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Weapons of Mass Destruction

Why the Subject is Important

Nuclear, chemical, and biological weapons–the three commonly recognized "weapons of mass destruction" (WMD)–are distinguished from "conventional" weapons by their capacity to destroy huge amounts of life and property in single attacks.[1] Although they could be used against large and concentrated formations of military forces, WMD are designed primarily to attack civilian economies and populations. One high-yield thermonuclear hydrogen bomb could level most of a medium-sized city. A biological attack using an agent such as anthrax that is professionally developed and delivered (something that is fortunately not easy to do) might kill well over a hundred thousand people.[2] WMD are the greatest potential completely man-made sources of disaster.

In the early years of the Cold War, the unprecedented danger posed by nuclear weapons was well appreciated, and even sometimes exaggerated.[3] As time went on, however, people learned to live with the bomb. While it may be going too far to suggest that the public became complacent about the manageability of these weapons, public anxiety has sprung up only occasionally since the early 1960s. The relaxation of concern has been due in part to the end of the Cold War, and in part to the sheer passage of time, during which the taboo against using nuclear weapons has been reinforced. Chemical weapons (CW), which have been used a number of times in Third World conflicts, or by the Aum Shin Rikyo terrorist group in Tokyo, bear no comparable taboo, but they are also not in the same class of destructive power as nuclear and biological weapons, since it is extremely hard to deliver CW in quantities sufficient to kill many thousands in one stroke.

It is uncertain how motivated governments or other groups will be to obtain such weapons or to use them, but the technological barriers to acquiring them have been falling. Eight countries currently possess nuclear weapons (a ninth, South Africa, developed and then dismantled them). An uncertain but probably greater number have clandestine chemical or biological weapon (BW) programs. For weak and isolated countries, or ones at odds with the sole remaining superpower, incentives for acquiring weapons of mass destruction have grown as well. Countries like Iraq, Iran, or North Korea have no conventional means by which to contest American military power; WMD may be the only

strategic “equalizer” available to them.

Overview of Events

Chemical weapons such as “mustard gas” were used widely on the battlefields of World War I. In part because their effectiveness then was mixed, and sometimes self-destructive, they were not used in Europe in World War II. As for biological weapons, Japan experimented against Chinese villages with agents such as typhus, cholera, and plague.[4] The most notable uses of WMD in the twentieth century, however, were the atomic bomb attacks on Hiroshima and Nagasaki in 1945. Thereafter, nuclear weapons were not again used in combat, but they developed in profusion as the Cold War pitted the American and Soviet militaries against each other in the realm of preparedness. By the end of the Cold War, the United States and Soviet Union had nearly 10,000 nuclear weapons apiece that could reach each other's homelands, as well as tens of thousands of “tactical” nuclear weapons designed for use on the battlefield or at sea.

For a while in the 1950s, U.S. policy touted nuclear forces as a substitute for conventional military power, offering a “bigger bang for the buck.” The North Atlantic Treaty Organization (NATO) came to rely on the threat that it would initiate use of nuclear weapons to counter a Soviet invasion of Western Europe. Even in the 1950s, however, and more so as time went on, most strategists and political leaders came to view nuclear weapons as useful primarily for deterring attack rather than for gaining military advantage in an actual war, because it became harder and harder to devise plausible plans for using the weapons first without triggering retaliation that would render a first strike effectively suicidal. The simple conception of mutual deterrence that came to dominate strategic thinking was the metaphor of two scorpions in a bottle; they will circle each other warily, ever poised to strike, but never doing so for fear of being killed by the other's return blow.

Because they represented the ultimate military capability, nuclear weapons became an essential component of great power status. (It is no accident that the five permanent members of the United Nations Security Council are nuclear powers.) Smaller, more vulnerable countries have acquired nuclear weapons in the absence of other means to guarantee their security against powerful adversaries. The Soviet Union detonated its first nuclear device in 1949, Britain in 1952, France in 1960, China in 1964, and India

in 1974, and Pakistan in 1998.. Israel does not officially admit to possessing nuclear weapons, but is known to have developed them in the 1960s.

