

**Arms Control without Arms
Control:
The Failure of the Biological
Weapons Convention Protocol and a
New Paradigm for Fighting the
Threat of Biological Weapons**

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FOREWORD

We are pleased to publish this forty-ninth volume in the *Occasional Paper* series of the United States Air Force Institute for National Security Studies (INSS). Among the many dimensions of national security that face unprecedented changes and challenges after the end of the Cold War, arms control has been as directly affected as any other dimension. The formal, bilateral, and verification-based arms control that was so central to that former period fits neither the new environment nor the expanded focus beyond the strategic nuclear arena. In this paper, Guy Roberts presents yet another of his insightful explanations and analyses of the adaptations and new directions that are required to give “arms control” continued relevance today and tomorrow. This thorough analysis of the special case of biological warfare controls follows his January 2001 INSS Occasional Paper (#36) *This Arms Control Dog Won't Hunt: The Proposed Fissile Material Cut-Off Treaty at the Conference on Disarmament* in chronicling both the failure of continuing emphasis on formal Cold War-type arms control products and the enduring centrality of cooperative “arms control” processes in the current national security environment. In Roberts line of argument, arms control is indeed dead, yet “arms control” can and must be reborn in the form of a wide range of integrally linked and multifaceted legal, diplomatic, economic, and military instruments to effectively fight the spread and use of dangerous weapons and systems.

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JAMES M. SMITH
Director

EXECUTIVE SUMMARY

After being terrorized by the October 2001 anthrax attacks in which five people lost their lives, it was anticipated that the United States would support a new protocol touted as a new compliance mechanism for strengthening the Biological Warfare Convention (BWC). However, in December 2001, the United States rejected the protocol as ineffective and fatally flawed. Backed by years of study and test inspections, the United States argued that traditional arms control approaches to biologically based substances can not work because of the dual nature of these substances. Unlike chemical or nuclear weapons, the components of biological warfare are found in nature, in the soil and air. The presence of these organisms in any quantity does not necessarily connote a sinister motive. Absent actual weaponization or compelling evidence of intent, it is virtually impossible to prove a violation of the BWC. Further, any information gains from such measures are more than offset by the risks to sensitive bio-defense programs and confidential and proprietary business information.

Despite the rejection of the protocol, the United States and the rest of the world recognize the tremendous threat biological weapons pose to peace and international security. Biological weapons have been used since antiquity, and efforts to constrain and prohibit them have been undertaken almost as long and with not much success. Nevertheless, the BWC coupled with the 1926 "Gas Protocol" banning the use of bacteriological weapons forms the basis for the prohibitory norm banning the development, production and use of biological weapons. Most of the nations of the world are parties to these treaties. Despite the inability to craft effective verification measures, the prohibitory norm remains strong as evidenced by the fact that no country admits to developing or possessing biological weapons (BW).

Still, there are a number of states and terrorist groups actively seeking to acquire and use these weapons. Russia, one of the BWC depository states, had (and is suspected of continuing to have) the world's largest offensive BW program, one that is a severe proliferation threat. Iraq and a number of other countries maintain significant programs. Terrorist groups such as Al Qaeda are known to be attempting to acquire this capability. These countries are also pressuring the developed countries to provide them with the technologies and equipment to develop such programs.

In recognition of the threat, the United States advocated moving beyond signing up to another ineffective arms control agreement and finding a new way to focus on a strengthened international commitment to combat the BW threat in all its forms. Recognizing that international cooperation is key, the United States proposed a number of alternative measures that it considered far more effective. These ranged from national bio-defense preparedness to bilateral efforts of cooperation to multilateral mechanisms for impeding, stopping, and rolling back illicit BW activities. A key element is getting serious about noncompliance and calling those nations who do not live up to their international legal and political obligations to account.

Using the US proposal as a blueprint, the states parties to the BWC adopted a modest work program to strengthen the implementation of and compliance with the legal obligations of the Convention. This is complementary to a new and more effective approach, advocated here, to utilize the numerous multilateral mechanisms and on-going initiatives designed to target a specific aspect of the threat and to the greatest extent possible limit the ability of terrorists and proliferators to acquire a BW capability. These include, but are not limited to, initiatives by international governmental organizations such as the World Health Organization, World Food and Agriculture Organization and World Customs Organization; new initiatives by regional security cooperation organizations such as NATO; international law enforcement cooperative efforts such as the initiatives started by INTERPOL and EUROPOL; the efforts of members of the Australia Group, a voluntary export control organization of like-minded states; and the numerous national and international efforts at tracking and interdicting the financial networks which fund these terrorist or proliferation activities. These multi-faceted initiatives fully support the goals of the BWC and have much more capability of interdicting and stopping those who might try to acquire such weapons.

The time for “better-than-nothing” proposals is over. A united world, acting in concert across a broad front of areas utilizing the full panoply of financial, diplomatic, economic, and military resources at our disposal, with the firm determination to rid the world of these weapons of terror, is our best hope for success. It is only when those that pursue these weapons learn that to do so is a huge miscalculation and that the world is united across this broad

band of international organizations against them will this threat to mankind be eliminated.

