The Illogic of the Biological Weapons Taboo

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In an important monograph published in 1961, Thomas Schelling and Morton Halperin argued that arms control and military policy should be committed to the same fundamental security purposes—preventing war, minimizing the costs and risks of arms competition, and curtailing the scope and violence of war in the event it should occur.[1] The strategists, writing primarily about the budding nuclear age and the missiles then being deployed, additionally emphasized that arms controllers and military planners alike should be committed to developing secure arsenals that do not invite war. In particular, especially vulnerable and dangerously provocative weapons systems should be limited because they might tempt or encourage preemptive or even preventive war. In the preface to the 1985 reprint edition, Schelling and Halperin note that this strategic understanding of arms control "is now widely accepted."[2] Indeed, their strategic logic continues to have significant influence.[3]

Despite the continued utility of the "strategy of arms control," we argue in this article that the international community is constructing an ill-considered and potentially dangerous biological weapons taboo that rebukes its fundamental logic. For decades, states attempted to develop an arms control regime that limited both the acquisition and use of biological weapons. However, efforts to limit biological weapons capabilities have now stalled, even as prohibitions on biological weapons use have been maintained and even strengthened. The resulting regime effectively allows states to retain suspicious capabilities

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An earlier version of this paper was presented at the International Security and Arms Control (ISAC)–International Security Studies (ISS) Annual Conference in Vail, Colorado, 23–25 October 2008. The authors would like to thank Ron Atlas, Daniel McIntosh, and Terry O'Sullivan for their helpful comments.

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that are inevitably viewed as threatening by many of their peers. In turn, relying upon states to uphold a taboo against using these weapons seems increasingly irrelevant in a world where nonstate actors might too readily acquire or develop dangerous capabilities. These developments are particularly worrisome in an international context featuring a large number of states embracing the logic of preventive counterproliferation—and attributing hostile intentions to "evil" or "outlaw" states defined by their domestic political structure, nonsecular leadership, alleged links to transnational terrorist groups, and/or perceived hostility toward other states.

We begin with a brief review of the classic strategic logic of arms control. Next, we provide a description of the evolution of the biological weapons regime, ending with an overview of the 2001 proposed verification protocol to the Biological Weapons Convention (BWC) and subsequent efforts to strengthen the regime. Finally, we conclude with a discussion of the perils of a biological weapons taboo that appears to preserve deadly capabilities while greatly fearing and absolutely prohibiting their use. While many political observers are hopeful that Barack Obama will rebuff the preventive counterproliferation policy emphasized by George W. Bush's presidential administration, we argue that the Obama administration is preserving reckless elements of the so-called Bush Doctrine.

The Strategy of Arms Control

Schelling and Halperin persuasively argued that arms control—including informal or tacit agreements as well as disarmament measures which they subsumed as arms control—should involve collaborative adjustment of military force postures so as to avoid war, minimize the costs and risks of arms competition, and curtail "the scope and violence of war in the event it occurs." As the authors wrote, "The aims of arms control and the aims of national military strategy should be substantially the same" and should "serve the security of the nation."[4] In other words, the goal of arms control should be entirely consistent with the central purpose of a military strategy like deterrence. The preeminent purpose is the reduction of the risk of war, which they claimed could be significantly influenced by the character of the military force posture. As Schelling and Halperin noted, "A main determinant of the likelihood of war is the nature of present military technology and present military expectations."[5] Indeed, the monograph explicitly encouraged security policy makers to think in broad strategic terms about both arms control and military force postures.

Arms control does not mean simply reducing the quantity of accumulated weapons or foregoing all new technological developments. Rather, arms controllers and military planners should be strategists seeking to eliminate the most dangerous kinds of weapons, even as they preserve—and perhaps increase—forces that contribute to security.

According to this logic, if weapons provoke especially perilous responses from a potential opponent, then arms controllers and military planners should seek to limit those weapons in favor of systems that can achieve security objectives like deterrence and stability without the heightened risks. In particular, Schelling and Halperin were concerned with characteristics of weapons that might invite preemptive or even preventive war. In the case of nuclear arsenals, for example, experts in the 1970s and early 1980s debated whether land-based missile systems make for especially vulnerable and tempting first-strike targets. Historically, these arms have often been vulnerably deployed in fixed silos and featured capabilities that make them especially threatening to a foe—very accurate guidance systems and substantial warhead throw weight that assures significant hard-target kill capability.[6] Such systems are viewed as far more dangerous and confrontational than are more mobile and survivable weapons that are more likely to be perceived as second-strike retaliatory systems, such as long-range bomber forces or nuclear-armed submarines. Schelling and Halperin also argued that arms control can reduce the risk of accidental war, primarily via improvements in command, control, and communication.

Against the backdrop of the Cold War, the strategic approach to arms control emphasized and urged joint American-Soviet management of military capabilities rather than political efforts to reduce hostile intentions.[7] Reducing the "capabilities for destruction" is a central goal of arms control, after all, and Schelling and Halperin devoted most of their attention to the manipulation of armaments to reduce the incentives for war. Put differently, the strategists emphasized the "direct relation of arms control to the military environment" rather than to the political or psychological realm. They did not promote arms control primarily as a "confidence building measure" (CBM), even though they recognized that arms control might "create confidence and trust."[8] By Holst's classic definition, CBMs are "arrangements designed to enhance such assurance of mind and belief in the trustworthiness of states and the facts they create;" thus, arms control might serve to increase "the trustworthiness of the announced intentions of other states in respect of their security policies."[9] Yet, Schelling and Halperin

pointed out that arms control might in some circumstances "create suspicion and irritation" and thus "worsen tensions rather than relieve them."[10] This seems to have been a prescient forecast about contemporary politics as many states worry that other states might develop arsenals that call into question their nonproliferation commitments. Estimates of another state's intentions are "necessarily . . . uncertain," emphasize Schelling and Halperin. By contrast, "Measures reciprocally [structured] to reduce capabilities for preclusive attack may help" all parties in an arms agreement.[11]

Given this emphasis on manipulating capabilities rather than intentions, the strategic approach to arms control is consistent with well-known theories of international relations (IR). Most prominently, many realists have long argued, as John Mearsheimer recently did, that "states can never be certain about other states' intentions. . . . intentions are impossible to divine with 100 percent certainty." He continued, "Potential adversaries have incentives to misrepresent their own strength or weakness, and to conceal their true aims."[12] Realists, therefore, focus on the material capability of states "to threaten each other," and such tangible means are said to be the "key factor that drives fear levels up and down."[13] While classic realists like Hans Morgenthau built an IR theory around national interests and human nature (a "will to power"), they nonetheless generally agree that state intentions are difficult to ascertain. Interests for Morgenthau were defined in terms of power, which is primarily evaluated in terms of a state's material capabilities. It "is both futile and deceptive," argued Morgenthau, to search for motives "because motives are the most illusive of psychological data, distorted as they are, frequently beyond recognition, by the interests and emotions of actor and observer alike."[14]

In sum, strategists view arms control as a mechanism for achieving primary security goals, such as reducing the likelihood and costs of war. Additionally, arms control should be primarily concerned with manipulating material capabilities rather than signaling or understanding national intentions. States fear accumulated capabilities, largely because intentions are very difficult to determine.

Limiting Biological Weapons: Arms Control or Taboo?

This section briefly surveys the history of efforts to limit the development and potential use of biological weapons. The evidence reveals that initial arms control efforts in this area sought only to restrict the use of these "poison" weapons. Ultimately, the agreements were broadened to limit capabilities as well. The most recent changes, however, reflect a form

of backtracking. Arguably, stymied by states' failure to agree about verification procedures, a sweeping arms control and disarmament regime has been transformed into a taboo that attempts primarily to preclude the use of bioweapons. Contemporary limits on capabilities have been weakened politically, and the prospects for stronger limits do not look good.

Attempts by mankind to utilize human disease as a weapon of war has an ancient lineage. According to Thomas J. Johnson, "The use of biological pathogens—bacteria, viruses, fungi and toxins—to kill or incapacitate one's enemies has a long pedigree that includes not only Scythian arrows, but the poisoned wells of Sparta, Persia, Rome and others."[15] Before the advent of modern medical science, combatants projected infected human corpses into enemy encampments, released plague-infested rats, or distributed contaminated clothing to civilian populations in the hopes of spreading human disease to the enemy.[16] Largely because of the lack of medical and scientific knowledge at the time, these crude methods of biological warfare were of limited military effectiveness. However, the discovery of the germ theory for human disease in the nineteenth century potentially changed how biological warfare could be waged. The introduction of the agar plate and sterile technique methods made it possible for scientists to isolate pathogenic bacterial strains. While the development of closed sterile fermentation processes during the 1940s allowed scientists to grow large-scale quantities of microbes for the production of vaccines and antibiotics, it also became possible for medical scientists to harness the reproductive power of human pathogens for military means. Furthermore, the advent of recombinant DNA technology in the 1970s bestowed upon scientists the power to manipulate the genes of microbes. While recombinant DNA technology made it possible to produce human insulin on a large scale, it also provided the potential means for scientists to produce more infectious pathogens through the use of genetic manipulation. Indeed, the reproductive capacity of bacteria and viruses make such organisms more deadly on a per-weight basis than conventional or chemical weapons.

