presented publicly as a possible means to deal with smaller, badly behaving states (i.e., those that might threaten use of chemical or biological weapons). American officials particularly are interested in being able to surgically disarm hostile states with nuclear bunker buster warheads. Yet many command bunkers are located in or near these states' largest cities (e.g., Baghdad, Tehran, etc.) as are a fair number of the weapons of mass destruction (WMD) storage and production facilities that might be targeted. Attacking these targets could easily entail the slaughter of large numbers of people.

It is not clear what can be done about this. Perhaps non-nuclear technologies, such as kinetic ballistic missile warheads, could be

developed to put hardened bunkers at risk. Perhaps targets could be selected that would keep potential collateral damage to a minimum or that would obviate the need to destroy the bunkers in question. Perhaps not. What is clear, however, is that relying heavily on nuclear targeting that entails heavy casualties will undermine the credibility of U.S. efforts to move away from MAD and to get other nations to follow.

Second, the United States and its allies would have to actively contest the notion that all states have a natural right to acquire nuclear weapons. Certainly, the notion that if a nation's security is threatened, it has a right to break out of the NPT needs to be challenged. If it is not, North Korea's recent accumulation of nuclear technology under false "peaceful" pretenses, and its withdrawal from the treaty is sure to be only the first of many such frauds. Any credible challenge to similar abrogations, however, requires the United States and its allies to take a much firmer line against states outside the NPT's five recognized nuclear weapons powers. This requires discipline that has yet to be demonstrated.

In fact, the United States and its allies all too frequently have done the opposite. For example, Israel's, India's, and Pakistan's possession of nuclear weapons has been excused as being "understandable." Recently, the chairman of the U.S. Nuclear Regulatory Commission visited two of India's nuclear weapons production reactors and extended American nuclear "safety" cooperation to New Delhi. Earlier, the U.S. Government did all it could to waive and bend mandatory legal sanctions directed against India's and Pakistan's nuclear tests in 1998.[6] More recently, the United States refused to identify Pakistan as a nuclear proliferator despite repeated reports of Pakistani nuclear assistance to North Korea and Iran. As for Israel, the United States did far too little to stop its nuclear weapons program and has done nothing publicly to get it to stop production of plutonium at its weapons plant at Dimona.

Such proliferation "realism" is not limited to friendly nuclear weapons states outside the NPT. Nor is it confined to how the United States relates to friendly nonweapon state members of the NPT. The United States protested North Korea's violation of the NPT and is seeking a resolution condemning it. It protested little or not at all, however, Pyongyang's actual withdrawal from the treaty.

Is the rationale that the United States recognizes North Korea's right to nuclear weapons and its right to keep all the nuclear technology it illicitly gained while a member of the NPT?

Then there is the argument U.S. officials make that if North Korea does not disarm, Japan might acquire nuclear weapons as well. This is something China should fear, American officials have explained, but is it also something Washington welcomes or expects? Perhaps the United States could "live" with such a good nation acquiring nuclear weapons so long as Japan acquires them to assure mutual deterrence of North Korea. Is the United States ready to make the best of such proliferation? Is it prepared to let other friends--South Korea, Taiwan, Saudi Arabia, Egypt, Turkey--follow suit?

Again, if the United States is to move away from MAD, it must eschew even indirectly endorsing the notion that nuclear weapons can assure a nation protection from attack or that acquisition of them is simply the exercise of a nation's right to self-defense. Certainly, if nations perceive that the United States is willing to look the other way or to endorse some nuclear proliferation as good, inevitable, or manageable, further proliferation will be more likely.

Third, the United States and its allies would actually have to enforce the current set of nuclear nonproliferation rules and make them less generous with regard to what is safe and what is dangerous. As noted before, the MAD or finite deterrence-inspired notion that states have a right to nuclear weapons and that, if this right is not exercised, they should be compensated with free access to all types of nuclear technology has more than run its course in the case of Iraq, Iran, and North Korea. Article IV of the NPT makes it clear that nations' inalienable right to develop nuclear energy for peaceful purposes must nonetheless be exercised "in conformity with Articles I and II," which prohibit states from assisting nonweapons states "in any way" to acquire nuclear explosives or control over such weapons.

This Article I and II prohibition, it should be noted, was originally inspired not by the finite deterrence or MAD thinking of the late 1960s, but by the original Irish UN Resolutions of 1958 and 1959, which were the first to call for an international nuclear nonproliferation treaty. In requesting that the UN establish a committee to study the dangers inherent in the further spread of

nuclear weapons, the Irish representative to the UN held no brief for nations having any "right" to acquire atomic explosives, much less for them being compensated with unrestricted access to nuclear technology for "peaceful" purposes. Nor did he argue that the key nuclear threat was the innovation and growth of superpower nuclear weapons.