***ARMS CONTROL WITHOUT ARMS CONTROL:
THE FAILURE OF THE BIOLOGICAL WEAPONS
CONVENTION PROTOCOL AND A NEW
PARADIGM FOR FIGHTING THE THREAT OF
BIOLOGICAL WEAPONS***

GUY B. ROBERTS

**INTRODUCTION: ADDRESSING THE FEAR OF
BIOLOGICAL WARFARE**

Germ terrorism is the single most dangerous threat to our national security in the foreseeable future.

- R. James Woolsey, former CIA director¹

On October 5, 2001 a Florida man died after opening a letter containing the deadly anthrax bacteria. Subsequently, several more letters containing anthrax were received at the offices of Senators Daschle and Leahy and NBC headquarters in New York. These letters and others resulted in a total of five deaths and 18 infections, and caused widespread panic. The terrorist attack of September 11, the prospect of more attacks by terrorists, to include the possible use of biological weapons, fundamentally changed public threat perceptions regarding the potential use of weapons of mass destruction (WMD),² and biological warfare (BW) in particular. The indiscriminate use of these weapons now seems plausible, even inevitable. Amid public calls to respond to this threat, it should have been relatively easy for nations to agree to new measures to strengthen one of the primary legal instruments prohibiting biological weapons (BW), the 1972 Biological and Toxin Weapons Convention (BWC).³ The BWC, among other things, serves as a useful declaratory statement by the community of nations that the possession and use of biological

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weapons is an anathema to civilized society. However, it has weak enforcement mechanisms and no compliance procedures.

Nevertheless, on December 7, 2001 the Fifth Review Conference of the BWC ended in disarray after three weeks of acrimonious debate with no agreement on additional measures to strengthen the BWC and the norm against the illicit use of biological agents.⁴ What was to be the culmination of ten years of negotiations to “strengthen” the BWC ended in ignominy leaving residuals of bitterness among the United States’ allies and friends, many of whom had invested a great deal of their time and political capital.⁵ The key reason the Review Conference broke down was the United States refusal to accept what it viewed as a fatally flawed compliance mechanism, the so-called Protocol to the BWC. The outright failure of the Review Conference was avoided when the chairman suspended the meeting for one year with negotiations scheduled to resume in November 2002.⁶

As will be discussed below, it is exceedingly unlikely the proposed protocol in any form will be resurrected or, for that matter, any other “arms control” measure adopted. One key reason is the historically consistent and firm belief on the part of the United States that the work product of this effort—a verification protocol—was fundamentally and irreparably flawed. It was flawed because it is virtually impossible to detect violations, and none of the proposed measures would have a reasonable chance of detecting state-sponsored illicit BW programs or terrorists plotting to use BW. It was widely recognized that none of the proposed measures would have stopped, for example, the anthrax attacks in the United States or any act of biological terrorism by a non-state actor. The United

States argued that agreeing to non-effective measures would also have the potential of adversely affecting and severely compromising sensitive industrial proprietary information and national security information concerning biodefense programs.

In the face of continuing and pervasive anxiety by the public over an expected biological attack on the United States or elsewhere,⁷ it seemed counterintuitive (and counter-productive) for the Bush Administration to reject this proposal touted as an effective way to combat the scourge of BW. While the US Government forges ahead with national and domestic measures to prepare for such an eventuality,⁸ there remains a sense that international efforts are floundering. As will be explained, not only is that not the case, but a number of initiatives are underway which, in combination, have a much greater probability of stopping, detecting, or rolling back illicit BW programs. These measures or mechanisms, while not traditional arms control, are fully supportive of the purposes and goals of the BWC.

The evidence, as detailed here, is compelling that traditional arms control measures such as the proposed verification protocol have little or no utility in stopping or deterring would be proliferators or terrorists. Recognizing the virtual impossibility of detecting a BW program, even with the most intrusive of inspection regimes, the better and more effective approach is to work with the multitude of already existing international bodies to develop standards, practices, and cooperative working relationships, some of which are reviewed below, which will make it difficult if not impossible for rogue states and non-state groups to possess or use these horrible weapons. This multitude of mechanisms and initiatives, coupled with a rededicated

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commitment to abide by the requirements of the BWC, further coupled with a determination to enforce compliance, is the appropriate strategy for signaling rogues and terrorists that the costs of noncompliance far outweigh any perceived gains.

Finally, the discussion will be limited to international initiatives and not, except in relation to coordination efforts, the need for new domestic initiatives to prepare and defend against a biological attack.⁹ Suffice to say, US domestic preparedness to an eventual biological attack is improving daily, and the infusion of over \$900 million in Federal funds will go a long way to preparing and training state and local authorities in the event of a biological attack. Obviously, much more needs to be done in this area, to include new technologies for faster detection and response to a biological incident whether it is deliberate or naturally occurring. The focus here, however, will be on the multi-faceted, multilateral efforts by multiple international government organizations to limit this threat to its lowest denominator and, hopefully, eliminate any rational incentive for violating the norm condemning those who would use such weapons. It is this new approach, not more traditional arms control negotiations or agreements, that will have the most success in strengthening the norm prohibiting and condemning these weapons and those who would use them.