Ultimately, the discovery, production, and utilization of chemical weapons in wartime provided the impetus for banning the use of biological weapons. In the public mind, the histories of chemical and biological weapons are linked.[17] Both types of weapons were first discovered in research laboratories, although chemists were much further along in developing chemical weapons during the late nineteenth and early twentieth centuries than biologists or medical scientists were with biological armaments. In any case, the scientific achieve-

ment of creating poison gases instigated the first international attempts to ban the use of chemical weapons during war. A similar ban on bioweapons eventually followed.

A relatively small group of states, most of them European, attempted to draft international rules restraining the conduct of war at the First Peace Conference at The Hague in 1899. The discussion at this conference was aimed at limiting the use of certain newly developed weapons—including submarine mines and torpedoes, balloons, and explosives. All warfare and weapons are potentially deadly; thus, the conference focused on reducing "the excessive armaments which weigh upon all nations." According to Richard Price, "Technologies were not regarded as in and of themselves immoral; their moral value was understood to depend upon how they were used."[18] Chemical weapons were treated uniquely as an absolute ban was applied only to chemical weapons and dum-dum bullets. The ban on chemical weapons was reaffirmed at the second Hague Conference of 1907. The conferees failed to enact the other parts of the arms control agenda outlined for the meeting.

The Hague Conference results can be viewed as extraordinary because chemical weapons had not been fully developed and, in fact, had not yet been used in battle. Usually, newly implemented technologies of war are denounced by victims, or by competitors who lack these new weapons. In this case, the conferees proscribed an undeveloped and untried military technology.[19] Unfortunately, the chemical weapons ban included no enforcement mechanism, and this shortcoming became crucially important during World War I as foes in the conflict used chemical weapons on a large scale. In turn, reports from the warfront about the use of chemical weapons painted pictures of horror for civilians back home. Indeed, contemporary accounts, which revealed significant casualties from the use of chemical agents, undoubtedly influenced the debate about the status of such weapons:

> During the World War a total of about 100,000 tons of gas was used by the various nations involved. The gas casualties produced have been estimated at 534,000 for France, Great Britain, the United States, Italy and Germany and of those casualties approximately 4.2 percent resulted in death. As regards Russia the facts are uncertain. Her troops were poorly protected against gas, however, and suffered heavily; the gas casualties in the Russian armies have been estimated at 475,000, of which 11.7 percent resulted in death.[20]

Today, it is estimated that about 1.3 million people were injured and over 90,000 died as a result of gas use in the First World War.[21] France, Ger-

many, Great Britain, and the United States employed these weapons during the conflict.

Public disgust with the use of chemical weapons in WWI pushed states to further limit their potential use. After the war, in fact, states held a series of international peace and disarmament conferences in hopes of limiting the awfulness of armed conflict. One tangible product of these meetings was the Geneva Protocol of 1925, which reaffirmed the ban on the use of chemical weapons. This agreement also included a prohibition on the use of biological weapons—then typically called bacteriological weapons—in warfare. The formal *Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous, or Other Gases, and of Bacteriological Methods of Warfare* (Geneva Protocol) did not restrict biological weapons research programs, nor did it bar the development and stockpiling of bioweapons. Furthermore, states that signed and/or ratified the Protocol insisted on maintaining a right to retaliate in-kind if they were attacked with biological or chemical weapons. Many nations used this opening as an entryway to develop bioweapons. As noted by Jeanne Guillemin, France started a biological weapons research program in 1921 and continued it until 1940. Japan began a biological weapons program in 1929, and the Soviet Union initiated a biological weapons program in the 1930s.[22]

British and US biological weapons programs were precipitated by the behavior of other major powers during World War II.[23] Following the familiar logic of the security dilemma, Britain and the United States acted out of fear that Germany and Japan were working to develop biological weapons. In order to have a retaliatory capacity against potential biological weapons attack, "the US Army established a biological warfare research program in 1941 through its Chemical Warfare Service."[24] As explained by biological weapons specialist Jonathon Tucker, this biological warfare research program was initiated "despite the deeply rooted international norm against the military use of poison and disease."[25] The Allied victory at the end of WWII did not eliminate fears related to the potential use of biological weapons. The Cold War competition with the Soviet Union motivated the United States, for example, to continue its efforts to develop biological weapons. In fact, recent scholarship notes that the US government enacted policies to place biological warfare research on par with the far more prominent nuclear weapons program.[26] At its height in 1969, the US biological weapons program employed approximately 3,000 scientists, technicians, and other workers.

In due course, events in the 1960s conspired against supporters of the US biological weapons program. For example, American military forces utilized tear gas and herbicides during the Vietnam War on a massive scale.[27] The executive branch argued that the use of these agents did not violate the Geneva Protocol because the treaty ostensibly banned only lethal chemical weapons. However, an overwhelming number of UN General Assembly member states condemned the American interpretation as contrary to international law.[28] Moreover, domestic critics of this policy and rationale, including many prominent congressional figures, pointed out the fallacy of nonlethality. Tear gas and herbicides were employed to roust enemy combatants from cover or to control rioting in South Vietnam. Reports from Vietnam revealed that helicopters targeted large numbers of tear gas grenades on Vietcong strongholds, a tactic which was followed immediately by B-52s dropping high-explosive or antipersonnel fragmentation bombs. The attacks seemed to be conducted to flush out those hiding in tunnels (whether civilian or combatants), to incapacitate them with gas, and then to wound or kill them with bombs rather than to capture them. This tactic appeared to be wholly inconsistent with the humanitarian justifications offered publicly by the United States.[29]

Additionally, accidents during testing and transport publicly highlighted the dangers of poison weapons.[30] Because of the perceived link between biological and chemical weapons, negative press on chemical weapons usage and development spilled over to taint the biological weapons research program as well. In fact, public outcry over the use of chemical weapons led the Congress in 1967 to begin hearings on US chemical and biological weapons programs. Moreover, the Nixon administration ordered a review of those programs, which continued to be linked together.[31] The review concluded that the United States should forgo the development and use of biological weapons. As a follow-up, President Nixon announced in 1969 that the United States would unilaterally destroy its stockpile of biological weapons, though the US government would continue a small defensive research program. Nixon's words were soon followed by visible and concrete disarmament actions. From May 1971 to May 1972, the Department of Defense destroyed its antipersonnel biological agent stockpiles stored at the Pine Bluff Arsenal in Arkansas, "including 220 pounds of dried anthrax bacteria, 804 pounds of dried tularemia bacteria, 334 pounds of dried Venezuelan equine encephalitis (VEE) virus, 4,991 gallons of liquid VEE viral suspension, 5,098 gallons of Q fever rickettsia suspension, and

tens of thousands of munitions filled with biological and toxin agents and stimulants."[32] Furthermore, the Pentagon cut the biological research budget in half—from $20 million per year to $10 million—and switched the focus of the programs exclusively to defensive purposes.

The Nixon administration also successfully negotiated the Biological Weapons Convention of 1972, which was accomplished in a UN disarmament forum. President Nixon and other administration officials involved with the negotiations often emphasized Washington's desire to prohibit the use of biological weapons under any conditions.[33] However, the BWC banned the development and stockpiling of biological weapons as well. It was signed and ratified by the United States and many other countries, becoming effective in 1975. As of March 2009, 163 states are parties to the treaty. John Parachini of RAND describes the BWC, along with the chemical weapons convention (which went into force in 1997), as "declarations that the international community bans germ and chemical weapons as taboo instruments of war."[34] In fact, the 1972 Biological Weapons Convention is considered the first multilateral disarmament treaty banning the production and use of an entire category of weapons. It arguably reflects a strong international normative consensus as biological weapons programs were stripped of any claim to military legitimacy. Essentially, any nation pursuing an offensive program had to do so secretly and illegally. Unfortunately, at the time the treaty was completed, this was not considered an especially onerous task. As authors Marie Chevrier and Iris Hunger note, "Effective verification was thought to be impossible, and the treaty was therefore given quite modest provisions to address compliance issues."[35] Nonetheless, the total prohibition of the development and possession of biological weapons distinguishes this second phase of bioweapons arms control from the first. Under the prior Geneva Protocol, as noted, neither the development nor the possession of such weapons had been outlawed.[36]

Activists who viewed biological weapons as immoral applauded Nixon's decision to end American involvement in offensive biological weapons development, but the policy reflected strong strategic considerations as well. First, National Security Advisor Henry Kissinger emphasized that the unpredictability of biological weapons limited their utility for retaliation and deterrence; hence, their greatest value was as a first-use weapon.[37] Potentially, such an attack could be quite devastating as relatively small quantities of biological agents could infect thousands of people (or more), create a genuine health care emergency, and thereby incite national panic.