The actual rate of the spread of nuclear capability has always been lower than prevalent estimates had expected. Since the Cold War, however, and the relaxation of tensions between the two principal nuclear powers, attention and concern have focused on the prospects for proliferation. This has been true especially because two countries that attempted to develop nuclear weapons in recent years–Iraq and North Korea–are viewed in the West as "rogue" states, whose good sense and restraint cannot be assumed. Much concern has also come to focus on the possibility that subnational terrorist groups might acquire and use WMD, particularly chemical or biological weapons.

Ever since the Cold War began, and increasingly in recent decades, efforts to negotiate arms control treaties and regimes have been prominent diplomatic counterparts to weapon programs. Disarmament conferences took place under United Nations auspices for decades, but never succeeded in controlling the activities of the main possessors of WMD. Negotiations between the United States and Soviet Union to reach agreements limiting weaponry and testing first met with success in the form of the Limited Test Ban Treaty of 1963, which precluded nuclear testing in the atmosphere. Arms control efforts gathered steam in the 1970s.

In 1972, Washington and Moscow concluded the first Strategic Arms Limitation Talks (SALT I), reaching agreement on limiting offensive missile systems and, most notably, the Anti-Ballistic Missile (ABM) Treaty, which cut off deployment of defensive systems against such missiles at minimal levels. Subsequent SALT II negotiations yielded a treaty further limiting offensive delivery systems, but the reheating of the Cold war and the Soviet invasion of Afghanistan derailed this treaty before it could be ratified. In the 1980s, Ronald Reagan and Mikhail Gorbachev reached agreement on eliminating all American and Soviet medium- and intermediate-range missiles (although these were not among the principal delivery systems on either side).

American-Russian negotiations continued after the Cold War, but by the time of the administration of George Bush the Younger, discussions had come to revolve around American proposals to terminate the ABM Treaty. This aim has been very controversial, both within the United States and among American allies, as well a contentious issue in U.S.-China relations. Informal cooperative measures to control and limit nuclear weapon inventories have also been pursued, as the United States has provided financial and technical aid to Russia (aid known as the Nunn-Lugar program, after the U.S. senators who sponsored the measures) to deal with the so-called "loose nukes" problem–the need to safeguard and dismantle much of the large, deteriorating, and poorly-protected inventory of old Soviet nuclear materials.

Attempts to prevent new nuclear powers from arising produced the Nuclear Non-Proliferation Treaty (NPT) in

1968, a pact that created two classes of adherents: those states who already had nuclear weapons and were obliged to negotiate to reduce their holdings but were allowed to keep such weapons, and those who did not yet have nuclear weapons and agreed to foreswear them in exchange for assistance in development of peaceful nuclear energy programs. The NPT has been remarkably successful, if the number of adherents is the measure of success (only a handful of countries have refused to sign and ratify it), but less so if prevention of proliferation by states who desire nuclear weapons is the criterion (most of the latter are among the handful who did not accede to the treaty, and two–Iraq and North Korea–agreed to the treaty but cheated, mounting clandestine weapons programs). The other main diplomatic accord designed to discourage nuclear proliferation is the Comprehensive Test Ban Treaty (CTBT), which has been signed by a majority of nations but which has not yet entered into force (and which was rejected by the U.S. Senate during the Clinton Administration).

The most sweeping international arms limitation arrangements have been the treaties banning biological and chemical weapons, to which almost all countries have adhered legally. The main limitation of these accords is that it is very difficult, if not impossible, to verify compliance, since factories for producing chemical or biological weapons are hard to detect and often indistinguishable from legitimate civilian facilities for production of chemical and biological agents for agricultural, industrial, or medical purposes.

Schemes for preventing the use of WMD that lie at the opposite extreme from formal negotiation have involved attempts to destroy nascent enemy programs before they could succeed in producing weapons. Although several governments occasionally considered the idea over the years, there have actually been very few such attempts. The United States did not attack the USSR before the first Soviet atomic test, and neither the United States nor the Soviet Union struck China before it deployed nuclear forces. Nor did the United States attack North Korean nuclear facilities when Pyongyang was caught violating the NPT with a covert program to produce fissionable material that could be made into nuclear explosive charges, or Iran, even though Washington has accused that country of having a nuclear weapon development program.

