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**AVERTING ARMAGEDDON: IN SEARCH OF NUCLEAR
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We begin our discussion of nuclear weapons – the only weapon of mass destruction that really matters - with a deceptively simple question: Does the spread of nuclear weapons make the world safer or more dangerous? Most people usually have an instinctive reply to this question: Of course, it makes things more dangerous. How could it not? It might seem surprising, therefore, that not all nuclear analysts agree, and the debate remains unresolved. Like so many of the issues relating to nuclear weapons, the debate is built largely on speculation and ambiguous historical experience. Nuclear weapons remain attractive to insecure or ambitious states. In regional rivalries such as the subcontinent, East Asia, and the Middle East, the bomb still has influence – great influence, in fact. Whatever else one has to say - and presumably not much has been left unsaid about the nuclear strategy of the past six decades - nuclear status still imparts extraordinary prestige and power. The nine current members of the nuclear weapon club - the U.S., Russia, Great Britain, France, China, Israel, India, Pakistan, and North Korea - still possess about 27,000 operational nuclear weapons of various types between them. At least another fifteen countries have on hand enough highly enriched uranium for a nuclear weapon.ⁱ

Since 1945, many critics have expressed alarm that the spread of nuclear weapons will inevitably lead to world destruction. So far, that prediction has not been proved right. But is that because of effective efforts to stop the spread of nuclear weapons, or, to borrow a phrase from former secretary of states Dean Acheson, after the Cuban Missile Crisis, just plain dumb luck?

Nuclear proliferation remains urgent not just because of the risk of a terrorist organization getting its hands on nuclear weapons, but because the proliferation of weapons necessarily means a proliferation of nuclear deterrents. Nuclear weapons have long been a force multiplier, able to make up for imbalances in conventional military power. Paradoxically, then, the unassailable lead of the United States in military power and technology, might actually invite other nations to acquire the bomb as a way to influence or even deter American foreign policy initiative. The lesson of the first Gulf War, one Indian general was reported as saying, is that you do not go to war with the United States without the bomb, the 2003 invasion of Iraq serving as yet another glossy advertisement of the protective power of a nuclear arsenal. This is not a new development. It is, in fact, a lesson American policymakers have

been concerned about for some time, and one for which no easy solution seems likely. Bill Clinton's secretary of defense, Les Aspin, outlined the problem as far back as December 1993:

During the Cold War, our principal adversary had conventional forces in Europe that were numerically superior. For us, nuclear weapons were the equalizer. The threat to use them was present and was used to compensate for our smaller numbers of conventional forces. Today, nuclear weapons can still be the equalizer against superior conventional forces. But today it is the United States that has unmatched conventional military power, and it is our potential adversaries who may attain nuclear weapons.

Accordingly, Aspin concluded, the United States could wind up being the equalized.ⁱⁱ Or, to take an earlier example, John F. Kennedy acknowledged in the wake of the Cuban missile crisis that even a small number of nuclear weapons could deter even the most powerful states.

A central element of the proliferation debate revolves around the perceived effectiveness of nuclear deterrence. If deterrence works reliably, as optimists argue, then there is presumably less to be feared in the spread of nuclear weapons. But if nuclear deterrence does not work reliably, pessimists maintain, more nuclear weapons states will presumably lead not just to a more complicated international arena but a far more dangerous one.

Some analysts have made a compelling case that the fear of nuclear proliferation or the spread of nuclear weapon has been exaggerated. Some go even further and argue that proliferation may actually increase global stability. It is an argument peculiar to nuclear weaponry, as it does not apply and is not made with regard to other so-called weapons of mass destruction such as chemical and biological weapons. Nuclear weapons are simply so destructive, this school of thought argues, that using them is such a high bar that it would be madness itself to launch against a nuclear-armed foe. Put another way, nuclear states should know better than to fight wars with each other. The argument that proliferation is not necessarily a dire threat has been made in expansions both lateral - to other countries - and vertical - in the growth of nuclear stockpiles. "Since 1945," remarked Michael Mandelbaum, twenty-five years ago, "the more nuclear weapons each has accumulated, the less likely, on the whole, it has seemed that either side would use them." Others have made similar arguments. Kenneth Waltz maintains, for example, that nuclear weapons preserve an "imperfect peace" on the subcontinent between India and

Pakistan. Responding to reports that all Pentagon war games involving India and Pakistan always end in a nuclear exchange, Waltz argues that “Has everyone in that building forgotten that deterrence works precisely because nuclear states fear that conventional military engagements may escalate to the nuclear level, and therefore they draw back from the brink?”

It was an idea frequently debated during the Cold War. French military strategist General Pierre Gallois observed in 1960 that the path to greater stability lay in the increased proliferation. “Few people are able to grasp that precisely because the new weapons have a destructive power out of all proportion to even the highest stakes, they impose a far more stable balance than the world has known in the past,” he said. “Nor is it any easier to make people realize that the more numerous and terrible the retaliatory weapons possessed by both sides, the surer the peace...and that it is actually more dangerous to limit nuclear weapons than to let them proliferate.” Gallois made this argument in the context of justifying the French bomb and increasing NATO nuclear capabilities. “These,” Gallois concluded, “are the realities of our time, but no one is willing to accept them at first blush.”ⁱⁱⁱ

Notwithstanding a few notable proponents of the “proliferation equals more security” argument, the weight of opinion is mainly on the other side of the ledger, heightened, especially since 9/11, that the spread of nuclear weapons is a bad thing – a very bad thing, in fact. The issues driving nuclear-armed states and even terrorist groups are no longer just political; we have also seen the obsessiveness of religious fundamentalism, which does not seem amenable either to diplomacy or humanitarian restraint. Indeed, since 9/11 the “rules” have changed and experts suggest that there are at least some terrorists who do want to inflict mass casualties. In this context, nuclear terrorism not only represents an effort to intimidate and coerce, but also poses a critical threat to states and peoples around the world.