Second, Nixon and his advisors sought to prevent a biological arms race with non–status quo nations, or so-called challenger states.[38] Then, as now, the United States viewed biological weapons as "a poor nation's weapon of mass destruction," and officials recognized great potential American vulnerability to deadly attack.[39] In comparison to nuclear weapons, for instance, bioweapons are both easier and less expensive to manufacture and require almost undetectable laboratory space. The estimated capital infrastructure cost of a 200-square-foot laboratory to produce anthrax is estimated to be around $220,000 dollars.[40] Low economic costs may lend an allure to biological weapons as an easy pathway to power for challenger states that lack the economic resources for nuclear weapons development and production, which is infrastructure heavy and almost surely requires a minimum investment of billions of dollars.[41]

In addition to their low cost, biological weapons are potentially attractive to challenger states because they represent a knowledge-intensive enterprise. The expertise for biological weapons development is based upon research that is widely disseminated by government agencies, universities, and other scientific organizations for the purpose of stimulating scientific process or finding practical applications to human medicine. Vaccine development and biological weapons programs alike utilize the same highly desired biotechnology. Conceivably, challenger states could use legitimate pharmaceutical manufacturing sites intended for vaccine production as cover for biological weapons research and development.[42] Indeed, tens of thousands of scientists and technicians all over the world already possess some of the basic knowledge necessary to perform biological weapons research.[43]

The dual development problem is not merely a theoretical concern. As former Russian president Boris Yeltsin publicly acknowledged in 1992, the Soviet Union grossly violated the terms of the BWC by actively weaponizing several human pathogens as part of a clandestine biological weapons program.[44] Though the Soviet Union was an advanced industrial state, its subterfuge in this area could be emulated and duplicated by smaller and poorer nations. In fact, though Iraq signed the BWC in 1972, the Iraqi government, too, hid a secret biological weapons program under the guise of legitimate pharmaceutical research. This was not discovered by the rest of the world until inspectors entered Iraq after the Persian Gulf War in 1991. The apparent Soviet and Iraqi ability to avoid treaty limits on research and development casts significant doubt about the ability of the BWC to provide meaningful limits on bioweapons proliferation.

The Verification Protocol to the BWC

Given the violations of the BWC by nations that ratified the treaty and the continued expectation of scientific advances in biotechnology, the Third Review Conference of the BWC in 1991 recommended convening a group of scientific and technical experts (called "VEREX," for verification experts) to consider verification procedures for biological research programs. Based upon carefully agreed parameters, the VEREX group soon recommended and established a forum for negotiating legally binding verification methods for the BWC. This forum, known as the Ad Hoc Group, worked from 1995 to 2001 to draft a protocol creating meaningful new verification procedures.[45] In 2001, the final draft was presented to the membership of the BWC for consideration. However, the United States rejected the draft protocol that July and called for terminating the Ad Hoc Group at the December meeting of the parties. The United States objected to the proposed verification regime, primarily because it viewed the planned procedures as insufficient for detecting cheating, though officials also argued that the procedures would be prohibitively expensive and unworkable. Amb. Donald Mahley, the US special negotiator for chemical and biological arms control issues, argued in 2001 that no accurate, timely, or comprehensive inventory of potential bioweapons facilities could be compiled given the fact that almost any serious biological research facility would be "capable under some parameters, of being diverted to biological weapons work. Trying to catalog them all would be tantamount to impossible."[46] Moreover, American officials often claimed that the procedures would jeopardize trade secrets of the pharmaceutical industry and compromise the security of US biodefense programs. Critics of the US position argued that the superpower obstinately and severely damaged efforts to build an effective biological weapons regime based on arms control and disarmament.[47] US officials responded by pointing to proposed substitute measures that would further criminalize bioterrorism, strengthen export controls, and encourage non–legally binding compliance protocols. In general, however, as shall be explored more extensively in the following section, the United States all-too-often highlights "the issue of BWC compliance solely by 'naming names' of countries it suspects of violations."[48]

The US suggestion to criminalize bioterrorism was adopted unanimously by the UN Security Council in April 2004. Specifically, UNSC Resolution 1540 obligates states "to refrain from supporting by any means non-State actors from developing, acquiring, manufacturing, possessing,

transporting, transferring or using nuclear, chemical or biological weapons and their delivery systems." Additionally, Resolution 1540 imposes binding obligations on all states "to establish domestic controls to prevent the proliferation of nuclear, chemical and biological weapons, and their means of delivery, including by establishing appropriate controls over related materials."[49] Finally, the resolution also encourages additional international cooperation on existing nonproliferation measures.

A 1540 Committee was established to collect written reports from UN member states and to establish a database to evaluate states' efforts to implement the resolution. So far, implementation of UNSCR 1540 has been mixed. By the end of the first deadline for submitting comprehensive reports, only 54 states had reported to the 1540 Committee.[50] While some states provided detailed and lengthy reports on their governments' efforts on nonproliferation of nuclear, chemical, and biological weapons, others filed cursory documents that arguably failed to address their obligations. Reporting requirements in this area may be useful, but Resolution 1540 simply makes clear that the international community opposes state transfer of biological weapons to nonstate actors. In Article II, the BWC already broadly prohibits the development of biological weapons; thus, this self-reporting requirement was not a giant leap forward in arms control. Moreover, without an effective verification mechanism, many states will continue to be concerned about shadowy connections between "rogue" regimes and terror networks.[51]

A number of cynical analysts and scientists accuse the United States and other advanced states of opposing a verification protocol because they covertly possess advanced biological weapons capabilities.[52] If spotlighted, such capabilities could undermine the arms control regime. Setting aside this accusation, even defensive (or "protective" in the words of the BWC) and thus technically legal research potentially invites the collapse of the biological weapons arms control regime. Put simply, biological research programs in the United States, Europe, and throughout the developed world are vast in scope and serve to highlight the problem of dual development. In the guise of defensive biowarfare, for example, the United States has constructed a vast research base constituted by an impressive infrastructure of labs and equipment. The anthrax attacks of fall 2001, particularly if they were the work of a single attacker—as the FBI has concluded—at a minimum reveal that American scientists working in defensive biological weapons programs can produce bioweapons with deadly capabilities. This

is no small matter. As Ambassador Mahley pointed out when explaining the US rejection of the BWC verification protocol, America has "tens of thousands" of facilities "potentially relevant to the Convention."[53] Presumably, the world's other advanced industrial states likewise have thousands of technical facilities with "dual use" capability. Analysts at the Center for Arms Control and Non-Proliferation worry that US biological weapons research "appears to be encouraging increased biodefense research around the world. Such research is precisely the type that raises the greatest dual-use concerns." The center's statement continues:

> Even worse, because of their dual-use nature, biodefense activities undertaken as a hedge against technological surprise and the unpredictability of potential adversaries can generate significant uncertainty among outside observers about their true intent. This problem is most severe for threat assessment research, which is usually conducted in secret.
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> Secrecy in biodefense is increasing, both in the United States and around the world. Secretive biodefense activities threaten to provoke a very real biological arms race as countries react to the suspected capabilities and activities of others and seek to anticipate and counter potential offensive developments by potential adversaries.[54]

Because of the failure to secure biological weapons disarmament, the existing flawed arms control regime could soon collapse and bioweapons capabilities could proliferate widely.

On the plus side of the equation, the supplies and equipment necessary for large-scale biological dual-use research and development are primarily produced by a small number of technologically advanced states.[55] At present, only a few states possess the means for large-scale vaccine production.[56] Lacking domestic suppliers, challenger states interested in biological weapons, especially those in the global south, will have to rely upon international sources to obtain dual-use supplies and equipment. For those nations, such dependency upon international sources creates a potential bottleneck for the proliferation of biological weapons. States that possess the means for large-scale production of bioweapons effectively control access to dual-use biotechnology. These biotechnology supplier states can restrict or even deny the sale or transfer of dual-use biotechnology to developing ones, especially to those deemed as potential challengers.