The only two preventive attacks on record were executed against Iraq. Israel struck Iraq's Osirak research reactor in 1981, and the United States and coalition forces attacked nuclear, chemical, and biological weapon development sites during the Persian Gulf War a decade later. Since the early 1990s, the West has preferred to deal with potential development of WMD in North Korea through negotiation and, in the case of Iraq, through intrusive inspections. (The

inspections of Iraqi facilities mandated in the surrender agreement signed by Iraq at the end of the Gulf War in 1991, and carried out under United Nations auspices, ended in 1998, when Baghdad refused to allow them to continue.)

Historical Controversies

Disarmament or Deterrence?

There have always been significant constituencies behind efforts to abolish WMD. They have come closest to achieving the objective in the CW and BW treaties, since even those countries that seek such weapons now do so secretly, unwilling to claim that such weapons are legitimate. Efforts to abolish nuclear weapons, however, have never come close to success. In the early years of the Cold War, the United States put forth the Baruch Plan, designed to accomplish a UN-supervised abolition of nuclear weapons, but the plan was rejected by the Soviet Union. Despite widespread rhetoric about the ultimate desirability of abolishing nuclear weapons, no other political initiative has moved seriously in that direction. The U.S. and USSR undertook serious measures of arms control, such as agreements to limit certain classes of systems for delivering nuclear weapons, and to reduce stockpiles, without eliminating capabilities entirely. But even if Washington and Moscow were now to move dramatically to take their inventories down to a mere ten percent of what they were at the height of the Cold War, these two countries alone would still have several thousand nuclear weapons apiece.

The national security establishments of the great powers, or of countries aspiring to such status, have come to see a reliance on deterrence as the alternative to a choice between complete nuclear disarmament and nuclear war. Based on the scorpions-in-the-bottle metaphor, the rationale is that the careful maintenance of a capability to inflict devastating retaliation will serve to prevent adversaries from contemplating an initial nuclear strike. In this view, nuclear weapons will continue to exist, but they will paralyze each other and thus keep the peace.

Deterrence or Defense?

Fearing that irrationality, miscalculation, or some unanticipated motive could lead an adversary to launch an attack, some strategists have always been unwilling to place full confidence in the stability of deterrence. They have sought measures to enable a defense against an attack when it is launched, either to intercept enemy weapons before they

can detonate on target or to blunt the effects of detonations that do occur. The latter aim led to efforts to improve civil defense, especially in the 1950s and early 1960s, but the growth of the explosive power and the numbers of weapons that the U.S. or USSR could use against each other eventually made such measures seem trivial in the amelioration they could provide. In the past decade, however, interest in civil defense measures against chemical or biological weapons used by terrorists, or by an enemy state in a limited attack, has revived.[5]

More consistent debate has revolved around proposals to develop "active" defenses to intercept an attack, especially defenses against ballistic missiles. The ABM Treaty reflected the dominant view through the middle period of the Cold War that, in a race between deployments of defensive systems and additional offensive missiles meant to overwhelm the defense, the defense could not win, and that agreeing to ban defenses would save both sides the expense of deploying ineffective defenses. Opponents of this view came to power in the U.S. with the Reagan administration. Especially since the end of the Cold War, the logic behind the ABM Treaty has fallen from favor among American defense planners, in part because the newly overwhelming dominance of American power suggests to some that foreign adversaries would lack the capacity that the old Soviet Union had to neutralize a U.S. defense.

Are Nuclear Weapons Bad or Good for Peace?

In the West, it is axiomatic that all WMD, especially nuclear weapons, are a curse, and that if the countries that have them cannot give them up, at least no more countries should be allowed to get them. Elsewhere, however, in countries whose security is not assured, the argument that those countries should not be allowed to have a deterrent capability of the same quality as the great powers does not command such consensus. India has no nuclear ally to protect it from China, and Pakistan has no guarantee against India, so they did not consider remonstrances from countries that still possess nuclear weapons themselves to be legitimate reasons for curtailing their own efforts to develop nuclear weapons..[6]

Those who see the effects of nuclear weapons as benign attribute much of the long peace between NATO and the Soviet alliance in the second half of the twentieth century to the caution and fear of war instilled by the danger of nuclear apocalypse. Had the prospect of utter devastation of civilization not existed, the reasoning goes, it is more likely that confrontations and crises over Berlin or other issues of the sort that traditionally have led to war would

indeed have boiled over and produced a conventional World War III.[7] Considering that World War II killed at least 50 million people and flattened most of the cities of Europe and East Asia, this reasoning goes, the restraining effect of nuclear fear is actually a welcome force for peace.