IN THE GARDEN OF GOOD AND EVIL: DEFINING THE PROBLEM

The Future ain't what it used to be.
– Yogi Berra¹⁰

The Nature of Biology

The darker corner of microbiological research is the abyss of maliciously designed biological warfare agents and systems to deliver them.
- Nobel Laureate Josh Lederberg¹¹

Article I of the BWC prohibits the development or production of “microbial or other biological agents, or toxins,” without further defining them. While the BWC does not define what biological agents or toxins are, the World Health Organization (WHO) formulated a definition of biological agents considered to be authoritative.¹² It defined biological agents “as those that depend for their effects on multiplication within the target organism and are intended for use in war to cause disease or death in man, animals or plants; they may be transmissible or non-transmissible.”¹³ For our purposes the discussion will be confined to these traditional notions of biological agents. These are generally defined scientifically as any living organism without restriction or limitation. Biological weapons usually consist of some form of bacteria, virus, or fungus. Examples include typhus, cholera, anthrax, small pox, and yellow fever. But there are also biological weapons that contain dead substances made from living organisms. These are known as toxins, and examples include the botulism toxin and shell fish poison.

They are inherently indiscriminate and uncontrollable and, as noted, universally condemned. Intrinsic features of biological agents which influence their potential for use as weapons include infectivity, virulence, toxicity, pathogenicity, incubation period, transmissibility, lethality, and stability. “Unique to many of these agents, and distinctive from their chemical counterparts, is the ability to multiply in the body over time and actually increase their effect.”¹⁴ Biological agents usually are dispersed by an aerosol spray that must be either inhaled or ingested.

The problem for the traditional arms control solution to this proliferation problem is that any microorganism able to cause

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disease in man, animals, or plants is capable of being used as a biological agent. Every germ that exists has the potential to be a biological weapon, and this is part of the uniqueness and difficulty of trying to prohibit the development, production, and use of such weapons. Clearly, it would be impossible to prevent the use of germs, and it would be counterproductive. In addition to being impracticable, it would effectively destroy the biotechnology industry. Although many are unsuitable for military applications since they are hard to produce, store, and disseminate effectively, almost every biological agent deliberately used against humans, plants, or animals has the capability to cause widespread panic and adversely affect a nation's perception of its national security.

The diversity and ready availability of naturally occurring microbial pathogens and their associated virulence pose a potential biological warfare (BW) threat. Many naturally arising pathogens and virulence-associated genes probably are not currently recognized or characterized because contact with human populations has been limited or because of inadequate diagnostic capabilities. The emergence of AIDS and the West Nile Virus are examples of naturally arising pathogens. The easy acquisition and low cost of these previously unknown agents could strengthen a country's or a nonstate actor's unconventional warfare capabilities and provide deniability because their use can be confused with natural disease outbreaks.

In the past 20 years the qualitative and quantitative impact of biological warfare, or the threat of such warfare, on military forces and urban communities has changed markedly. Improved production techniques have resulted in more virulent strains of organisms and the genetic modification of non-pathogenic

organisms to pathogenic strains with virulent characteristics. The biotechnology revolution has made altering microbes easier by turning gene splicing into an automated, industrial process. Posting the genetic sequences of microbes on the Web will by 2003 provide scientists with an unprecedented resource, the sequences of 250,000 microbial genes. Advocates say easy access to genetic information will benefit scientists working on biowarfare defense,¹⁵ but it is also potentially an open avenue for a terrorist or proliferator.

Advances in biotechnology are both exhilarating and frightening. The implications of genetic engineering for biological warfare are far-reaching and we cannot predict with any certainty what directions these new techniques and applications will take. Biological agents, which may have no useful or beneficial purpose today, may become tomorrow's wonder treatment. Who would have believed 20 years ago, for example, that botulinum toxin, one of the deadliest substances known to man, would one day become a beauty treatment used to temporarily wipe out facial wrinkles. Indeed, today there are "Botox" parties where people gather for wine, cheese, and "anti-wrinkle injections."¹⁶ Genetic engineering provides the potential for improved virulence by the incorporation of genes (i.e., specific strands of DNA) permitting increased production of a pathogen or toxin. Thus, as much as 100 times more pathogens or toxins could be produced per cell than could be produced by naturally occurring strains. Cells that normally do not produce toxins may be altered to produce toxins for biological weapon development. Conversely, known pathogens or toxins may be genetically inactivated for vaccine countermeasure development. Cells can

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also be modified to produce antibodies directly for passive immunization against specific infectious agents.