Political scientist Scott Sagan has also highlighted the ways in which organizations and communications can fail; for example, rather than being anomalies, accidents should be seen as an inherent part of organizations. When nuclear weapons are thrown into the mix, the risk of catastrophic accidents becomes inevitable. Moreover, Sagan holds the view that a fundamental level of risk is inherent in all nuclear weapons organizations regardless of nationality or region. Clearly, it is an element that compounds the problem of nuclear weapons in regions still embroiled by centuries-old religious, cultural, and ethnic tensions, to be sure with many old scores to settle. All of these elements combine in a barely controllable milieu of states' nuclear weapons policy, a disaster waiting to happen.

Halting the Spread of Nuclear Weapons

This invariably leads us to our second, essential question: How can a nation - or a community of nations - prevent the spread of nuclear weapons? Since the question was first raised during the closing stages of the World War II, a wide range of answers have been given and tried, ranging from the legislative, through international norms and treaties, and even preventive military action. None has proved entirely satisfactory.

Whereas the Baruch Plan of 1946 equated controlling the atom and disarmament, President Dwight D. Eisenhower managed to separate the two in his 1953 proposal known as "Atoms for Peace." The focus of the proposal was on stopping the spread of nuclear weapons, not on disarmament. In a speech to the United Nations on December 8, 1953, Eisenhower called for a renewed emphasis on peaceful uses of atomic energy and on providing commercial incentives for reaping the benefits of atomic energy. The price was that all fissile material would be placed under the custody of a UN agency. Again, the initiative met with mixed success. On the plus side, it contributed directly to the establishment of the International Atomic Energy Agency (IAEA), in July 1957, charged with monitoring and encouraging the safe use of nuclear technology for peaceful purposes, while acting as an international, neutral watchdog of nuclear weapons transfers and developments. The Vienna-based IAEA, a United Nations-affiliated organization with 137 member countries, has played an increasingly important role in recent years, but its power depends heavily and ultimately on international political tides. On the negative side, a few nations, notably India, chose to use the Atoms for Peace project to establish their own nuclear weapons programs.

In the 1950s and 1960s, while the U.S., the Soviet Union, Great Britain and France built their nuclear arsenals, frequent estimates of the future size of the nuclear-armed community centered on two-dozen states. But with the People's Republic of China's initial nuclear test in October 1964, a worried White House and Kremlin hastily put forth proposals to restrict the spread of nuclear weapons. In the so-called Eighteen Nation Disarmament Committee, which had been discussing this matter, nonaligned members argued that a non-proliferation treaty must not simply divide the world into nuclear "haves" and "have nots," but must balance obligations. The Non-Proliferation Treaty (NPT) was signed in 1968 after the Americans and the Soviets reluctantly agreed "to pursue obligations in good faith" to halt the

arms race “at the earliest possible date” (the fig leaf they hid behind) and to seek “a treaty on general and complete disarmament under strict effective international control.” Questionable adherence to this pledge annoyed non-nuclear nations at subsequent NPT review conferences only to draw renewed, feeble pledges from the superpowers.

Nevertheless, the Non-Proliferation Treaty, with its 185 signatories, became the cornerstone of a loosely structured nonproliferation regime. The IAEA established international inspections and safeguards aimed at preventing nuclear materials being diverted to military uses. During 1974 and 1975, a Nuclear Suppliers Group was established in London to further ensure that nuclear materials, equipment, and technology would not be used in weapons production. Various Nuclear-Weapons Free Zones meanwhile extended the nonproliferation regime to Latin America (1967), the South Pacific (1996), Africa (1996), Southeast Asia (1997), and Central Asia (2002), while a Comprehensive Nuclear Test Ban Treaty, which the U.S. Senate has refused to ratify, rounded out the regime. Still, for all its faults, the NPT stands out as the high-water mark of multilateral global efforts to establish an enforceable regime to curb the further spread of nuclear weapons.

By the time the NPT was signed, the nuclear club already had five members: the United States, the Soviet Union, the United Kingdom, France, and China, who greeted each new addition meeting with varying degrees of concern. American policymakers engaged in serious discussion against both the Soviet and Chinese nuclear programs before each successfully exploded its first atomic device in 1949 and 1964, respectively. The Indian Government of Prime Minister Indira Gandhi seriously considered, but ultimately rejected plans, for preventive military attacks on Pakistan’s nuclear facilities in the early 1980s. Israel, not a signatory to the treaty, actually carried out a military strike against an Iraqi nuclear power facility on June 7, 1981, at Osirak. Less aggressive measures have also had a mixed record of success. American efforts to thwart the British nuclear program consisted mainly of cutting off the flow of information and materials to their erstwhile atomic partner. The French were in point of fact actively discouraged from developing an independent nuclear option and offers were made for a European nuclear force instead. None of these efforts was decisive.