Theoretical Relevance

Nuclear deterrence theory emerged as the principal contribution of civilians and academic theorists to public policy debate, at least in the United States. It was one of the few policy areas in which academics established the terms of reference in which policy evolved (even though academic theories were honored far less in the world of practice, the actual war plans of the nuclear powers). The unusual role of theory on this subject developed largely because the weapons were new and revolutionary, and military establishments had no experience in using them. As a brash civilian executive in the Pentagon during the 1960s said to one top commander, "General, I have fought just as many nuclear wars as you have."[8]

Within theoretical circles, the appeal of deterrence theory derived from its simplicity. It involved few variables (primarily, the relative vulnerability of nuclear delivery systems and of cities). In addition, the debates revolved overwhelmingly around a small number of strategic choices (primarily, whether war plans should concentrate on "counterforce" targeting of military forces, or "countervalue" targeting of civilian assets, and whether states should attempt to gain nuclear superiority and deploy effective defenses against nuclear attack, or–for lack of ability to do the latter in the face of a determined adversary–accept vulnerability and rely on mutual deterrence to keep the peace).

Nevertheless, debates continued episodically about fundamental questions because no theoretical consensus ever developed on how to reconcile the contradiction between two different deterrent goals: deterrence of WMD attack or deterrence of attack by conventional forces. To maximize deterrence of an enemy attack with WMD, the threat of devastating retaliation that would make the costs of such an attack far outweigh the gains was the critical element. In short, ensuring the capacity of <u>both</u> sides to inflict unacceptable damage in retaliation was the key. If any first use of nuclear weapons would inevitably prove suicidal, there would never be such a first use–neither scorpion would ever dare strike.

If such mutual nuclear deterrence was solid, however, strategists worried that the world would be made safe for

conventional war, as an aggressor would feel free to use regular military forces behind a nuclear shield. To deter conventional attack, threats of deliberate nuclear escalation in response were deemed necessary, and were officially the backbone of NATO military doctrine throughout the Cold War. But this meant that, in principle, nuclear first use must not be suicidal. Theorists and policymakers alike struggled endlessly to reconcile these goals and strategies, but never succeeded in reaching a solution that attracted enduring general support.

The main corpus of deterrence theory developed during the Cold War years, and has not been substantially elaborated since its end. This is true, as of 2001, despite the fact that policy is moving away from the views that were dominant in academic circles, and toward investment in defense rather than reliance on deterrence. Very little serious theory about deterrence, defense, strategy, or arms control that is unique to non-nuclear WMD has yet been developed, despite the surge of concern about chemical and, especially, biological weapons.

Bibliographical Essay

In the post-Cold war era, attention to chemical and biological weapons has increased, but for most of the past half-century nearly all serious thinking about WMD has been about nuclear warfare. To understand the full range of issues involved in confronting the existence of WMD, it is best to start with a solid understanding of the physical capacity of nuclear weapons and of how the Cold War superpowers handled them and thought about their functions. Although too technical for average readers, the most definitive source on the first point is Samuel Glasstone, ed., *The Effects of Nuclear Weapons*, Revised Edition (Washington, D.C.: U.S. Government Printing Office, for the Nuclear Regulatory Commission, 1977). A primer on issues in nuclear strategy produced by the Harvard Nuclear Study Group is Albert Carnesale, Paul Doty, Stanley Hoffmann, Samuel P. Huntington, Joseph S. Nye, Jr., and Scott D. Sagan, *Living with Nuclear Weapons* (Cambridge, MA: Harvard University Press, 1983). The best general intellectual history is Lawrence Freedman, *The Evolution of Nuclear Strategy*, Second Edition (New York: St. Martin's Press, 1989). Other useful surveys of basic issues and developments are two books by Michael Mandelbaum: *The Nuclear Question* (New York: Cambridge University Press, 1979) and *The Nuclear Revolution* (New York: Cambridge University Press, 1981).