In the past, offensive BW programs employed naturally occurring pathogens such as *Bacillus anthracis*, the causative agent of anthrax. Today and in the future, an approach based on "mining nature's bioweapons" (selecting yet-to-be-harnessed pathogens for their virulence factors¹⁷ out of the environment for use as BW agents) may provide a broad and powerful platform upon which a wide variety of weapon development efforts can take place. General robustness or survivability of a pathogen can also be genetically improved to promote stability during dissemination, and nutrient additives are used to enhance survival of selected biological agents in aerosols. Controlled persistence of a pathogen to permit survivability under specified environmental conditions may eventually be possible. The potential also exists for the development of so-called "conditional suicide genes," which could program an organism to die off following a predetermined number of replications in the environment. Thus, an affected area may be safely reoccupied after a predetermined period of time.¹⁸

In addition to bacteria and viruses, fungi and parasites are also capable of lethal or incapacitating disease, and both are now seen in increasing numbers as naturally occurring pathogens, especially in immuno-compromised humans. Both classes of agents also are difficult to treat because they are intrinsically more similar to human cells; thus, the drugs needed to kill them are more toxic for humans. Fungi in particular are attractive biological weapons because many of them can sporulate to form hardy, environmentally resistant structures that also are quite easy to

aerosolize. Genetic tools for manipulation of fungal genes are increasingly available.

Additional targets for BW include plants and animals. Plant and animal pathogens can be similarly mined with subsequent laboratory modifications. An excellent and recent example of this potential is foot and mouth disease, but there are many others which could easily and with relatively little expense be used to devastate an economy and put at risk the health and well being of a nation's population.¹⁹

One big wake-up call came in February, 2001 when Australian scientists at Canberra's Research Center for the Biological Control of Pest Animals, publishing in the *Journal of Virology*, showed how easy it was to modify mousepox, a fairly innocuous virus in mice, and turn it into a killer.²⁰ The second shock came with the recent announcement that scientists have created a live polio virus "using its genome sequence, which is available on the Internet, as their blueprint and genetic material from one of the many companies that sell made-to-order DNA."²¹ This is only a precursor of the ever-increasing technological know-how that's becoming almost pedestrian. As Dr. Robert Lamb, President of the American Society for Virology speculated, "Could someone make a highly pathogenic virus like Ebola? Could you in fact make that in a rogue laboratory that doesn't need more than two skilled workers? My feeling is you probably could."²²

Well-designed germs could outwit even treatments using drugs. The fact is we have already stepped into an open and uncharted territory where novel forms of bioterror become possible. As with the human immune system, many current

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biowarfare detection kits depend on antibodies reacting with the antigenic surface coatings of pathogenic bacteria or viruses. Thus, modified non-pathogens can be used to mask the agent from the immune-based detector and, potentially, from the human immune system itself to increase the agent's effectiveness.

And Its Capacity For Good And Evil

It is hard to predict where all this will lead. What is clear is that the BW threat fifty years from now will be radically different due to revolutionary advances in the biosciences. The promise of the revolution in biotechnology and almost daily advances in medicine and treatments is a growing healthy, productive, and long life for all. The threat is the possibility of extermination. As recent history has demonstrated, biological weapons remain a real and prospective threat to all civilization. Against the United States, biological agents potentially offer advantages to those adversaries who cannot hope to compete on the traditional battlefield or in the political marketplace of ideas. There are clearly a number of advantages to biological warfare. First, it evokes a unique psychological response and will likely generate panic and fear in the population at large once the threat becomes known. As we have observed during the 2001 anthrax attacks in the United States, a small amount of agent caused five deaths and 18 infections, a fraction of one day's carnage on America's highways, but it was enough to paralyze a significant portion of society and government, and it resulted in an enormous diversion of resources to ensure that the agent's effects were contained and eventually neutralized.

Equally important, because of the time required for a biological agent to take effect and for symptoms to appear, it is

extremely difficult, if not outright impossible, to identify the perpetrator and, absent an obvious delivery vehicle such as a missile, the means and method of delivery. In 1993 the author ran an exercise involving leading experts from industry, health services, and representatives from the intelligence community, the military, and other government agencies to try to determine whether or not we could determine if an outbreak of a disease was a naturally occurring one or an attack.²³ The consensus was that absent a smoking gun or unique characteristics such as a genetically modified agent it would be extremely difficult to conclusively determine one way or the other.

Finally, another reason our adversaries may decide to use a biological weapon is that our defenses against such weapons are limited and nascent. It is virtually impossible to inoculate all US military personnel against the full range of possible agents—which number in the dozens—let alone the national population. Deficiencies in bio detection equipment are well known, and although significant progress has made in developing a real-time detection capability that could be deployed in tactical situations, an actual capability is still some years away.²⁴

Obviously, there are risks associated with weaponizing and employing biological agents. It is extremely difficult technologically to adapt BW agents to missile warheads, and there are a number of technological challenges to converting pathogens into an aerosol or dry dust for delivery by less sophisticated means such as crop dusters or agricultural sprayers.²⁵ While it might be feasible for terrorists to get or produce those materials, delivering them is extremely difficult. It requires expertise, special

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equipment, and practice—all of which is hard to conceal. (The smallpox virus is an exception to this generality.)