Instead, Ireland's call for a nuclear nonproliferation treaty was premised on the fear that the spread of nuclear weapons to additional states would make nuclear disarmament and reductions less likely and accidental or catalytic wars--ones instigated by smaller powers to draw the superpowers to their defense--more probable. Against this threat, the Irish representative urged adoption of the most basic restraint: states with nuclear weapons should agree not to share or spread them, and states without them should agree not to acquire them. As for the sharing of nuclear technology for civilian purposes, the Irish recognized that the spread of such civilian capabilities would actually make the spread of nuclear weapons more likely and that, therefore, the proliferation of such technology had to be controlled. Finally, the Irish downplayed the idea that the superpowers had to disarm themselves before any progress could be made to reduce the spread of nuclear weapons to other states.[7]

Clearly, this original Irish Resolution is the one to which we need to return if we want a NPT agreement that will reduce rather than fan further nuclear proliferation. This will require that the United States and other nuclear technology-exporting states recognize that much of what they are willing to share is too close to bombmaking and a nation quickly diverting such technology military ends cannot be safeguarded against. Certainly, light water reactors in Iran will bring it dangerously close to having a large arsenal of near-weapons-grade plutonium after only 15 months of operation. The same is true of North Korea if either of the two light water reactors the United States, Japan, and South Korea are helping to build are completed. It is even clearer that Russia's, Pakistan's, and China's sharing of fuel fabrication, plutonium separation, and uranium enrichment technology and hardware with Iran and North Korea simply is too close to bombmaking to allow for any monitoring that would afford timely warning of a possible military diversion.

Unfortunately, America is still pushing international cooperation on advanced fuel cycles and reactors that includes cooperation on "proliferation resistant" breeder reactors and reprocessing (because of the addition of several steps that could just as easily be subtracted). This cooperation is being proposed for Brazil, South Africa, South Korea, and Argentina--states that only recently gave up nuclear weapons programs of their own.

Finally, there seems to be growing U.S. and allied indifference to further civilian use of weapons-usable plutonium. The United States is proposing to reconsider President Ford's policy of deferring the commercial use of such nuclear fuels. As an unannounced lead in this effort, Washington is plowing ahead with its efforts to convert 34 tons of weapons-grade plutonium into mixed oxide (MOX) civilian fuels over the next 20 years and to help pay Russia do the same. The U.S. Department of Energy claims that this effort has nothing to do with reversing the Ford policies. But, in fact, this project will result in over $6 billion in MOX fuel fabrication facilities being built both here and in Russia and the movement of over 17,000 nuclear weapons' worth of plutonium into civilian commerce.[8]

Such risky civilian efforts, which are consistent with a MAD-inspired reading of the NPT and the need for the freest exchange of nuclear technology for civilian purposes, are themselves bad enough. What's worse is encouragement of lax enforcement of existing nonproliferation rules. Japan recently announced that it had lost between 59 and 206 kilograms (10 to 51 crude bombs' worth) of nuclear weapons-usable material over the past 15 years inf its civilian breeder and MOX operations. Despite the significant amount of material "lost," the United States made no complaint, and the IAEA conducted no serious investigation. In fact, the IAEA still only makes public the special nuclear materials it believes are unaccounted for. It keeps no public account of the nearly 200 tons (25,000 to 50,000 crude weapons' worth) of weapons-usable civilian plutonium that specific member states have on hand.[9]

Such a cavalier attitude regarding the sharing, accounting, generation, and safekeeping of civilian nuclear weapons-usable materials and related technologies might have made sense in the MAD world of the NPT in 1968, but after the events of September 11 and al Qeada's announced interest in nuclear explosives, it is woefully unwise.

TOWARDS A SANER SET OF POLICIES

Making the changes noted above will not be easy, but it would be a mistake not to try. Currently, there are only five declared nuclear states, all of whose arsenals (except China's) are becoming smaller. India, Pakistan, and Israel also have nuclear weapons, as does North Korea. The question is how much worse it can get? The answer is plenty.

If nothing is done to shore up U.S. and allied security relations with the Gulf Coordination Council states and with Iraq, Turkey, and Egypt, Iran's acquisition of even a nuclear weapons breakout capability could prompt one or more of these states to try to acquire a nuclear weapons option of its own. Similarly, if the United States fails to hold Pyongyang accountable for its violation of the NPT or lets Pyongyang hold on to one or more nuclear weapons while appearing to reward its violation with a new deal--one that heeds North Korea's demand for a nonaggression pact and continued construction of the two light water reactors--South Korea and Japan (and later, perhaps, Taiwan) will have powerful basis to question Washington's security commitment to them and their pledges to stay non-nuclear.