Not every nuclear and prospective nuclear power has regarded the NPT and its subsequent indefinite renewal in 1995 positively.^{iv} After all, the NPT is specifically designed to freeze the status quo. The leading nuclear states party to the treaty naturally regarded this as a positive arrangement

because it preserved their status while retaining their freedom with respect to modernizing their own nuclear arsenals, which they have clearly done. But other countries such as India, also not a signatory to the treaty, saw it as exclusionary on the part of the established nuclear powers and bristled at what it perceived to be the nuclear double standards of the West, Russia and China. For, according to former Indian defense minister K.C. Pant, “We very seriously proposed a 15-year plan for the phased elimination of nuclear weapons. However, after the NPT was extended ‘in perpetuity’, it was apparent the big powers had no intention of shedding their nuclear arsenal.” India may well have gone nuclear because of double standards and the wish to be taken seriously.^v

Disarmament critics also argue that under the NPT, the nuclear powers should not be expanding their nuclear arsenals but rather moving towards total nuclear disarmament. Article VI of the treaty is clear: “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.” Moreover, continue critics, what possible purpose could nuclear weapons serve in the war on international terrorism? And could not the expense of modernizing nuclear forces be better put to use?

Typically, and in defense of his government’s decision to update and replace the United Kingdom’s Trident nuclear weapons system, former British Prime Minister Tony Blair responded to his opposition by pointing out that the NPT did not commit member states to total disarmament but rather to negotiations on effective measures and that his government had fulfilled this pledge. It had, in fact, cut its nuclear weapons explosive capacity by 70 percent since the end of the Cold War, given up bombs carried by strategic aircraft, and reduced the operational readiness of its four Vanguard submarines, each carrying 16 U.S.-supplied Trident ballistic missiles equipped with up to three warheads. In any case, only one submarine was on patrol at any one time and would require several day’s notice to fire. Nonetheless, there was considerable resistance. On February 24, 2007, the national “No Trident” demonstration brought up to 100,000 protestors to the streets of London to demand the government reverse its plans to build a new generation of nuclear weapons to replace Trident. There was also considerable resistance from Labour MPs, and enough of them voted against the Trident replacement proposal to force Blair to rely on support from the Conservatives. By the end of March, Blair got his way: a replacement submarine, including missiles and warheads, and even that would be no less than 17 years in the making.

Clearly, nuclear proliferation is one of the key challenges to the stability of the contemporary international system, and the current non-proliferation regime seems increasingly unable and, perhaps, unwilling to meet the expectations of its designers. Since the signature of the NPT in 1968, nuclear powers have barely fulfilled their commitments to reduce their atomic arsenals, while the number of non-nuclear states that have crossed the threshold status and are now regarded as full-fledged atomic powers has increased and threatens to keep growing. What can be done about it?

In recent years, a team of leading nonproliferation experts, assembled by the Carnegie Endowment for International Peace, offered a sober blueprint for rethinking the international nuclear nonproliferation regime. They offered a fresh approach to deal with states and terrorists, nuclear weapons, and fissile materials alike. According to their plan, an effective strategy for nuclear security will require *universal compliance* with the norms and rules of a toughened nuclear nonproliferation policy, where *compliance* means more than declarations of good intent. In future, it will also mean actual performance. *Universal*, moreover, means that nonproliferation norms and rules must be extended not only to treaty members, but to all states and to individuals and corporations as well.

Six obligations, expanded below, form the essential core of the universal compliance strategy; together, they constitute a *balance of obligations* among the nuclear and non-nuclear states, while erecting a defense-in-depth against the spread of nuclear weapons. They are: making nonproliferation irreversible; devaluing the political and military currency of nuclear weapons; securing all nuclear materials; stopping illegal transfers; committing to conflict resolution; and solving the Three-State Problem, i.e., persuading India, Israel, and Pakistan to accept the same nonproliferation obligations accepted by the weapon state signatories to the NPT. The alternative, with the human misery that would most likely occur, would be a deadly lesson in consequence management, for which there are no real answers.^{vi}

Obligation One: Make Nonproliferation Irreversible. The goal here is to radically revise the rules managing the production of fissile material, while clarifying and tightening the terms by which states can withdraw from the NPT. This could best be accomplished by precluding the acquisition of uranium enrichment and plutonium reprocessing plants by any additional state; providing, in return, internationally guaranteed, economically attractive supplies of the fuel services necessary to meet

nuclear energy demands; ending the production of highly enriched uranium worldwide, while adopting a temporary “pause” in the separation of plutonium; passing a new UN Security Council resolution making a state that withdraws from the NPT fully responsible for violations committed while it was still a party to the treaty; barring states withdrawing from the treaty from illegally using nuclear assets acquired from abroad before their withdrawal; and suspending nuclear cooperation with countries that the IAEA cannot certify are in full compliance with their nuclear nonproliferation obligations.