However, these challenges are certainly within the capability of terrorist states, and of state-sponsored terrorist groups. Of particular concern is the technological know-how of former employees of the Soviet Union's Biopreparat now offering their services to suspect nations.²⁶ Also of concern are the increasing capabilities of biotechnology industry to potentially develop more lethal and vaccine-resistant agents through genetic engineering, or as a result of the increasing knowledge of the human genome to develop pathogens to target traits of specific ethnic groups.²⁷ For non-state terrorist groups, while the technical challenges are imposing, they are not insurmountable, and the technology is easily obtainable.²⁸ The pharmaceutical industry, and numerous bioprocess industries, produce large quantities of micro-organisms and employ genetics to modify microbial properties. It is hard to detect illicit research and development activities and easy to procure samples of many different bioagents from a variety of sources, legitimate or not. In addition, natural outbreaks of anthrax, bubonic plague, and other pathogens offer the terrorist the means to obtain seed materials. The information and technology for bioterrorism is ubiquitous and easily obtainable. As one expert describes it,

Training in genetics, microbiology and biotechnology is now offered in college courses around the world. Huge volumes of information pertinent to bioterrorism are available in the non-classified scientific journals and on the Internet. The number of trained personnel capable of undertaking sophisticated genetic manipulations has expanded substantially, including in nations viewed as potential sponsors of terrorism. Technological advances allow the cultivation and harvesting of large quantities of

virulent micro-organisms virtually anywhere and at minimal expense. A survey of 1,400 US academic institutions revealed that 16 per cent had stocks of pathogens listed in the draft Biological Weapons Convention [Protocol], 11 per cent had high-level microbiological containment facilities and 3 per cent had large volume bioreactors. Over 2,000 new biotechnology companies have been formed in the US and 1,500 in Europe during the last 20 years, together with a parallel expansion of expertise in genetics and molecular biology within the pharmaceutical sector.²⁹

Advances in genetic engineering have opened the door to limitless germ weaponry that could outfox vaccines and treatments. For example,

The ultimate biothreat lies in infections caused by viruses that can integrate themselves into the genes of their victims to await activation at a later date. This is no longer a dystopian fantasy. Infection with latent agents and their controlled reactivation has already been achieved in animal experiments.³⁰

We must face the stark facts. The risk of the use of biological weapons is here. Science, in its steady gains to manipulate genes primarily for the purpose of developing medical treatments, has made it possible for the design of lethal cut-and-paste versions of viruses and bacteria. All that's technically required to develop a deadly variation of even a common germ is access to the standard gene manipulation technology now available in labs worldwide.

**THE THREAT OF BIOLOGICAL WARFARE: THE
“POOR MAN’S ATOMIC BOMB”**

Behold, the hand of the Lord will come with a very severe murrain on your livestock which are in the field, on the horses, on the donkeys, on the camels, on the herds, and on the flocks. . . .

- Exodus 9:3³¹

The Early History of Biological Warfare

Throughout history, infectious diseases contracted naturally have had a significant impact on civilization and, in particular, military operations.³² It was quickly recognized by warring tribes and nations that, although not without risk to your own army, the spread of these diseases to your enemies often resulted in their destruction with little or no cost or effort. When historians look back on the emergence of inhalation anthrax as a weapon in the fall of 2001, it is likely they will not see an anomaly, but rather the continuation of a pattern. The history of warfare and the history of disease are intertwined. The intentional dissemination of disease simply adds a new dimension to threats that are posed by infectious and toxic agents traditionally transmitted only by natural routes.

The deliberate use of microorganisms and toxins as weapons has been attempted throughout history.³³ Biological warfare has evolved from the crude use of cadavers to contaminate water supplies to the development of specialized munitions for battlefield and covert use. Recognition of the potential impact of infectious diseases on armies resulted in the crude use of filth, cadavers, animal carcasses, and contagion as weapons. These have been used to contaminate wells, reservoirs, and other water sources of armies and civilian populations under attack since antiquity, through the Napoleonic era, and into the 20th century.³⁴ These practices have continued to modern times, as evidenced by the smearing of punji sticks with excrement by the Viet Cong in the early 1960s.³⁵

Armies have used biological warfare for millennia.³⁶ As early as the sixth century BC, Assyrians poisoned enemy wells with rye

ergot, and Solon of Athens used skunk cabbage to poison the water supply during his siege of Krissa. In 400 BC, Scythian archers dipped their arrows in blood and manure, attempting to cause illness in their enemies. The Greeks polluted their enemy's wells and drinking water supplies with animal corpses in 300 BC; later the Romans and Persians would adopt the same strategy.³⁷