Indeed, the so-called Australia Group (AG), an informal arrangement of states created in 1985, exploits such bottlenecks by relying upon export controls and licensing measures to limit the proliferation of chemical and biological weapons.[57] The AG originally focused on chemical weapons pro-

liferation but turned its attention to biological weapons in the early 1990s after disclosures about the illicit Iraqi program. One serious weakness of the AG is that Russia, with its dubious history of noncompliance with the BWC, does not belong to the group. Challenger states might also be able to evade the AG by "using transshipment points and shell companies."[58] Unfortunately, the AG is a voluntary consultative regime and member states are under no legally binding agreement to adhere to the established export controls on dual-use biotechnology. This lack of specific enforcement provisions makes it somewhat likely that states will eventually have to rely upon interdiction at sea to assure compliance. More than 90 states are partners of the Proliferation Security Initiative (PSI), in fact, which promises to force confrontations between member-state naval vessels and ships carrying cargo from rogue states.[59] Alleged "outlaws" targeted by the AG and the PSI will undoubtedly complain about great-power application of double standards to maintain oligopoly control of biotechnology. Moreover, while the purpose of such actions would be to seize technologies capable for use to develop "weapons of mass destruction" (WMD), it is certainly possible that such confrontations could provide the kind of concrete evidence about proliferation that would lead worried states to undertake more dangerous preemptive or preventive military actions.

Some legal scholars note that despite the breakdown of the verification protocol and the technological weakening of the arms control regime, various states have taken measures to strengthen the taboo against bioweapons use. Primarily, this has been accomplished by states withdrawing their previous reservations to the original Geneva Protocol and thereby renouncing their right to retaliate in-kind to a bioweapons attack.[60] Most recently, the state parties to the BWC met in Geneva in 2006 for the Sixth Review Conference on the treaty. The results of this conference were unremarkable, as states did not agree to new verification procedures. Rather, states are supposed to adopt "national measures" to implement BWC prohibitions and to establish and maintain security and oversight over pathogenic microorganisms and toxins. Conferees also called for enhanced international capabilities for "responding to, investigating and mitigating the effects of cases of alleged use of biological or toxin weapons or suspicious outbreaks of disease" and "strengthening and broadening national and international institutional efforts and existing mechanisms for the surveillance, detection, diagnosis and combating of infectious diseases affecting humans, animals, and plants." In addition to these health-related

measures, states are supposed to develop and adopt codes of conduct applicable to their scientists.[61] Finally, the parties reaffirmed all articles of the BWC. To facilitate confidence-building measures and assist in administrative duties with regards to the BWC, the member states agreed to establish an implementation support unit in Geneva. Again, however, the final document did not include a legally binding verification protocol for the bioweapons treaty. Clearly, despite the wishes of many other states, the United States continues to be sufficiently powerful to preclude any agreement requiring on-site inspections of potential biological weapons facilities.[62] Bioweapons specialist Jonathan Tucker recently pointed out that the Democratic Clinton administration did not act forcefully to battle domestic interests opposed to a strict bioweapons verification regime—and that those interests became even more powerful in the George W. Bush era. As a result, Tucker is not optimistic that the new political administration in Washington will alter the US negotiating position.[63]

As demonstrated throughout the last two sections, states have long attempted to develop arms control and disarmament measures that limit both the acquisition and the use of biological weapons. However, the latest efforts to limit biological weapons capabilities by the creation of a verification protocol have been effectively abandoned, even as the normative taboo against the use of these weapons has remained in place—and been strengthened. Recent efforts to limit capabilities, such as UNSC Resolution 1540, the Australia Group, and the Proliferation Security Initiative, are arguably linked fairly directly to so-called counterproliferation strategy.[64] These measures address state capabilities but are intended to focus on specific national regimes allegedly tied to terrorists. As will be shown in the concluding section, this is a worrisome development given that more and more states have signaled their willingness to embrace military counterproliferation tactics that would feature anticipatory attacks against specific "outlaw" states that they believe will use WMDs. The next section explains the strategic implications of a biological weapons taboo in an era of counterproliferation and a global "war on terrorism."

The Dangers of a Bioweapons Taboo

Utilization of biological, chemical, or nuclear weapons is now generally understood to be abhorrent and illegitimate. In an interesting and growing literature, a number of scholars of international relations have examined the development of taboos that prohibit the use of these weapons of mass

destruction.[65] Their research explains how the taboos developed over time and came to be widely shared in world politics. In his study of the chemical weapons (CW) taboo, for instance, Richard Price identifies a "tradition of practice that forbids the use of CW and characterizes it as abnormal behavior among the society of states."[66] Price points out that these weapons are uniquely stigmatized among "countless cruel technological innovations in weaponry."[67] Similarly, Nina Tannenwald examines the development of "a normative prohibition on nuclear use," widely acknowledged as a "nuclear taboo," which has proven "essential to explaining why nuclear weapons have remained unused."[68] Numerous scholars and policy actors have similarly referenced a long-standing taboo against biological weapons use.[69]

A taboo prohibiting use of a particular kind of weapon is not the same as an arms control prohibition banning the production or maintenance of weapons capabilities. In fact, the taboo outlawing nuclear use explicitly does not extend to development and deployment of those weapons. As Tannenwald notes in regard to nuclear weapons, it is "easier to ban the use of nuclear weapons than to ban the weapons themselves."[70] Though great powers promised under Article VI of the Nuclear Non-Proliferation Treaty to negotiate "in good faith" towards "nuclear disarmament," their disinterest in that outcome clearly limits the overall meaning of the taboo banning nuclear use. For example, the prohibition against nuclear use has certainly not eliminated all security fears related to the proliferation of nuclear weapons. Throughout the nuclear era, activists and analysts alike have worried that the existence of atomic weapons poses a real threat to global security. Nuclear anxiety clearly undergirded the 1950s efforts to ban the bomb, the 1980s attempts to establish a nuclear freeze, and growing post–9/11 acceptance of the logic of preventive attacks. In the case of the overall nuclear weapons regime, however, the force of a taboo is obviously strengthened by the reality of deterrence.

In contrast, the current biological weapons regime is overly reliant upon the taboo against use, making it ill-considered and potentially antithetical to security goals. First, biological agents produce a less detectable production and delivery "footprint," making retaliation (and thus deterrence) much more difficult and problematic.[71] Effectively, the current international regime allows many states to retain bioweapons capabilities that will be viewed by other states as illegal, immoral, and threatening. This is especially worrisome in a global context that finds various state leaders publicly challenging deterrence theory, embracing the logic of preventive war, and

attributing hostile intentions to other states—occasionally labeled as evil, rogue, or outlaw countries—because of their domestic political structure, nonsecular leadership, alleged links to transnational terrorist groups, and/or perceived hostility to other states.[72] As John Borrie of the UN Institute for Disarmament Research (UNIDIR) predicted at a September 2005 briefing about the Biological Weapons Convention, "Understanding hostile intent [is] going to become more important than merely recognizing where capacity exists, because the latter will become widespread."[73] In August 2009, Amb. Kenneth Brill, director of the National Counterproliferation Center, suggested that this forecast future had arrived. He pessimistically summarized the spread of dual-use biological technologies and declared, "To put it plainly then, the WMD proliferation challenge in the 21st Century is keeping states and nonstate actors from doing what they *can* do if they *choose* to do so . . . we are dealing with WMD counterproliferation as more than a technical issue and increasing the emphasis on issues like intentions and motivations."[74]

Ultimately, we do not argue for complete rejection of the current biological weapons taboo. We do worry, however, that additional bioweapons proliferation seems inevitable, particularly if states do not adopt more sweeping arms control measures. We attempt to demonstrate the additional great need for an arms control and disarmament component of the regime that might altogether eliminate bioweapons and extend the meaning and scope of the taboo. The current bioweapons taboo against use needs to be paired with meaningful arms control to form a regime and strengthened taboo resembling the efforts to limit chemical weapons proliferation and use. Precisely because biological weapons attacks are considered abhorrent, states will continue to fear the development and potential use of these weapons. Failure to control the proliferation of biological weapons capabilities could substantially increase the likelihood of war as states pursue counterproliferation policies that will attempt to prevent surprise attacks. Indeed, the United States and other nations may well have already embraced national strategies that exhibit zero tolerance for bioweapons proliferation—at least toward worrisome challenger states. The counterproliferation initiatives and preventive war threats embraced by the United States have to date been tied to alleged intentions of certain rogue states to pursue weapons of mass destruction rather than to specific material capabilities. In addition to developing the regime to include more sweeping arms control and disarmament measures, we would call on states

to use great caution before launching anticipatory strikes against other states. Indeed, states should reduce the risks tied to the current taboo by using multilateral mechanisms to determine the gravity of threats and to decide appropriate solutions to those threats.