Obligation Two: Devalue the Political and Military Currency of Nuclear Weapons. Specifically, all states must diminish the role of nuclear weapons in security policies and international politics, while the nuclear weapon states must do more to make their nonproliferation commitments irreversible, especially through the steady, verified dismantlement of their nuclear arsenals. This could be done a number of ways: disavowing the development of new types of nuclear weapons; reaffirming their current moratorium on nuclear weapons testing; ratifying the Comprehensive Test Ban Treaty; lengthening the time decision makers would have before deciding to launch nuclear weapons by taking missiles off hair-trigger alert; making nuclear weapons reductions, such as those required under the 2002 Treaty of Moscow, irreversible and verifiable; and producing a detailed road map of the steps that would be necessary to verifiably eliminate nuclear arsenals in order to clarify whether or not disarmament is possible.

Obligation Three: Secure All Nuclear Materials. By this is meant that all states must maintain robust standards for securing, monitoring, and accounting for all fissile material in any form – to prevent nuclear terrorism, while creating the potential for secure nuclear disarmament. This could be done in two ways: first, convene a high-level “Contact Group to Prevent Nuclear Terrorism” to establish a global standard for protecting weapons, materials, and facilities; and, second, identify, secure, and remove nuclear materials from all vulnerable sites within four years – an accelerated “Global Cleanout.”

Obligation Four: Stop Illegal Transfers. In particular, states must establish enforceable prohibitions against efforts by individuals, corporations or states to assist others in secretly acquiring the technology, materials and know-how for nuclear weapons. This obligation can be assisted along the lines of establishing and enforcing national legislation implementing UN Resolution 1540 to secure nuclear materials, strengthen export controls, and criminalize illicit trade; making the IAEA’s

Additional Protocol a mandatory conditions for all transfers by members of the Nuclear Suppliers Group; expanding the voluntary data-sharing between the Nuclear Suppliers Group and the IAEA while making it obligatory for transfer of controlled items; developing with corporations and banks voluntary actions to block trade, loan, and investment activity that would advance the illegal acquisition of nuclear capabilities; and ground the Proliferation Security Initiative in international law to cover international waterways and airspace.

Obligation Five: Commit to Conflict Resolution. This is recognition of the simple fact that the proliferation problem cannot be solved by nonproliferation measure alone. This would require concentrating the diplomatic influence of the major powers on resolving the regional conflicts that underlie states' pursuit of security through nuclear weapons. And there are plenty of places to start.

Obligation Six: Solve the Three-State Problem. This problem revolves around the issue of how to persuade India, Israel, and Pakistan to accept the same nonproliferation obligations accepted by the weapon state signatories to the NPT. This would take two forms of action: first, in return for international recognition that India, Israel, and Pakistan will not give up their nuclear weapons absent durable regional peace and progress toward global nuclear disarmament, the three states should accept all of the nonproliferation-related obligations accepted by the five original nuclear weapon states; and, second, the NPT leadership should cooperate with India, Israel, and Pakistan on nuclear material security and reactor safety, while maintaining trade restrictions on new reactors.

Cold War Legacy

Since the end of the Cold War the problem of the spread of nuclear weapons has become more complicated, not less. The legacy of the Cold War has played an important role. After the fall of the Berlin Wall and the collapse of the Soviet empire, the first challenge was to dismantle what Soviet premier Mikhail Gorbachev referred to as the “infrastructure of fear” that had dominated global security relations during the Cold War and Washington and Moscow declared the arms race over with the

signing of the START Treaty in August 1991. Stopping it was one thing; reversing direction was quite another.

It is hard to find anyone who can offer a convincing argument as to why the United States and Russia both still need thousands of operational nuclear weapons in their stockpiles so many years after the end of the Cold War. Today, according to former secretary of defense Robert S. McNamara, the United States has deployed approximately 4,500 strategic offensive nuclear warheads and the Russians roughly 3,800. (The strategic forces of the UK, France and China are considerably smaller, with 200 - 400 nuclear weapons in each state's arsenal; the newer nuclear states of India and Pakistan have fewer than 100 weapons each.) Of the 8,000 active or operational U.S. warheads - each with the destructive power 20 times that of Hiroshima - 2,000 are on hair-trigger alert, ready to be launched on 15 minutes' warning. Moreover, the United States remains prepared to initiate the use of these weapons by the decision of one person, the president - against either a nuclear or non-nuclear enemy, whenever the president believes that it is deemed in the national interest.

One of the most pressing concerns of security experts and policymakers in the early 1990s was to secure the weapons of the former U.S.S.R. while that empire imploded. In 1991, the breakup of the Soviet Union left nuclear weapons in the former Soviet states of Ukraine, Belarus, and Kazakhstan. These newly independent states, each of which was "born nuclear," were ultimately convinced to give up their inherited weapons, and all of those nuclear weapons were repatriated to Russia, but not without much anxiety. That the new states would simply give up these powerful bargaining chips was no foregone conclusion. The Nunn-Lugar program, with considerable U.S. funding to secure these weapons, aided in achieving a successful transfer. The sheer numbers of nuclear weapons even combined with this relatively modest dispersal illustrated the problem of command, control, and security in an environment of deteriorating military infrastructure. Whether a cash-strapped military complex might look to liquidate its assets or the compromising of security measures allowed theft, the threat to the international community was acute.