In such a world, Washington's worries would not be limited to gauging the military capabilities of a growing number of hostile, nuclear, or near-nuclear-armed nations. It also would have to gauge the reliability of a growing number of nuclear or near-nuclear friends. Washington might still be able to assemble coalitions, but if the coalitions are with nations like France, which has nuclear options of its own, it would be much, much more iffy. The amount of international intrigue such a world would generate would also easily exceed what our diplomats and leaders could manage or track. Rather than worry about using force for fear of producing another Vietnam, Washington and its very closest allies are more likely to grow weary of working closely with others and view military options through the rosy lens of their relatively quick victories in Operation DESERT STORM, Kosovo, and Operations IRAQI FREEDOM and JUST CAUSE. This would be a world disturbingly similar to that of 1914 but with one big difference; it would be spring-loaded to go nuclear.

To move away from such a future, is worth the effort. But what step should be taken first? Clearly, it would be helpful if the United States and its allies backed country-neutral rules that would close some of the worst loopholes in the NPT. These gaps principally consist of the NPT's nonapplication to weapons states outside the treaty, the NPT's lack of any serious enforcement measures, its generous inattention to risky "peaceful" nuclear cooperation, and its allowance of nuclear weapons transfers between states so long as the weapon transferred remains under the control of the exporting nation (e.g., U.S. nuclear weapons deployed in Germany).

To begin to fill these loopholes and to get back to an Irish Resolution view of the NPT generally, one might start by trying to establish an "international common usage" against any state helping others to acquire WMD (nuclear, chemical, or biological weapons) such as that which already exists against piracy and the trading in slaves. Piracy and slaving are currently activities that can be conducted only outside of the protection of international law. Any nation that encounters someone engaged in these activities is free to act against them, to arrest them, seize their cargo, or force their vessels or vehicles to return to their point of origin.

One approach to help establish such a rule against WMD might be to establish that nations henceforth must not deploy chemical, biological, or nuclear weapons onto any other nation's soil in peacetime, whether such weapons remain under control of the first nation or not. Beyond this, the United States and like-minded nations should propose that nations give international notification before shipping (1) any special nuclear materials (as defined by the IAEA statute); (2) any item on Schedule One of the Australia Group's list of biological and chemical weapons items; or (3) any item on the Nuclear Suppliers' list. In fact, shippers' export declarations laws in the United States and Australia already require exporters in these states to make prior notification of their export shipments. Other nations should do likewise. Posting these notifications on a website would make them available internationally almost immediately.

In addition, the United States and other like-minded nations should declare that, henceforth, no nation is allowed in peacetime to redeploy nuclear, chemical, or biological weapons onto another country's soil. This rule is one the United States, with its various

submarine-launched ballistic and cruise missile systems, long-range bombers, air-launched cruise missiles, and sea-based strike aircraft, can easily live with. Any nation violating this rule, whether friendly (e.g., Pakistan) or not (e.g., North Korea), should be subject to interdiction.

Finally, if there is support for stronger action, exports made outside the procedures of IAEA, Australia Group, Nuclear Suppliers Group, and (perhaps) the Missile Technology Control Regime might be banned and targeted for interdiction. This rule would clearly put a bind on nonmembers of these organizations. It would apply not just to Iran, which has announced its desire to export its nuclear expertise, but to China, North Korea, and Pakistan, who trade in nuclear and missile technology. It also could include Israel, which has exported technology to China, and India, a state that announced a military cooperative agreement with Iran and its intent to export military technology internationally.

If the UN Security Council quickly acted to adopt such a measure, all the better. If it failed to act, however, those who discover a violation of the proposed rules might choose to act on their own. In either case, an international common usage against WMD trade would be beneficial in a number of currently worrisome cases. Pakistan, for one, could no longer contemplate transferring nuclear warheads legally under its control to Saudi Arabia (as its generals have privately suggested they might). Nor could Pyongyang act on its threat to transfer its nuclear weapons to another state without risking having its shipment legally blocked or seized. Beyond this, any strategic weapons-related assistance a Pakistan (or a North Korea, China, Iran, or Russia) might want to give to other states would have to be announced before it was actually shipped or else hazard being interdicted. This, at the very least, in turn, would help prevent a repeat of another Iran--i.e., of another nation covertly acquiring all it needs to break out quickly with a large arsenal of weapons without quite breaking the rules.

This international common usage also would give the world's Indias, Israels, and Pakistans, who cannot be made weapons state members of the NPT, a formal way to uphold international nonproliferation norms. In addition, it would allow other nations

that have bad proliferation reputations (e.g., China and Russia) to work with the United States to restore their good names. Finally, by establishing an international rule against warhead transfers and dangerous covert trade, it would afford supporters of nonproliferation a legal basis for acting against violators even if they were not caught in the act.