It seems clear that many states possess or will soon develop bioweapons capabilities that other states view as threatening. In August 2002, then–US undersecretary of state for arms control and international security John Bolton declared, "The United States believes that over a dozen countries are pursuing biological weapons."[75] The James Martin Center for Nonproliferation Studies (CNS) similarly estimates that 14 states maintain active biological weapons research programs: Algeria, China, Cuba, Egypt, India, Iran, Israel, Libya, North Korea, Pakistan, Russia, Sudan, Syria, and Taiwan.[76] From that list, the US government has long accused Cuba, Iran, Libya, North Korea, Sudan, and Syria of sponsoring terrorism, though Libya and North Korea were recently removed from the official State Department listing.[77] Potentially, the roster of states pursuing worrisome WMD capabilities of any type could be much longer and the threshold for implementing counterproliferation policies concomitantly lower. Former US special advisor David Kay, who originally led the Iraq Survey Group effort to locate WMD, told Congress in January 2004 that "probably 50 countries" are developing "weapons of mass destruction–related program activities."[78] In his 2004 State of the Union address, then-president George W. Bush used that exact phrase to describe Iraqi WMD developments and to justify in hindsight the US decision to go to war. Indeed, Bush reminded his audience that a crucial "part of the offensive against terror" involves "confronting the regimes that harbor and support terrorists, and could supply them with nuclear, chemical or biological weapons."[79]

As Schelling and Halperin explained decades ago, certain weapons systems seem especially threatening to other states and might provoke war. Such weapons should be the prime concern of arms controllers. Arguably, biological weapons pose exactly this kind of threat—feared especially by the United States in recent years, but by other states as well. The very political leaders who might decide to use force to counter the risks posed by tyrannical regimes or suicidal terrorists argue that deterrent threats will be insufficient.[80] For this reason, since 2001, under the so-called Bush Doctrine, the United States has threatened to attack states that it fears might use WMDs or transfer these arms to terrorists. In December 2002, the Bush White House released a *National Strategy to Combat Weapons of*

Mass Destruction that declared simply, "We will not permit the world's most dangerous regimes and terrorists to threaten us with the world's most destructive weapons."[81] The 2002 *National Security Strategy of the United States of America* was even more direct about the need for preventive action "to stop rogue states and their terrorist clients before they are able to threaten or use weapons of mass destruction . . . even if uncertainty remains as to the time and place of the enemy's attack."[82]

It is important to note that the Bush White House was neither the first nor the last US administration to threaten war or preventive strikes because of the proliferation of WMD. Moreover, the United States is not the only state to threaten proliferant states with preventive war. As Scott Sagan and Marc Trachtenberg have documented, many US government officials supported preventive war options against new Soviet nuclear capabilities during the 1950s and against other subsequent proliferants.[83] For example, John F. Kennedy's administration "came dangerously close" to ordering strikes against nascent Chinese nuclear capabilities in 1963.[84] Somewhat more recently, ad hoc hostility to new proliferant states was turned into a more concrete antiproliferation policy. In December 1993, Bill Clinton's then–secretary of defense Les Aspin announced a defense counterproliferation initiative, which the DoD defined even then as a mission in "support of proliferation prevention and intelligence activities; deterring the use of nuclear, chemical, and biological weapons; defending against such weapons and their effects; and maintaining a robust ability to find and destroy delivery forces and infrastructure elements with minimum collateral effects, should this become necessary."[85] Secretary Aspin noted that counterproliferation provided "a military planning process for dealing with adversaries who have weapons of mass destruction. And our concerns are by no means limited to the nuclear threat." He noted, for instance, a new effort "to oversee all DoD biological defense programs."[86] Historian Marc Trachtenberg points out that the Clinton counterproliferation policy was tested in 1994 when he colorfully concludes that "the smell of war was in the air" vis-à-vis North Korea. He claims, in fact, that "the policy the Clinton administration pursued toward North Korea in 1994 was cut from the same cloth as the Bush strategy."[87] Apparently, the central difference between the Clinton and Bush strategies is that the more recent administration was more overt about its plans in the post–9/11 era and actively sought to emphasize "counterproliferation" rather than traditional nonproliferation strategies, which at least partly reflected the Bush

government's publicly stated doubts about the utility of arms control.[88] The Proliferation Security Initiative is effectively a formalized organizational measure, backed by the US Navy and nearly 100 states, which will assure continuation of counterproliferation strategy into the future.

Will Pres. Barack Obama abandon counterproliferation, or has he, too, threatened to use preventive military measures against such threats? While it seems likely that the Obama administration will not refer publicly or admiringly to a "Bush Doctrine," the new president has frequently signaled that he shares his predecessors' worries about the threats posed by biological and nuclear weapons—and the need to take the offensive against the states and their potential terrorist partners that pose these threats. His 2008 campaign document on *Confronting 21st Century Threats* listed "biological attacks," along with nuclear weapons and cyber warfare, as "three potentially catastrophic threats" faced by the United States.[89] At a Purdue University Summit on Confronting New Threats, Obama claimed that "the successful deployment of biological weapons . . . could kill tens of thousands of Americans and deal a crushing blow to our economy."[90] Moreover, like many within the Bush national security team, Obama has expressed concern that "there are certain elements within the Islamic world right now that don't make those same calculations" that the Soviet leadership did about the basic logic of deterrence ("they don't want to be blown up, we don't want to be blown up").[91] In an interview with the *Chicago Tribune* in 2004, Obama specifically worried about an inability to deter radicals within Iran and Pakistan.

Moreover, President Obama has often expressed a willingness to use force to address threats posed by rogue states and terrorists. Echoing Bush, Obama has frequently said that he "won't take any options off the table, including military, to prevent" one worrisome "game changing" scenario—Iran "obtaining a nuclear weapon."[92] To define precisely what this might mean, Secretary of State Hillary Clinton openly speculated in June 2009 about a United States "first strike" against Iran like the prior attack on Iraq to remind Tehran that "their pursuit of nuclear weapons will actually trigger greater insecurity."[93] President Obama has similarly said he would act preventively against biological threats. In an interview with *Arms Control Today*, he noted, "To prevent bioterror attacks, I will strengthen US intelligence collection overseas to identify and interdict would-be bioterrorists before they strike."[94] In the case of Pakistan, where Osama bin Laden and other al-Qaeda terrorists have apparently fled, candidate Obama pointed

to a willingness to strike against "al-Qaeda in their [Pakistani] territory . . . if they could not or would not do so, and we had actionable intelligence." He continued with a more sweeping statement a few moments later: "My job as commander in chief will be to make sure that we strike anybody who would do America harm when we have actionable intelligence to do that."[95] Even though Obama embraces the traditional international legal standard limiting the ability to strike other states to cases when the United States faces an "imminent threat," he has written that "al-Qaeda qualifies under this standard, and we can and should carry out preemptive strikes against them whenever we can."[96] In practice, the Obama administration has continued the Bush policy of making strikes inside Pakistan using Predator drone aircraft armed with missiles. Indeed, the current administration reportedly expanded attacks well beyond tribal border areas more deeply into Pakistan.[97]

The United States is certainly not the only country that has embraced preventive counterproliferation and counterterrorism policies in the post–9/11 era. Dombrowski and Payne find that while "views expressed by other states do not align perfectly with the positions held by US officials," who embrace a rationale for preventive war, "they do suggest that the international community is beginning to embrace some of the Bush Doctrine's underlying logic. A sizeable number [of states] seem to agree that the risk of calamitous surprise attacks, especially with chemical, biological or nuclear weapons, might well justify preventive strikes against terrorists or preventive wars against their state sponsors."[98] The United Kingdom, Italy, and Australia willingly joined Washington in its attack on Iraq and used much the same rationale for publicly justifying this action. Israel has threatened to attack Iran, and both Russia and India have at times openly admired the logic of America's counterproliferation initiatives. In all, Dombrowski and Payne find that the world seems to be embracing a new international norm allowing preventive strikes to address threats associated with weapons of mass destruction.

These counterproliferation policies are particularly worrisome when threats are said to be defined by perceived hostile intentions rather than by imminent military threats. In fact, by linking alleged threats to national regime type, the United States and other states have embraced a double standard that arguably threatens the nonproliferation regime. American policy makers openly define "evil" or "outlaw" states by their domestic political structure, nonsecular leadership, alleged ties to transnational terror-

ists, and/or perceived animosity. Washington, for instance, has frequently accused Iran, Saddam-era Iraq, Libya, Syria, and North Korea of pursuing biological and other weapons of mass destruction, even as it turned a blind eye toward Israeli WMD status over the years.[99] Alleged WMD activity is described as illegal, illegitimate, and inhumane, but only when pursued by certain kinds of regimes. In contrast, as former undersecretary of state John Bolton admitted, "There are still other states with covert BW programs that we have not named in Biological Weapons Convention fora. The United States has spoken to several of these states privately."[100] As Michael Krepon explains, by dividing the world "between responsible states—US friends and allies—and evildoers" in Conference on Disarmament negotiation forums, "the Bush administration postulated and sought to enforce separate [arms control] norms for each camp."[101] For example, the *Final Declaration of the Sixth Review Conference* on the BWC does not include a key statement about compliance standards found in the *Final Declaration of the Fourth Review Conference* in 1996 (the *Fifth* made no declaration): "Any noncompliance with its provisions could undermine confidence in the Convention. Noncompliance should be treated with determination in all cases, without selectivity or discrimination."[102] Diplomats often charge that such inequitable application of standards undermines the legitimacy of nonproliferation norms.[103] Further proliferation, in turn, increases the risk of the most worrisome implication of duplicity. States said to be evil, nondemocratic, hostile sponsors of terror wear a counterproliferation bulls-eye because they cannot be allowed to develop biological or other weapons of mass destruction.