The problem seemed even more worrying with those weapons dispersed further afield. During the Cold War, both sides deployed tens of thousands of nuclear weapons and nuclear-capable delivery vehicles, well beyond their own borders in the name of forward defense and pre-positioning. The list of locations beyond the continental United States to which American nuclear weapons, both tactical and

strategic, were dispersed is surprisingly long: Alaska, Canada, Greenland, Guam, Hawaii, Japan, Johnston Island, Kwajalein, Midway, Morocco, Philippines, Puerto Rico, South Korea, Spain, Taiwan, Belgium, France, Greece, Italy, Netherlands, Turkey, United Kingdom, and West Germany. In Europe alone, thousands of American nuclear weapons had been deployed since September 1954 in a constantly rotating inventory of obsolescence and replacement, peaking at approximately 7,300 in 1971.

The number of American nuclear weapons deployed overseas has been reduced markedly since the dissolution of the Soviet Union. In 1991, President George H.W. Bush ordered the withdrawal of all ground and sea based tactical nuclear weapons from their overseas bases. But the United States remains the only nation to continue basing land-based nuclear weapons beyond its own borders (other countries continue to deploy sea and air-based weapons). The number of American nuclear weapons still based in Europe remains at about 480.

Nuclear Deterrence for the Post-Cold War Era

The breakup of the Soviet Union augured a new reality in which “The prospect of a Soviet invasion into Western Europe, launched with little or no warning, was no longer a realistic threat.” Gorbachev shared the sentiment, describing it as a revolution in strategic thinking; no longer should the deterrent to war be the threat of war. “Our next goal,” he said, “is to make full use of this breakthrough to make disarmament an irreversible process”

By the time Bill Clinton assumed the presidency the euphoria of the end of the Cold War was giving way to more sober analysis. It had become increasingly apparent that the problems associated with nuclear weapons had not actually faded away - they had simply been transformed. Rather than opening an era of global peace and security, the end of the Cold War paved the way for instability and the resurfacing of regional issues that had long been suppressed. Sarajevo, Kosovo and Rwanda became household words.

Nevertheless, the Clinton administration pressed ahead with its efforts to align nuclear policy with new circumstances. In late 1993 it announced that the U.S. Government had adopted a new understanding of “deterrence.” A wide-ranging and thorough “Bottom Up Review,” conducted by the Pentagon during 1993, identified a number of key threats to U.S. national security. Foremost among

them was the increased threat of proliferation of nuclear weapons and other weapons of mass destruction. The new “deterrence,” therefore, would be aimed at deterring not only the threat to use nuclear weapons but also the acquisition of atomic technology and materials. By employing significant military and economic disincentives, the administration hoped to neutralize some of the chief threats to stability such as North Korea, Iraq, and Libya.

But the central thrust of U.S. nuclear policy remained the potential of a resurgent Russia. In keeping with its redefinition of “deterrence,” the Clinton administration announced in September 1994 that it was adopting a new nuclear doctrine. The doctrine of mutual assured destruction or MAD was to be replaced with a policy of mutual assured safety, aimed primarily at the Russian heartland. This served a dual purpose: first, to provide leadership for continuing reductions in nuclear weapons, and, second, and more critically, to provide a hedge against a reversal of the reform process in Russia. Although it remained unlikely that Russia’s weak economy could rebuild a conventional force of the magnitude that it had maintained during the Cold War, U.S. defense planners speculated that nuclear weapons might offer an attractive, cheaper option to a new generation of Russian leaders.

In November 1997, Clinton issued a Presidential Decision Directive describing in general terms the purposes of U.S. nuclear weapons while providing broad guidance for developing operational plans. It was the first such presidential directive on the actual employment of nuclear weapons since the Carter administration. It was notable in that Washington finally abandoned the Cold War tenet that it must be prepared to fight a protracted nuclear war. The directive also noted that strategic nuclear weapons would play a smaller role in the U.S. security posture than at any other point during the second half of the twentieth-century, but that they were still a vital part of U.S. efforts as a hedge against an uncertain future. But for those that believed that deterrence was a thing of the past, Clinton’s directive served as a sharp reminder that not much had changed. In words, still ringing from those at the height of the cold war, the Clinton administration declared:

Deterrence is predicated on ensuring that potential adversaries accept that any use of nuclear weapons against the United States or its allies would not succeed...A wide range of nuclear retaliatory options are required to ensure that the United States is not left with an all-or-nothing response...The United States will retain sufficient ambiguity of use that an

adversary could never be sure that the United States would not launch a counter-attack before the adversary's weapons arrive.^{vii}

At the same time, Aspin's successor, secretary of defense William Cohen wondered aloud whether a smaller nuclear force made it a more attractive target and deliberately cultivated the ambiguity concept upon which deterrence rested.

With transition to a coherent post-Cold War posture incomplete, the United States publicly considers Moscow an ally while Pentagon war game scenarios involving Moscow as the primary enemy continue. For its part, Russia maintains a nuclear force of considerable size, ostensibly to make up for the deterioration of its conventional capabilities.