At the battle of Tortona, Italy, in 1155, Barbarossa put human corpses in his enemy's water supply, successfully contaminating it. Catapulting infected corpses into besieged cities was commonplace during the medieval period. In 1346-47, for example, the Muslim Tatar, De Mussis, catapulted bubonic plague-infected corpses over the walls of Kaffa on Russia's Black Sea in Crimea (now Ukraine), causing an epidemic. The city surrendered and the defending Christian Genoese sailors fled to Italy and Turkey, possibly beginning the Black Death pandemic in Europe.³⁸ In 1422, during the siege of Karlstejn in the Holy Roman Empire, soldiers' corpses and 2,000 cart loads of excrement were hurled at the enemy. And, in 1485 near Naples, the Spanish supplied their French enemies with wine laced with leprosy patients' blood. During Pizarro's conquest of South America, it is alleged that he improved his chances of victory by presenting to the natives, as gifts, clothing laden with the smallpox. Likewise between 1754 and 1767 the British infiltrated smallpox-infested blankets to unsuspecting American Indians during the French and Indian war, and smallpox eventually decimated the American Indian population.³⁹ Even Napoleon used biological weapons by attempting to force the surrender of the city of Mantua by infecting the citizens with swamp fever.⁴⁰

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Prior to and during World War II, the Japanese had embarked on a major effort to develop biological weapons with mixed success. They bombed several Chinese cities with anthrax and plague and conducted extensive experiments involving unwilling human subjects.⁴¹ After the war, a number of Japanese scientists in American custody who had participated in the infamous “Unit 731” program were granted immunity from war crimes prosecution on the condition that they would disclose the results of their research efforts.⁴²

The United States offensive BW program was begun in 1942.⁴³ The program included a research and development facility at Camp Detrick, Maryland (renamed Fort Detrick in 1956), testing sites in Mississippi and Utah, and a production facility in Terre Haute, Indiana. While the United States did fill about 5000 bombs with anthrax spores at a pilot plant at Camp Detrick, none were ever used.⁴⁴ After the war, basic research and development activities were continued at Fort Detrick.⁴⁵ The program was expanded during the Korean War as technical advances allowed large-scale fermentation, concentration, storage, and weaponization of microorganisms. In addition, a program to develop countermeasures, including vaccines, antisera, and therapeutic agents to protect troops from possible biological attack, was begun in 1953. By the late 1960s, the US military had developed a biological arsenal that included numerous bacterial pathogens, toxins, and fungal plant pathogens that could be directed against crops to induce crop failure and famine⁴⁶ In addition, bio weapons were developed for the Central Intelligence agency using cobra venom and other toxins.⁴⁷

All of these programs were terminated after President Nixon announced in 1969 that the United States was unilaterally renouncing the right to possess or use biological weapons.

The Current Threat: Rogue States

Deliverable weapons of mass destruction in the hands of a terror network, or a murderous dictator, or the two working together, constitutes as grave a threat as can be imagined. The risks of inaction are far greater than the risk of action.

- Vice President Cheney, 26 August 2002

We know full well that weapons of mass destruction are being sought by nations, despite the international norm outlawing such weapons, who would not hesitate to use them against us. These include biological weapons, which potentially have capacity to do far more harm than even nuclear weapons at a much lower cost.⁴⁸ Today, there is little doubt that a dozen or more of these rogue nations have clandestine biological weapons programs.⁴⁹ And over the past 40 years there have been at least 121 incidents around the world involving the use of biological agents.⁵⁰ While Iraq's efforts at acquiring biological and other weapons of mass destruction are well documented,⁵¹ a number of other clandestine programs continue in a number of other countries.⁵² Only a few countries with known programs have given them up and primarily as a direct result of regime change to a democratically elected pluralistic government.

For example, despite its ratification of the BWC in 1975, South Africa actively pursued an offensive biological weapons (BW) program. The precise scope and results of the BW program remain unclear, but public hearings and court documents mention research on bacterial pathogens, viral pathogens, and toxins. By 1985, South Africa had certainly tested the military utility of a

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number of toxins. Meanwhile, the government allegedly used anthrax bacteria and botulinum toxin for assassinations, and the military is alleged to have used cholera bacteria to contaminate water supplies. However, no clear evidence exists of either the weaponization or large-scale production of any pathogen or toxin, and in 1990, soon-to-be-retired President F.W. de Klerk ordered all work halted on lethal agents.⁵³

Arguably the most disconcerting and dangerous program was (and is) the former Soviet Union's biological warfare efforts subsequent to its ratification of the BWC. As documented by Ken Alibek,⁵⁴ the former deputy head of Biopreparat, the Soviet agency charged with running the biowarfare program, tons of biological agents were produced for use against the United States and its allies. Biological weapons were so attractive to the Soviet Union that it risked international censure and spent vast resources to produce them. The Soviet program reached its heyday in the 20 years *after* the Soviets ratified the 1972 treaty. At its height, 32,000 people worked for Biopreparat (the civilian pharmaceutical and vaccine company that served as a cover for biological weapons work), an additional 10,000 or so worked in Defense Ministry bioweapons laboratories, and thousands of others were scattered through other agencies.⁵⁵