Conclusion

The international community is constructing an inadequate and potentially dangerous biological weapons taboo that rebukes the fundamental logic of arms control. Historically, states attempted to develop an arms control regime that limited both the acquisition and the use of biological weapons. However, in the most recent decade, efforts to limit biological weapons capabilities have stalled, even as prohibitions on biological weapons use have been maintained and even strengthened. The new regime effectively allows states to retain suspicious capabilities that will be viewed as threatening by their peers. The United States is especially concerned about proliferation, though it embraces a double standard whereby it seems to tolerate WMD in the arsenals of friendly or democratic states. In any event,

the neglect of an arms control approach is particularly troublesome in an international context that embraces counterproliferation and the logic of preventive war—and attributes hostile intentions to "evil" states defined by their domestic political structure, nonsecular leadership, alleged ties to transnational terrorists, and/or perceived hostility to major powers.

It is beyond the scope of this article to develop a workable inspection regime, but many experts in the field have offered what looks to be viable options.[104] Specifically, we would strongly urge consideration of the kinds of detailed recommendations offered by a team of experts from the drug and biotechnology industries, defense contractors, and weapons inspection community assembled by the Stimson Center.[105] According to these professionals, a robust verification regime requires deployment of teams of on-site inspectors with scientific and technical expertise in "biosafety engineering, aerobiology, molecular biology, and computers" as well as scientists with years of experience in pharmaceutical purification development (from research laboratory bench scale to large-scale manufacturing) and auditing.[106] Inspectors should initially perform open-source document reviews of facilities, which should include facility blueprints and diagrams and personnel lists. Satellite photos would also be very helpful. Any discrepancies between the actual layout and the blueprints, diagrams, or photos would be investigated and accompanied by interviews with facility staff. Ideally, in fact, on-site teams should observe staffers in their research laboratories or manufacturing areas while they are working—then talk to them about their daily work and routines. Concerns about suspicious activities would trigger sampling of HEPA (high-efficiency particulate air) filters and waste treatment equipment in addition to laboratory countertops. Storage refrigerators and freezers should be inspected and samples taken for testing, especially stored samples that are incorrectly labeled. Furthermore, to assure reliability, only validated assays or tests should be performed on the facility samples. The Stimson Center's experts pointed out that the now-abandoned Verification Protocol assigned an inadequate number of inspectors to biological facilities and did not allot sufficient time for on-site inspections.

Another group of experts from the University of Maryland's Center for International and Security Studies has more recently proposed a somewhat unique international oversight system. The "International Pathogen Research Authority" they imagine would establish routine oversight protocols for a range of activities that trigger extreme, moderate, or only

potential concern.[107] As with any effective system, it would have to be implemented globally and applied without exception to all scientists engaged in relevant biological research. The proposed protocols include licensing, disclosure, and peer review processes geared around the kinds of risk-benefit calculations already developed for other areas of scientific research. The Maryland group favors video and electronic monitoring of work areas and equipment and places less emphasis on adversarial inspection processes. To work effectively, the entire enterprise must be backed by adequate resources and imbued with legitimate legal authority, likely as a result of an interstate treaty. To prevent abuse of power, the oversight system must include credible protections for industrial secrets.

Regardless of the precise contours, the international community clearly needs to redouble its efforts to build a more effective and verifiable biological weapons arms control regime to augment the existing taboo. This will likely entail a comprehensive global system of peer oversight or inspection that is adequately funded and ideally linked to the BWC. While a relatively intrusive inspections regime might well cost billions of dollars, any such spending is likely to be dwarfed by the costs of "preventive" war or a biological weapons attack.[108] SSQ

Notes

1. Thomas C. Schelling and Morton H. Halperin, *Strategy and Arms Control* (New York: Pergamon-Brassey's Classic, 1961; 1985 reprint).

2. Ibid., xi.

3. See, for example, Jeffrey A. Larson, "An Introduction to Arms Control," in *Arms Control: Cooperative Security in a Changing Environment*, ed. Larsen (Boulder, CO: Lynne Rienner, 2002), 1–15. Larson argues (p. 5) that the Schelling and Halperin logic is a "founding premise of arms control theory."

4. Schelling and Halperin, *Strategy and Arms Control*, 1, 142–43.

5. Ibid., 3.

6. For an overview, see Pavel Podvig, "The Window of Vulnerability that Wasn't," *International Security* 33, no.1 (Summer 2008): 118–38. In their 1985 preface, Schelling and Halperin note that the "ABM Treaty was almost the ideal model" of what they had proposed. "Imperfect defensive systems inherently increase the risk of war by creating on both sides an incentive to strike first." Also, ABM deployment would likely have increased the costs of the arms race as both the United States and Soviet Union would have deployed more offensive forces in response. See Schelling and Halperin, *Strategy and Arms Control*, xi.

7. The strategists conceded (p. 121) that arms control might actually entail increased deployment of certain kinds of weapons. However, this is not a major theme of the book. Nonetheless, see Thomas C. Schelling, "Reciprocal Measures for Arms Stabilization," *Daedalus* 134, no. 4 (Fall 2005): 101–17. The journal republished his 1960 essay.

8. Schelling and Halperin, *Strategy and Arms Control*, 6.

9. Johan Jørgen Holst, "Confidence–Building Measures: A Conceptual Framework," *Survival* 25 no.1 (January/February 1983): 2.

10. Schelling and Halperin, *Strategy and Arms Control*, 6, 45.

11. Ibid., 13.

12. John J. Mearsheimer, *The Tragedy of Great-Power Politics* (New York: W. W. Norton & Co., 2001), 31, 38.

13. Ibid., 43.

14. Hans Morgenthau, with Kenneth Thompson, *Politics among Nations*, 6th ed. (New York: Knopf, 1985), 5–6. Constructivist scholars have also argued that "real motives" cannot be ascertained. See Ronald R. Krebs and Patrick Thaddeus Jackson, "Twisting Tongues and Twisting Arms: The Power of Political Rhetoric," *European Journal of International Relations* 13, no. 1 (March 2007): 35–66.

15. Thomas J. Johnson, "From Scythian poisoned arrows to anthrax dispersal, bombs, biological warfare has always been with us," *Military History* 19, no. 3 (August 2002): 24.

16. Maurice R. Hillman, "Overview: Cause and Prevention in Biowarfare and Bioterrorism," *Vaccine* 20, no. 25 (August 2002): 3055–56.

17. Jeanne Guillemin, *Biological Weapons: From the Invention of State-Sponsored Programs to Contemporary Bioterrorism* (New York: Columbia University Press, 2005).

18. Richard Price, "A Genealogy of the Chemical Weapons Taboo," *International Organization* 49, no. 1 (Winter 1995): 90.

19. Ibid., 90–91.

20. James E. Mills, "Chemical Warfare," *Foreign Affairs* 10, no. 3 (April 1932): 444.

21. Demetrious Evison, David Hinsley, and Paul Rice, "Chemical Weapons," *British Medical Journal* 324, no. 9 (February 2002): 332.

22. See Guillemin, *Biological Weapons*, 24–26, 75–91, 131–47.

23. Jonathon B. Tucker, "A Farewell to Germs: The US Renunciation of Biological and Toxin Warfare, 1969–1970," *International Security* 27, no. 1 (Summer 2002): 107–48. See also Guillemin, *Biological Weapons*, 57–74. The United States did not become a party to the Geneva Protocol until 1975.

24. Tucker, "A Farewell to Germs," 109.

25. Ibid.

26. Guillemin, *Biological Weapons*, 92–111.

27. J. B. Neilands, "Vietnam: Progress of the Chemical War," *Asian Survey* 10, no. 3 (March 1970): 209–29. See also Guillemin, *Biological Weapons*, 112–17.

28. The vote was 80–3. The US dissenting vote was matched only by Australia and Portugal. See Thomas Graham and Damien J. LaVera, *Cornerstones of Security: Arms Control Treaties in the Nuclear Era* (Seattle: University of Washington Press, 2003), 9.