Effectiveness of Non-proliferation Efforts

Non-proliferation efforts in recent years have enjoyed mixed results. On the one hand, nuclear stockpiles have been reduced markedly, with some of that fissile material being converted to peaceful purposes by blending down bomb-grade plutonium and uranium to lower-grade versions more suitable for nuclear power production. "One out of every ten light bulbs in the United States is powered by a former Soviet bomb," boasted Ambassador Linton Brooks, administrator of the U.S. National Nuclear Security Administration. On the other hand, the risk of nuclear weapons or fissile materials falling into the wrong hands seems greater than ever.

As of September 2005, there have been 220 cases of nuclear smuggling confirmed by the International Atomic Energy Agency since 1993. Eighteen of those cases involved highly enriched uranium. There are ongoing fears about Russian accountability for small, suitcase-sized bombs after former Russian national security adviser Alexander Lebed made a startling public claim in 1997 that up to 100 of those bombs were unaccounted for. Originally envisaged for use by spies behind enemy lines for sabotage and demolition in the event of war, the weapons were designed to be highly portable, self-contained, and possibly with short-cuts in their arming and detonation procedures. Put another way, they are a terrorist's dream. "[M]ore than a hundred weapons out of the supposed number of 250 are not under the control of the armed forces of Russia," Lebed said in a September 1997 interview on American television program *60 Minutes*. "I don't know their location. I don't know whether they have

been destroyed or whether they are stored or whether they've been sold or stolen, I don't know.” Lebed's claims have been the subject of vigorous debate.

The issue is more than historical curiosity. On October 11, 2001, just one month after terrorists struck in New York and Washington, CIA Director George Tenet briefed President Bush that, according to a CIA source, Al Qaeda had stolen a small nuclear bomb from the Russian arsenal. That bomb, according to the source, was then in New York City. The intelligence proved false. None the less, thefts of nuclear-usable material and attempts to steal nuclear weapons were no longer in the realm of the hypothetical, but a proven, recurring fact of international life. According to Graham Allison, “Thousands of weapons and tens of thousands of potential weapons (softball-size lumps of highly enriched uranium and plutonium) remain today in unsecured storage facilities in Russia, vulnerable to theft by determined criminals who could then sell them to terrorists.” In the years since the end of the Cold War, there have been numerous cases of theft of nuclear materials in which the thieves were captured, sometimes in Russia, on other occasions in the Czech Republic, Germany, and elsewhere.^{viii}

There is also the problem of the spread of nuclear weapons to weak or failing states. Illustrating the immediacy of the problem was the case of the international trafficking of atomic technology and materials set up by Pakistani atomic scientist Dr. A.Q. Khan. It amounted to a “one stop shopping network for nuclear weapons.” By all accounts, Khan's operation was a highly sophisticated supply and production network spreading from Pakistan to Libya, North Korea, Iran, Malaysia, and elsewhere. Shutting it down had immediate, flow-on effects. Khan's network had played a crucial role in Libya's nuclear ambitions. Within months of the network being shut down in 2004, Libya had renounced its nuclear program, allowed international inspectors into the country, and given up much of the supporting technology.

It was a proliferation breakthrough of unusual drama. It was also sobering: the network was sophisticated, effective, and had operated undetected for several years. Though A.Q. Khan and his known cohorts are out of business, there is still the great, unanswered question, Who else might have access to the nuclear technology he and his network proliferated? We simply don't know, according to London strategic studies think-tank chief, John Chipman, as “Pakistan has never made public Khan's confession, the details of its investigation into the network, including who was arrested and who was simply detained ‘for debriefing’, the charges and laws under which Khan's associates were detained,

the grounds for their release, or the identities of those who were put under a form of continued ‘house arrest’.” Pakistan has stopped providing information on the official grounds that the Khan case is closed. In addition, most of Khan’s foreign accomplices remain free and only three have been convicted and imprisoned. The upshot is the real concern that international framework of export controls still contains serious gaps that could well be exploited by a network similar to that of Khan’s.^{ix}

What do we know, then? We do know that the dismantling of the A.Q. Khan network had the appearance of a notable success of aggressive non-proliferation efforts and putatively led directly to tangible counter-proliferation progress in compelling Libya to abandon its nuclear ambitions and its advanced weapons programs. At first glance, the Libyan case seemed a model of successful deterrence, but first appearances proved deceptive. Encouraged by the coincidence of timing with the invasion of Iraq and the heated domestic political environment, early news reports of Libya's decision to end its nuclear ambitions implied that deterrence had played a key role. Perhaps Colonel Qaddafi had feared that Libya might face the same fate as Saddam’s Iraq. The later exposure of Libya's reliance on Khan’s network put events into a better perspective. While Qaddafi might have been deterred to some extent, it was probably not the primary driving force behind Tripoli's decision. Libya had simply been caught red-handed, flaunting international rules against the trafficking of nuclear technology and materials. Confronted with undeniable evidence of its wrongdoing and deprived of its principal source for continuing the nuclear program, it probably saw more political advantage in “confessing“ and renouncing nuclear weapons rather than in denying reality. Qaddafi was proved right.