For those who wish to engage the main theorists directly, the essential precepts of nuclear deterrence theory

initially germinated in Bernard Brodie, ed., *The Absolute Weapon: Atomic Power and World Order* (New York: Harcourt, Brace, 1946). Other landmark works include: William W. Kaufmann, "The Requirements of Deterrence," in Kaufmann, ed., *Military Policy and National Security* (Princeton: Princeton University Press, 1956); Henry A. Kissinger, *Nuclear Weapons and American Foreign Policy* (New York: Harper, for the Council on Foreign Relations, 1957), which was the book that established the young Kissinger as a policy theorist; Herman Kahn, *On Thermonuclear War* (Princeton: Princeton University Press, 1960) and *On Escalation: Metaphors and Scenarios* (New York: Praeger, 1965), works known for their clinical, hyper-rationalistic theorizing about hypothetically varied ways to fight nuclear wars; Albert Wohlstetter, "The Delicate Balance of Terror," *Foreign Affairs* vol. 37, no. 2 (January 1959), which popularized the notion that making retaliatory forces invulnerable to attack was the key to "crisis stability"; Glenn H. Snyder, *Deterrence and Defense: Toward a Theory of National Security* (Princeton: Princeton University Press, 1961); and Thomas C. Schelling, *The Strategy of Conflict* (Cambridge, MA: Harvard University Press, 1960) and *Arms and Influence* (New Haven, CT: Yale University Press, 1966), theoretical explorations of deterrence, coercion, and stability that are still widely read in the 21st century. A trenchant set of essays is Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Ithaca, NY: Cornell University Press, 1989), which reflects on the many ways that nuclear weapons have changed international politics.

On the role of nuclear doctrines and threats in Cold War crises and alliance diplomacy, see: Marc Trachtenberg, *A Constructed Peace: The Making of the European Settlement, 1945-1963* (Princeton: Princeton University Press, 1999), which dissects the interaction of nuclear strategy, European politics, and diplomacy; David N. Schwartz, *NATO's Nuclear Dilemmas* (Washington, D.C.: Brookings Institution, 1983), which traces the history of nuclear strategic innovations in the western alliance; McGeorge Bundy, *Danger and Survival: Choices About the Bomb in the First Fifty Years* (New York: Random House, 1988), a book that combines the perspective of historian and participant; and Richard K. Betts, *Nuclear Blackmail and Nuclear Balance* (Washington, D.C.: Brookings Institution, 1987), on attempts by the superpowers to use nuclear threats for diplomatic leverage. Essays surveying the reasons for disagreement between nuclear strategists are in Lynn Eden and Steven E. Miller, eds., *Nuclear Arguments: Understanding the Strategic Nuclear Arms and Arms Control Debates* (Ithaca: Cornell University Press, 1989).

On arms control and disarmament, major sources include: Bernard Bechhoefer, *Postwar Negotiations for Arms Control* (Washington, D.C.: Brookings Institution, 1961), a historical overview of efforts to negotiate arms control

agreements in the first phase of the Cold War; Donald G. Brennan, ed., *Arms Control, Disarmament, and National Security* (New York: Brazillier, for the American Academy of Arts and Sciences, 1961), the first major set of essays surveying the logic and prospects for negotiated arms limitation; and Thomas C. Schelling and Morton H. Halperin, *Strategy and Arms Control* (New York: Twentieth Century Fund, 1961), the premier theoretical statement of the mutual deterrence position, reconciling military strategy and nuclear stability through arms control. For a compendium of all nuclear and other WMD agreements actually concluded by the superpowers during the Cold War, see *Arms Control and Disarmament Agreements: Texts and Histories of the Negotiations* (Washington, D.C.: U.S. Arms Control and Disarmament Agency, 1990). A very readable history and analysis of the first major arms agreements between the United States and Soviet Union, which reflects Henry Kissinger's perspective on the events, is John Newhouse, *Cold Dawn: The Story of SALT* (New York: Holt, Rinehart and Winston, 1973); a contrasting version of the history, a memoir by the chief American negotiator, is Gerard Smith, *Doubletalk: The Story of the First Strategic Arms Limitation Talks* (Garden City, NY: Doubleday, 1980). Bruce Berkowitz, in *Calculated Risks* (New York: Simon and Schuster, 1987), presents a critical assessment of arms control in practice along with recommendations for improving it.