29. George Bunn, "Gas and Germ Warfare: International Legal History and Present Status," *Proceedings of the National Academy of Sciences of the United States of America* 65, issue 1 (15 January 1970): 256.

30. For details, see Guillemin, *Biological Weapons*, 119–21; and Tucker, "A Farewell to Germs," 113–15.

31. Tucker, "A Farewell to Germs," 115–30. See also Guillemin, *Biological Weapons*, 122–25.

32. Tucker, "Farewell to Germs," 139–40.

33. Federation of American Scientists (FAS), *A Report of the Working Group on Biological Weapons: The US Government's Interpretation of the Biological and Toxin Weapons Convention,* November 2002, http://www.fas.org/bwc/papers/usinterpretation.pdf.

34. John Parachini, "Non-Proliferation Policy and the War on Terrorism," *Arms Control Today*, October 2001, http://www.armscontrol.org/act/2001_10/parachinioct01.asp.

35. Marie Isabelle Chevrier and Iris Hunger, "Confidence-Building Measures for the BWTC: Performance and Potential," *Nonproliferation Review* 7, no. 3 (Fall/Winter 2000): 24. The authors found (p. 40) no evidence that CBMs "have increased confidence in countries' treaty compliance or in the effectiveness" of the treaty. They call for a strong compliance protocol.

36. Guillemin, *Biological Weapons*, 13.

37. FAS, *Report of the Working Group on BW*.

38. Tucker, "A Farewell to Germs," 128, 142–43.

39. Lt Col Terry N. Mayer, "The Biological Weapon: A Poor Nation's Weapon of Mass Destruction," in *Battlefield of the Future, 21st Century Warfare Issues*, eds. Barry R. Schneider and Lawrence E. Grinter (Maxwell AFB, AL: Air University Press, September 1995), http://www.airpower.maxwell.af.mil/airchronicles/battle/front.html. The United States, in fact, was a prominent victim of a series of anthrax attacks during fall 2001. However, the FBI has concluded the attacks were committed by a domestic scientist likely acting alone. See Federal Bureau of Investigation, "Anthrax Investigation, Closing a Chapter," 6 August 2008, http://www.fbi.gov/page2/august08/amerithrax080608.html.

40. Dr. Michael Callahan, Testimony, *Engineering Bio-Terror Agents: Lessons from the Offensive US and Russian Biological Weapons Programs, Hearing before the Subcommittee on Prevention of Nuclear and Biological Terror of the Committee on Homeland Security*, House of Representatives, 109th Congress, 1st sess., 13 July 2005, 17, http://www.fas.org/irp/congress/2005_hr/bioterror.pdf.

41. See Jeffrey W. Knopf, "Recasting the Proliferation Optimism-Pessimism Debate," *Security Studies* 12, issue 1 (Autumn 2002): 65–69.

42. For a review of the dual-use dilemma, see William M. Evan and Bret B. Hays, "Dual Use Technology in the Context of the Non-proliferation Regime," *History and Technology* 22, no. 1 (March 2006): 105–13; and Gregory Koblentz, "Pathogens as Weapons: The International Security Implications of Biological Warfare," *International Security* 28, no. 3 (Winter 2003/04): 84–122.

43. For a general review of the advances in biotechnology that may have applications in biological weapons research, see Christopher F. Chyba and Alex L. Greninger, "Biotechnology and Bioterrorism: An Unprecedented World," *Survival* 46, no. 2 (Summer 2004): 143–62.

44. Ken Alibek, with Stephen Handleman, *Biohazard: The Chilling True Story of the Largest Covert Biological Weapons Program in the World—Told from the Inside by the Man Who Ran It* (New York: Random House, 1999). See also the US General Accounting Office, *Biological Weapons: Efforts to Reduce Former Soviet Threat Offers Benefits, Poses New Risks* (Washington, DC: GPO, April 2000).

45. Jonathan B. Tucker, "Strengthening the BWC: Moving toward a Compliance Protocol," *Arms Control Today* (January/February 1998), http://www.armscontrol.org/act/1998_01-02/tucker.asp.

46. Statement by Donald Mahley, US special negotiator, to the Ad Hoc Group of Biological Weapons Convention States Parties, Geneva, Switzerland, 25 July 2001, http://geneva.usmission.gov/press2001/0725mahley.htm.

47. Some analysts argue that the proposed protocol was flawed. For some criticisms of the protocol, see Kenneth D. Ward, "The BWC Protocol: Mandate for Failure," *Nonproliferation Review* 11, no. 2 (Summer 2004): 1–17. Others insist that a workable verification procedure is possible. See a collaborative research report of experts from the US pharmaceutical and biotechnology industries, *Compliance through Science: US Pharmaceutical Industry Experts on a Strengthened Bioweapons Nonproliferation Regime*, Henry L. Stimson Center, Report no. 48, September 2002, http://www.stimson.org/cbw/pdf/ComplianceScience.pdf. For a brief but thorough discussion of much recent literature, see Koblentz, "Pathogens as Weapons," 94–97. The Government Accountability Office (GAO) has suggested that inspections are compatible with protection of

industry trade secrets. See GAO, *Arms Control: Experience of US Industry with Chemical Weapons Convention Inspections* (Washington, DC: GPO, September 2000), http://www.gao.gov/cgi-bin/getrpt?GAO/T-NSIAD-00-249.

48. Peter Crail, "The Sixth Review Conference of the Biological Weapons Convention: Success or Failure?—An Interview with Jonathan B. Tucker," James Martin Center for Nonproliferation Studies, 4 January 2007, http://cns.miis.edu/stories/070104.htm.

49. UN 1540 Committee Web site, 2007, http://www.un.org/sc/1540/.

50. Nuclear Threat Initiative Web site, 2009, http://www.nti.org/f_WMD411/f2n1.html. To date, not all UN member states have delivered comprehensive reports to the 1540 Committee.

51. The Clinton administration used this terminology to refer to relatively minor powers viewed as outlaws because of their authoritarian governments, aggressive behavior, and pursuit of biological, chemical, or nuclear weapons. The prior Bush administration sometimes referred to "renegade" states. See Robert S. Litwak, *Rogue States and US Foreign Policy* (Washington, DC: Wilson Center Press, 2000).

52. Oliver Meier, "The US Rejection of Bioweapons Verification and Implications for Future Negotiations," *International Network of Engineers and Scientists against Proliferation Information Bulletin* 21 (April 2003): 73, http://www.inesap.org/sites/default/files/inesap_old/pdf/INESAP_Bulletin21.pdf.

53. Mahley, statement.

54. Center for Arms Control and Non-Proliferation, "Biological and Chemical Weapons," http://www.armscontrolcenter.org/policy/biochem/.

55. See Table III.1 identifying "The number of biotechnology companies, research institutions and industrial associations in selected regions and countries," in *UN Conference on Trade and Development, The Biotechnology Promise: Capacity-building for Participation of Developing Countries in the Bioeconomy* (New York: United Nations, 2004), 49, http://stdev.unctad.org/docs/biotech.pdf. India and Mexico have far more biotechnology companies than other developing countries. See also William Hoffman, "Global biotechnology clusters map," 20 August 2009, http://www.mbbnet.umn.edu/scmap/biotechmap.html.

56. Susan Foster, Richard Laing, Bjørn Melgaard, and Michel Zaffran, "Ensuring Supplies of Appropriate Drugs and Vaccines," in *Disease Control Priorities in Developing Countries*, 2nd ed. (New York: Oxford University Press, 2006), http://www.dcp2.org/pubs/DCP/72/Section/10409.

57. The Australia Group Web site, 2007, http://www.australiagroup.net/en/index.html.

58. Michael Barletta, Amy Sands, and Jonathan B. Tucker, "Keeping Track of Anthrax: The Case for a Biosecurity Convention," *Bulletin of the Atomic Scientists* 58, no. 3 (May/June 2002): 60.

59. See US Department of State, Bureau of International Security and Nonproliferation, *Proliferation Security Initiative*, http://www.state.gov/t/isn/c10390.htm; and Andrew C. Winner, "The Proliferation Security Initiative: The New Face of Interdiction," *Washington Quarterly* 28, no. 2 (Spring 2005): 129–43.

60. David P. Fidler, "Facing the global challenges posed by biological weapons," *Microbes and Infection* 1, no. 12 (October 1999): 1059–66.

61. The United Nations Office at Geneva (UNOG) Web site, 2008, "Sixth Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, (Geneva, 20 November–8 December 2006), Final Document," 19, http://daccessdds.un.org/doc/UNDOC/GEN/G07/600/30/PDF/G0760030.pdf?OpenElement.