Another troubling, complication in controlling proliferation is the blurred line between civilian atomic energy programs and weapons programs. Much effort in recent years has been directed toward establishing clear demarcation lines between them, but it always remains possible for a civilian atomic energy program to migrate to a nuclear weapons program. Civilian atomic energy programs build expertise, contribute technology and produce material. It is a characteristic recently exploited by two of the three countries President Bush notoriously identified as part of “an axis of evil.” Iran has long insisted that its nuclear ambitions lie only in civilian atomic energy reactors; the international community, including the International Atomic Energy Agency, remains unpersuaded. Teheran’s claim that it has a “peaceful” right to acquire all it needs to come within range of having a bomb served as a reminder of what the NPT was meant to avoid. Iran, for whatever reason, continues to reject international demands to suspend its uranium enrichment program.

By agreements concluded with the Clinton administration, North Korea was putatively allowed to maintain a strictly civilian atomic energy program. Clearly, North Korea was intent on using its energy reactors to enrich uranium, the key ingredient required for an atomic weapon. But problems with North Korea over nuclear proliferation were nothing new. The regime started building nuclear reactors in the 1960s and did not join the NPT until 1985, while the signing of a safeguards agreement that would permit the IAEA inspections of its nuclear program was postponed until 1992. When the overdue inspections suggested that the North Koreans were hiding nuclear material, the Democratic People's Republic of Korea became the first country to announce its withdrawal from the NPT, dramatically suspended one day before it became effective. Then came the period under the Agreed Framework in 1994, which, for a number of reasons, collapsed in 2002. The Agreed Framework, worked out by the Clinton administration, required the U.S. both to help North Korea to acquire modern, light water reactors that would produce energy but not weapons and to move toward normal relations. Neither of these happened as Clinton's successor pushed for the so-called "six-party talks" on North Korea in which the two Koreas, China, Russia, Japan, and the United States were jointly to reach a solution with Kim II Sung's Stalinist-style regime.

On October 9, 2006, North Korea, one of the poorest nations on this planet, exploded a plutonium bomb in a tunnel at a place called Punggye, in the far north of the country, becoming the 9th country in history - and arguably the most unstable and dangerous - to proclaim that it had joined the club of nuclear weapons states. Why would North Korea want to acquire nuclear weapons - defense, offense, diplomatic bargaining chip? No one was quite sure. What to do about it was equally problematical. The normally sober *New York Times* editorialized that this was going to be a problem as North Korea "is too erratic, too brutal, and too willing to sell what it has built to have a nuclear bomb." The shortage of information on the generally reclusive North Korean nuclear program remains a serious issue for the international community, especially when this nation has repeatedly demonstrated antagonistic security policies. The possibility of some form of military conflict on the Korean peninsula in the years ahead remains high as it seems highly probable that North Korea would seriously contemplate using nuclear weapons in combat. The North Korean nuclear problem will not go away despite Pyongyang's recent decision to shut down and seal for purposes of abandonment the Yongbyon nuclear facility in exchange for energy and diplomatic concessions. At this juncture, it is hard to tell exactly what if anything it

would take for North Korea to give up its nuclear ambitions. In the meantime, longtime Korea watchers remain skeptical of Pyongyang's continual maneuvering and "data declarations."

Finally, there is the problem of the proliferation of weapons states in South Asia. Efforts to roll back the India-Pakistan nuclear arms race have been spectacularly unsuccessful. Admittedly, the problem had been handled very differently from the Libyan case. India joined the nuclear club with a successful test on May 18, 1974, having begun its program in response to the border clash with China in November 1962, with China developing its own bomb two years later.^x Since then, India maintained a "dual front" approach to its defense planning, with Pakistan and China clearly in its sights. But it is the India-Pakistan front that has been the cause of intense global concern since things heated up considerably in mid-1998. The two countries have had a marked history of conflict during the relatively short life of the Pakistani nation. It is a rivalry fueled by many cultural and security issues, and it has a ready-made flashpoint in the contested territory of Jammu and Kashmir.

Since 1947, when Pakistan was carved off India by the British, serious military conflict has broken out between the two sides at least four times. Each time India has won. The injection of nuclear weapons into that volatile mix has naturally led to widespread concern. In May 1998, India tested five nuclear weapons. Before the month was out, Pakistan had hastily responded with six nuclear tests of its own. Each side engaged in saber-rattling rhetoric and tension has built up on several occasions since, most notably in brinkmanship of dual mobilizations in 2002. The tests provoked widespread international condemnation aimed at both parties.

Whether nuclear weapons stabilize or destabilize the India-Pakistan rivalry remains a controversial question. Deterrence optimists argue that the risks of even a small scale nuclear exchange on the subcontinent, where the urban environments would almost certainly lead to millions of deaths, should force each side back from the brink. Former Indian minister of external affairs Jaswant Singh fell in that camp, adding that those who were condemning India's nuclear policies loudest were engaging in what amounted to "nuclear apartheid." "If deterrence works in the West—as it so obviously appears to," he argued, "by what reasoning will it not work in India?"^{xi} The Pakistani leadership professed similar views: a nuclear conflict would surely have no victor. In South Asia, nuclear deterrence may, however, usher in an era of durable peace between Pakistan and India, providing the requisite incentives for resolving all outstanding issues, especially Jammu and Kashmir. This is the optimistic view. Deterrence

pessimists argue, however, that such a view places far too much trust in the organizational integrity of the respective military establishments. Could either side actually control the escalation of a crisis even if they wanted to? Many security experts think not.