In 1991 then President Yeltsin agreed with the United States and the United Kingdom to open up BW facilities and take steps to ensure there were no longer any biological weapons programs underway. But to this day much of the former program remains shrouded in secrecy and "[t]here is concern . . . that there remains a very large production capacity, and possibly even research and stockpiles, that have not been destroyed as required by the

Biological Weapons Convention.”⁵⁶ As a result of Russia’s recalcitrance, the Bush Administration in 2002 refused to certify that Russia was taking the necessary steps to eliminate and dismantle the relics of its past biological warfare programs.⁵⁷ Fears abound that these agents and weapons still exist, are poorly guarded and ripe for smuggling by underpaid, disgruntled, and desperate employees. As one Pentagon expert describes it, “There’s been a lot of talk of nuclear smuggling. However, I personally believe that loose [germs] could perhaps be even more realistically used by terrorist groups to attack targets over here and in the United States.”⁵⁸

The Russians still refuse to allow inspectors or the public into many of the sites known to be laboratories for producing bio weapons.⁵⁹ One of the closed labs, the Center of Military-Technical Problems of Biological Defense at Yekaterinburg (formerly Sverdlovsk), was the site of an accidental anthrax release in 1979 that killed at least 68 people.⁶⁰ While the US Government has provided millions of dollars under the Cooperative Threat Reduction program⁶¹ to enhance security and retrain scientists at Russia's civilian-run bioweapons factories, the veil of secrecy surrounding military labs has fueled suspicions that Russia is continuing research on offensive BW weapons. Equally troubling is the probability that many scientists and technicians employed in these programs have sought employment in countries known to have active BW programs. These include Iran, Syria, North Korea, and Iraq.

Iraq’s thirst for weapons of mass destruction is well known and serves as the basis for the current international security threat that it poses. There is overwhelming evidence that one of the core

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objectives of the Iraqi regime is the acquisition of biological weapons. Saddam Hussein has evidently sacrificed all other domestic and foreign policy goals to the singular aim of acquiring WMD. A recent report by the Institute of International Strategic Studies recounts Iraq's denials of weapons capacity, its strenuous attempts to deceive and hinder UN inspectors, and the many UN resolutions it has failed to obey. It concludes that, if unchecked, Iraq will most certainly rebuild, if it hasn't already, its WMD capabilities, and "it seems likely that the current Iraqi regime will eventually achieve its objectives."⁶² In the past decade, Saddam has systematically broken every agreement he's made with the UN and violated with impunity all of the Security Council resolutions demanding he disarm and eliminate his WMD capabilities. In fact, the Iraqi regime has been doing the opposite; busily enhancing its biological weapons and other weapons of mass destruction capabilities.⁶³ As Vice President Cheney has declared, "These are not weapons for the purpose of defending Iraq; these are offensive weapons for the purpose of inflicting death on a massive scale, developed so that Saddam can hold the threat over the head of anyone he chooses, in his own region or beyond."⁶⁴

Iraq is believed to have maintained a substantial stock of biological warfare agents and is researching different ways of "weaponising" them. In fact, Iraqi officials have even bragged about the fact they possess biological weapons.⁶⁵ Following revelations made by Lieutenant-General Hussein Kamel, a son-in-law of the Iraqi leader who defected to the United States in 1995, Baghdad admitted for the first time that it had produced biological agents. According to the Iraqi government, Baghdad produced 8,400 liters of anthrax, 19,000 liters of botulinum, and 2,000 liters

each of aflatoxin and clostridium. A single gram of anthrax—roughly 1/30 oz—contains 1 trillion spores, or enough for 100 million fatal doses if properly dispersed. Iraq now claims to have destroyed these agents. But as Charles Duelfer (former UNSCOM Inspector) stated, "In terms of where it went, we could never nail it all down."⁶⁶

Even if inspectors had found all the materials before they left the country, Iraq has almost certainly made more in the past four years. Thanks to Rihab Taha, a British-educated Iraqi biochemist, nicknamed Dr. Germ by the U.N. inspectors, Saddam still has the best biological expertise in the region.⁶⁷ There are fears that Iraq has developed large quantities of smallpox, Ebola virus, bubonic and pneumonic plague bacteria, and the toxin, ricin. Other defectors had described in detail the hidden underground laboratories and mobile laboratories designed to thwart any attempt at detection or to be subject to inspection by UN inspectors.⁶⁸ As far as delivery vehicles are concerned, in addition to using Scud missiles, Anthony Cordesman, of the Center for Strategic and International Studies in Washington, wrote in a recent report,

Iraq can certainly produce new stocks of bulk BW agent, including botulinum toxin and anthrax with its existing facilities, equipment and materials. BW agent could be delivered by short range munitions including artillery shells and rockets. Delivery by ballistic missile is more problematic given that much of the agent would be destroyed on impact and the immediate area of dispersal would be small. Civilian casualties could still be in the hundreds or thousands. Refurbished L-29 trainer aircraft could operate as weapons-carrying UAVs with a range of over 600km. Such UAVs, in theory, would be considerably more effective than ballistic missiles in delivering CBW. Commando and terrorist attack is also possible.⁶⁹

The Current Threat: Non-State Actors

It is a certainty that the al Qaeda is pursuing [weapons of mass destruction] and has succeeded in acquiring at least a crude capability to use them.