62. See Voice of America News, "UN Conference Aims to Reduce Threat of Biological Weapons," 20 August 2007, available from Federal Information and News Dispatch, Inc., Lexis-Nexis.

63. Crail, "Sixth Review Conference."

64. CDR Joel Doolin, USN, for example, argues that PSI interdictions might be justified by referencing Resolution 1540. See Joel A. Doolin, "The Proliferation Security Initiative: Cornerstone of a New International Norm," *Naval War College Review* 59, no. 2 (Spring 2006), 45–46, 51.

65. For a review of the security implications of taboos, see Leonard A. Cole, "The Specter of Biological Weapons," *Scientific American* 275, no. 6 (December 1996); and T. V. Paul, "Nuclear Taboo and War Initiation in Regional Conflicts," *Journal of Conflict Resolution* 39, no. 4 (December 1995): 696–717. For a cultural-historical argument, see John Ellis van Courtland Moon, "The Development of the Norm against the Use of Poison: What Literature Tells Us," *Politics and the Life Sciences* 27, no. 55 (September 2008), 55–77.

66. Price, "A Genealogy," 103.

67. Richard M. Price, *The Chemical Weapons Taboo* (Ithaca: Cornell University, 1997), 1.

68. Nina Tannenwald, "The Nuclear Taboo: The United States and the Normative Basis of Nuclear Non-Use," *International Organization* 53 (Summer 1999): 433–68.

69. For example, see FAS, "Strengthening the Ban on Germ Weapons," press release, 7 November 2001, http://www.fas.org/bwc/news/FASPressRelease7Nov2001.html; Joseph W. Foxell, "Trends in Bio-Terrorism: Two Generations of Weapons," *Journal of Contingencies and Crisis Management* 7 (June 1999): 102–18; and Fidler, "Facing the global challenges posed by biological weapons."

70. Nina Tannenwald, "Stigmatizing the Bomb, Origins of the Nuclear Taboo," *International Security* 29 (Spring 1995): 48.

71. David P. Fidler and Lawrence O. Gostin, *Biosecurity in the Global Age, Biological Weapons, Public Health, and the Rule of Law* (Stanford: Stanford Law and Politics, 2008), 25–26.

72. Experts on biotechnology and biological warfare vigorously debate the threat posed by nonstate actors. Using an analogy to Moore's Law for the production of computer chips, Dr. Rob Carlson of Biodesic, an engineering firm in Seattle, argues that near-term biotechnological discoveries will give potential bioterrorists the ability to genetically engineer and produce new biological weapons for only tens of thousands of dollars. For details of his thesis, see Robert Carlson, "The Pace and Proliferation of Biological Technologies," *Biosecurity and Bioterrorism: Biodefense Strategy* 1, no. 3 (September 2003): 203–14, http://www.synthesis.cc/writing/Carlson_Pace_and_Prolif.pdf. However, other experts posit that the near-term threat of a large-scale bioterrorist attack is exaggerated. Dr. Milton Leitenberg of the Center for International and Security Studies at the University of Maryland argues that terrorist groups have had difficulty obtaining pathogens and toxins, producing them in large enough quantities for a mass attack, and developing delivery systems for their dissemination. For details on the technological hurdles, see Milton Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat* (Carlisle, PA: US Army War College, Strategic Studies Institute, December 2005), http://www.strategicstudiesinstitute.army.mil/pdffiles/PUB639.pdf. Bioterrorism seems to be a potential future threat, while state-sponsored biological warfare programs are a present danger to international security.

73. John Borrie, "The evolution of the biological weapons threat and the BTWC, A joint briefing by the UN Department for Disarmament Affairs and the UN Institute for Disarmament Research," 13 September 2005, 13, http://www.unog.ch/80256EDD006B8954/(httpAssets)/1D1FF77A60E56AC6C1257193003A0FC9/$file/BWC+seminar+Sept+05+-+Brief+History+of+BW.pdf.

74. Kenneth C. Brill, "Remarks by the Director of the National Counterproliferation Center," Washington Institute for Near East Policy, 4 August 2009, http://www.dni.gov/speeches/20090804_speech.pdf .

75. John R. Bolton, "The US Position on the Biological Weapons Convention: Combating the BW Threat," Remarks at Tokyo America Center, Tokyo, Japan, 26 August 2002, http://usinfo.org/wf-archive/2002/020827/epf201.htm.

76. James Martin Center for Nonproliferation Studies, 2002, http://cns.miis.edu/research/cbw/possess.htm.

77. See Department of State, "State Sponsors of Terrorism," http://www.state.gov/s/ct/c14151.htm. The listings can seem fickle as Iraq was on the list from its inception then off during the Iran war then back on at the time of the Persian Gulf War and finally removed during the latest Bush presidency.

78. Senator Mark Dayton (D-MN) asked David Kay, "Just based on your general knowledge, how many countries would you say in the world today would qualify under the category of developing weapons of mass destruction–related program activities or having such activities?" Kay "hesitate[d] to give . . . an off-the-cuff number" but ultimately said that "you're talking about probably 50 countries that have programs that would fall somewhere in that broader vernacular." *Hearing on Iraqi Weapons of Mass Destruction and Related Programs, Senate Armed Services Committee*, 28 January 2004, http://globalresearch.ca/articles/KAY401A.html.

79. George W. Bush, "State of the Union Address," 20 January 2004, http://georgewbush-whitehouse.archives.gov/news/releases/2004/01/20040120-7.html.

80. For a scholarly argument on deterrence, see Koblentz, "Pathogens as Weapons," 107–10.

81. White House, *National Strategy to Combat Weapons of Mass Destruction*, December 2002, 1, http://georgewbush-whitehouse.archives.gov/news/releases/2002/12/WMDStrategy.pdf.

82. White House, *The National Security Strategy of the United States of America*, September 2002, 14–15, http://georgewbush-whitehouse.archives.gov/nsc/nss/2002/nss.pdf.

83. Scott D. Sagan, "More Will Be Worse," in *The Spread of Nuclear Weapons, A Debate Renewed*, eds. Scott D. Sagan and Kenneth N. Waltz (New York: W. W. Norton & Co., 2005), 56–59; and Marc Trachtenberg, "Preventive War and US Foreign Policy," *Security Studies* 16, no. 1 (January–March 2007): 1–31.

84. Gordon H. Chang, "JFK, China and the Bomb," *Journal of American History* 74, issue 4 (March 1988): 1310.

85. Committee for National Security, National Science and Technology Council, *National Security Science and Technology Strategy, 1995*, 8, http://handle.dtic.mil/100.2/ADA298630.

86. Les Aspin, "Counterproliferation Initiative," Presidential Decision Directive PDD/NSC 18, December 1993, http://www.fas.org/irp/offdocs/pdd18.htm.

87. Trachtenberg, "Preventive War and US Foreign Policy," 17, 19.

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89. "Confronting 21st Century Threats," Obama campaign Web site, 16 July 2008, http://www.barackobama.com/2008/07/16/fact_sheet_obamas_new_plan_to.php.

90. Barack Obama (speech at Purdue University, 16 July 2008), http://www.cfr.org/publication/16807/barack_obamas_speech_at_the_university_of_purdue.html.

91. David Mendell, "Obama would consider missile strikes on Iran," *Chicago Tribune*, 25 September 2004.

92. "Obama Says Economy, Iraq Are Top Issues," *CBS News*, 21 September 2008, http://www.cbsnews.com/stories/2008/09/21/60minutes/main4463342.shtml.

93. "Transcript: Secretary of State Hillary Clinton on 'This Week'," 7 June 2009, http://abcnews.go.com/print?id=7775502.

94. "2008 Presidential Q&A: President-elect Barack Obama," *Arms Control Today*, December 2008, http://www.armscontrol.org/system/files/Obama_Q-A_FINAL_Dec10_2008.pdf.

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108. Linda J. Bilmes and Joseph E. Stiglitz, "The Iraq War Will Cost us $3 Trillion, and Much More," *Washington Post*, 9 March 2008, http://www.washingtonpost.com/wp-dyn/content/article/2008/03/07/AR2008030702846.html. The United States has spent over $50 billion in response to the fall 2001 anthrax attacks. See Bob Drogin, "Anthrax hoaxes pile up, as does their cost," *Los Angeles Times*, 8 March 2009, http://articles.latimes.com/2009/mar/08/nation/na-anthrax-threats8. By comparison, cost estimates for the previously negotiated BWC verification protocol seem trivial. See Lynn C. Klotz, "The Biological Weapons Protocol as a Health Care Intervention," *FAS Public Interest Report: The Journal of the Federation of American Scientists* 55, no. 1 (January/February 2002), http://www.fas.org/faspir/2002/v55n1/bw.htm.