The nuclear experience of recent years suggests that the underlying approach of creating rigorous international norms and inspection supervisory regimes remains the best and most effective way of controlling nuclear threats. Mohamed El Baradei, director general of the International Atomic Energy Agency and winner of the 2005 Nobel Peace Prize holds that “We cannot respond to these threats by building more walls, developing bigger weapons or dispatching more troops. These threats require primarily multinational cooperation.” The IAEA works with the atomic programs in more than 100 countries. El Baradei estimates that as many as 49 nations know how to make nuclear weapons and warns that global tension could well push some over the line. Still, the situation is not as bad as John F. Kennedy worried about in 1963 when he predicted that there could be well over 15 or 20 nuclear powers by end of the decade. Interestingly, his concern was not that developing nations would acquire the bomb but rather that advanced industrial economies would do so, particularly West German and Japan. Several European nations, including neutral Sweden, which was then developing plans to build 100 nuclear weapons to equip its armed forces, were already actively pursuing nuclear weapons programs.

On the other side of the ledger, the Bush administration's policies had been informed by a robust skepticism of the actual effectiveness of international controls and have often emphasized more aggressive counter-proliferation efforts, turning its attention more and more to deterring the acquisition of atomic technology and materials, a policy initiated in the Clinton years. Bush revealed himself to be a deterrence pessimist of the first order. In justifying the invasion of Iraq, Bush declared: “I acted because I was not about to leave the security of the American people in the hands of a madman. I was not about to stand by and wait and trust in the sanity and restraint of Saddam Hussein.”^{xii}

The invasion of Iraq in March 2003 was therefore presented mainly as an effort to destroy Iraqi weapons of mass destruction programs, for fear that Saddam could not be deterred and, implicitly, that he might try to turn the tables on the United States and its allies. “We don't want the smoking gun to be a mushroom cloud,” then national security adviser Condoleezza Rice said in October 2002 in the lead up to the war. As is well-known, it turned out that Iraq had no weapons of mass destruction, particularly

of the nuclear kind. Less well-known, paradoxically, is that the invasion reinvigorated the very argument that inspection regimes such as the one imposed on Iraq during the 1990s could indeed be effective instruments in slowing or stopping the spread of nuclear weapons. Unfortunately, for the people of Iraq - and the Coalition of the Willing - Bush called Saddam's bluff.

The clarity of the Cold War world has given way to the ambiguities and uncertainties of a world where global security is threatened by regime collapse, nuclear terrorism, new nuclear weapons states and regional conflict, and preexisting nuclear arsenals. The dangers inherent in such a mix are in themselves greatly magnified by easier access to nuclear technology, inadequately protected stockpiles of plutonium and highly enriched uranium, the growing availability of missiles worldwide (31 nations with ballistic missiles), black market nuclear supply networks, and a trend toward acquisition of "latent" nuclear weapons capabilities through the possession of the entire nuclear fuel cycle. The results are clear: of all the potential threats to the global community today (including global warming), nuclear weapons, the most deadly weapon ever invented—and really the only true weapon of mass destruction-- probably pose the greatest risk. Indeed, the bomb still matters.

ⁱ Portions of this chapter have been adapted from Joseph M. Siracusa, *Nuclear Weapons: A Very Short Introduction* (London and New York: Oxford University Press, 2008).

ⁱⁱ Quoted in David G. Coleman and Joseph M. Siracusa, *Real-World Nuclear Deterrence: The Making of International Strategy* (Westport, CT: Praeger Security International, 2006), 108.

ⁱⁱⁱ Pierre Gallois, "NATO's New Teeth," *Foreign Affairs*, 39, 1 (October 1960): 73.

^{iv} Susanna Schrafstetter and Stephen Twigge, *Avoiding Armageddon:: Europe, the United States, and the Struggle for Nuclear Nonproliferation, 1945-1970* (Westport, CT: Praeger, 2004), 2.

^v George Perkovich, *India's Nuclear Bomb: The Impact on Global Proliferation* (Berkeley, CA: University of California Press, 1999), 3.

^{vi} See George Perkovich et al., *Universal Compliance: A Strategy for Nuclear Security* (Washington, D.C: Carnegie Endowment for International Peace, 2005).

^{vii} Quoted in Coleman and Siracusa, *Real-World Nuclear Deterrenc*, 116.

^{viii} Graham Allison, *Nuclear Terrorism: The Ultimate Preventable Catastrophe* (New York: Times Books, 2004), 1.

^{ix} *Nuclear Blackmarkets: Pakistan, A.Q. Khan and the Rise of Proliferation Networks: A Net Assessment* (London: IISS, 2007).

^x Allen Whiting, *The Chinese Calculus of Deterrence: India and Indochina* (Ann Arbor, MI: University of Michigan Press, 1975) and Neville Maxwell, *India's China War* (Garden city, NY: Anchor Books, 1972). For new insights into why China's leaders and military thinkers see the United States as its major potential nuclear threat, see Larry M. Wortzel, *China's Nuclear Forces: Operations, Training, Command, Control, and Campaign Planning* (Washington, D.C.: U.S. Army War College, 2007).

^{xi} Jaswant Singh, "Against Nuclear Apartheid," *Foreign Affairs* 77, 5 (September/October 1998),.

^{xii} Quoted in Coleman and Siracusa, *Real-World Nuclear Deterrence*, 120.