Moral and ethical critiques of nuclear strategic ideas can be found in *The Challenge of Peace: God's Promise and Our Response,* Pastoral Letter on War and Peace (Washington, D.C.: National Conference of Catholic Bishops, May 1983), and Joseph S. Nye, Jr., *Nuclear Ethics* (New York: Free Press, 1986). Analytical criticisms rooted in moral disagreement with mainstream official thinking include Philip Green, *Deadly Logic: The Theory of Nuclear Deterrence* (Columbus, OH: Ohio State University Press, 1966) and Anatol Rapoport, *Strategy and Conscience* (New York: Harper & Row, 1964).

On the proliferation of chemical and biological WMD, there has been far less non-technical literature of strategy, policy, and ethical debate compared with the nuclear literature. Since the end of the Cold War, however, with its fixation on problems of coping with tens of thousands of superpower nuclear weapons, the pace has picked up. See Kathleen Bailey, *Doomsday Weapons in the Hands of Many* (Urbana, IL: University of Illinois Press, 1991) and Richard A. Falkenrath, Robert D. Newman, and Bradley A. Thayer, *America's Achilles Heel: Nuclear, Biological, and Chemical Terrorism and Covert Attack* (Cambridge, MA: MIT Press, 1998), the first a useful primer and the second a focused analysis of the potential for mayhem caused by small states and terrorist groups in possession of chemical and biological weapons. Recent ideas focusing on the most potent non-nuclear WMD are in Joshua Lederberg, ed.,

Biological Weapons: Limiting the Threat (Cambridge, MA: MIT Press, 1999). The most up-to-date analytical survey of the issues posed by nuclear proliferation in the non-western world is Victor A. Utgoff, ed., *The Coming Crisis: Nuclear Proliferation, U.S. Interests, and World Order* (Cambridge, MA: MIT Press, 2000).

Endnotes

1. The full range of weapons of mass destruction is also sometimes referred to by the acronym "NBCR," for nuclear, chemical, biological, and radiological.

2. One official study suggested that an airplane delivering 100 kg of anthrax spores under ideal conditions in the Washington, D.C. area could kill between one and three million people. U.S. Congress, Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction: Assessing the Risks*, OTA-ISC-559 (Washington, D.C.: U.S. Government Printing Office, August 1993), 54. Although developing anthrax itself is far easier than manufacturing a nuclear weapon, perfecting the means to deliver anthrax by aerosol, and disseminating it effectively in permissive weather conditions, are extremely difficult.

3. There was much popular apocalyptic literature in the 1950s. The best-known example, which identified nuclear war with the end of the world, was Nevil Shute's novel, *On the Beach* (New York: Morrow, 1957).

4. Sheldon Harris, "Japanese Biological Warfare Research on Humans: A Case Study of Microbiology and Ethics," *Annals of the New York Academy of Sciences* 666 (December 1992).

5. Richard K. Betts, "The New Threat of Mass Destruction," *Foreign Affairs* 77, no. 1 (January/February 1998): 36-38.

6. India, for example, has a large literature (in English) on nuclear weapons and strategy. Examples of extensively developed rationales for an Indian nuclear force include K. Subrahmanyam, ed. *Nuclear Myths and Realities: India's Dilemma* (New Delhi: ABC, 1981) and Rear Admiral Raja Menon, *A Nuclear Strategy for India* (New Delhi: Sage, 2000).

7. For detailed arguments for and against the benign view of nuclear proliferation see Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate* (New York: W.W. Norton, 1995).

8. Alain Enthoven, quoted in Fred Kaplan, *The Wizards of Armageddon* (New York: Simon and Schuster, 1983), 254.