If the United States wanted to build additional support for this effort, it might offer to remove its prior deployment of nuclear arms in Western Europe. These weapons are almost certain to be removed with the planned reduction of American forces in Germany. Also, most of these weapons are quite old if not obsolete. Such an offer (to do what the United States will likely do in time anyway) would still have to be implemented carefully so as not to undermine NATO alliance relations. It could not be done suddenly or appear to be a response to antinuclear protests. Assuming this could be done, though, such an offer might help persuade Russia and others to support an international stance against WMD proliferation both before and at the time of any UN vote.

In conjunction with the proposed ban on unannounced dangerous trade, a ban on redeploying WMD could set into motion a much more serious review of MAD-inspired nonproliferation policies. What should the IAEA and the world's leading nuclear suppliers consider to be safe and dangerous? Should nations like Iran be able to get all they need to break out with a large arsenal virtually overnight? What constitutes timely warning of a diversion of civilian technology to military purposes? Is something more than inspection required to find special materials unaccounted for? Does it make sense to spread nuclear bulk handling facilities--reprocessing, enrichment, fuel fabrication plants--when nuclear weapons material sufficient to make scores of bombs will be present? What of increased civilian commerce in nuclear weapons materials? Is this trade worth the risks, or should it be put on hold? What of missile technologies? Should controls be tightened to prevent proliferation or relaxed to promote missile defense cooperation? In either case, how should this be done?

A debate over all these questions is likely, assuming the United States and other nations choose to get serious about moving away

from MAD toward a world with fewer nuclear weapons in fewer hands. On the other hand, without such a move, the bold steps Washington has already taken away from MAD's opposition to missile defenses will noty get us where the United States and the world want to go--toward a safer, saner world where security is based on defenses and self-restraint, rather than offensive capability; the kind of peace that can only come with a world full of Canadas.

ENDNOTES - CHAPTER 12

1. See, e.g., National Planning Association, 1970 *Without Arms Control*, May 1958; Howard Simons, "World-Wide Capabilities for Production and Control of Nuclear Weapons," *Daedalus*, Summer 1959; and William C. Davidson, Marvin I. Kalkstein, and Christophe Hohenemeser, *The Nth Country Problem and Arms Control*, National Planning Association, January 1960.

2. See, e.g., "Statement by the Indian Representative [Trivedi] to the First Committee of the General Assembly: Nonproliferation of Nuclear Weapons, October 31, 1966," in U.S. Arms Control and Disarmament Agency, *Documents on Disarmament, 1966*, U.S. Government Printing Office, 1967, p. 679.

3. See, e.g., "Statement by the Brazilian Representative [Azeredo da Silveira] to the Eighteen Nation Disarmament Committee: Draft Nonproliferation Treaty, August 31, 1967," in U.S. Arms Control and Disarmament Agency, *Documents on Disarmament, 1967*, U.S. Government Printing Office, 1968, p. 370.

4. See, e.g., "Statement by the Dutch Representative [Eschauzier] to the First Committee of the General Assembly: Nonproliferation of Nuclear Weapons [Extract], May 6, 1968," in U.S. Arms Control and Disarmament Agency, *Documents on Disarmament, 1968*, U.S. Government Printing Office, 1969, pp. 295-96; and "Statement by acda Director Forster to the First Committee of the General Assembly: Nonproliferation of Nuclear Weapons, November 9, 1966," in U.S. Arms Control and Disarmament Agency, *Documents on Disarmament, 1966*, U.S. Government Printing Office, 1967, p. 271.

5. See U.S. Department of State Policy Planning Council, "After NPT, What?" NSF, Box 26, LBJL, May 25, 1968, as cited in Avner Cohen, *Israel and the Bomb*, Columbia University Press, 1998, p. 299.

6. See Mark Hibbs, "U.S. Confirms It Has Intelligence Pointing to DAE Planning Arms Tests," *NuclearFuel*, April 14, 2003.

7. For documentation of these points, see Henry Sokolski, *Best of Intentions: America's Campaign Against Strategic Weapons Proliferation*, Praeger Publishers, 2001, pp. 39-56.

8. For a full discussion of this effort, see Daniel Horner, "Full G8 Funding for Construction of Russian MOX Plant Seen by Year's End," *NuclearFuel*, April 28, 2003.

9. Each year the IAEA and every second year EURATOM announce the total amounts of plutonium and highly enriched uranium they believe they are safeguarding. Both, however, are barred by rules of confidentiality from specifying what amounts they believe each country they are safeguarding is holding. On this point, see David Albright, Frans Berkhout, and William Walker, *Plutonium and Highly Enriched Uranium 1996 World Inventories, Capabilities and Policies*, Oxford University Press, 1997, p. 407; and Albert Wohlstetter, *et al*., *Swords From Plowshares: The Military Potential of Civilian Nuclear Energy*, University of Chicago Press, 1977, pp. 65-67.

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