- Vice President Cheney⁷⁰

Some have argued that biological weapons are too difficult to disperse to be feasible, and that terrorists fear these agents too much or know too little about them to be willing to fabricate or use them in any effective way.⁷¹ The relative historical rarity of BW use can most likely be explained by a combination of factors such as deterrence, delayed and unpredictable consequences, the risk of self-injury, and moral qualms about using such weapons. On the other hand, as the former deputy head of the Soviet Union's biological warfare program stated "These weapons are attractive to some nations and terrorist groups alike, because they are relatively easy and inexpensive to produce and can cause widespread illness, fatalities and panic. And the effect of these weapons is not immediately obvious, allowing time for the terrorists to escape."⁷²

Terrorist threats to use or steal biological agents are real and must be taken seriously. Indeed, it is widely recognized that just a few kilograms of these agents can inflict severe, long-lasting and widespread harm on a par with or even greater than the devastation of a nuclear explosion. The description of the horrors that may be visited upon us when—not if—biological weapons fall into the hands of terrorists or rogue states is well documented⁷³ and the stuff of popular culture. Indeed as one proliferation expert describes it "Only a blind, deaf and dumb terrorist group could have survived the last five years and not been exposed at least to the possibility of the use of WMD while the

more discerning terrorists would have found some tactically brilliant possibilities already laid out on the public record.”⁷⁴

Evidence that it is possible to amass the material and know-how *without* a government's assistance exists in the case of Aum Shinrikyo, an apocalyptic cult that conducted several acts of terror in Japan in the 1990s.

Aum Shinrikyo, which had about 40,000 members worldwide, produced large amounts of botulinum toxin and the bacterium that causes anthrax. Aum Shinrikyo's experience, however, demonstrates that access to the raw materials does not ensure successful attacks. From 1990 to 1993, cult members released the botulinum toxin five times and anthrax spores four times, causing no casualties. The organization's most notorious terrorist act—the release of sarin in the Tokyo subway on March 20, 1995—killed only 12 people, although it injured more than 1,000 and caused panic.

The only modern example of biological terror in the United States, prior to the anthrax letter attack in 2001, occurred in 1984 when a religious group called the Rajneeshees put salmonella bacteria in salad bars and coffee creamers in 10 restaurants in Oregon. This caused 751 cases of illness but no deaths. While not significant in terms of numbers or fatalities, there have been a number of other individual cases over the last several decades in which biological agents have been used or the threat of such use against individuals or groups.⁷⁵

Terrorists are generally not too concerned with the yield effectiveness of their weapons of terror. That fact alone raises the chance that some group may eventually attempt an act of terror using biological or chemical means. Indeed, "The chance of a

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large [bioweapons] attack that affects tens of thousands or hundreds of thousands is very small. But is that what the terrorist cares about? Inducing enough disease to produce panic or disrupt life is probably enough.”⁷⁶ The likelihood of BW use will continue to increase due to the increasing attractiveness of asymmetrical warfare, and the extensive public attention given to BW in the media and by political leaders, which has increase awareness of US vulnerabilities and the possibilities of paralyzing and undermining the Government.

Over the last several years fanatical groups have embarked on concerted efforts to acquire biological weapons. With money no object, fanatics are supposedly being trained to use these agents on Western populations.⁷⁷ For example, Osama Bin Ladin’s Al Qaeda has threatened to unleash a terrorist offensive using chemical and biological weapons.⁷⁸ And, as recent discoveries in Afghanistan have confirmed, terrorist groups such as Al Qaeda are actively pursuing the capability to use biological agents for terroristic purposes against the United States and its allies.⁷⁹

Clearly, there are advantages in using BW to include its accessibility; destructive potential; potential covertness; political, social and psychological salience; and the intensive media attention an attack would attract. Despite prodigious efforts at protection and preparedness, there is, unfortunately, little doubt that a BW attack will occur again against the United States or its interests, probably within the next ten years.

**THE EMPEROR HAS NO CLOTHES: THE FAILURE OF
THE “VERIFICATION” PROTOCOL AT THE BWC
REVIEW CONFERENCE**

In my opinion—and I know some people are going to be disappointed in my response—this treaty is worthless. It isn't worth the price of the paper it's written on. Why?

Because I believe enforcement is impossible. Research and production are easy to hide and difficult to prove. Timetables for inspections are very limited, and it is impossible to search countries like Russia and China with such limited timeframes. Iraq is a small country, but we were unable to find everything until Saddam's son-in-law defected. But even in this case we have not "discovered" everything.

- Dr. Ken Alibek, former deputy head of Russia's secret biological warfare program⁸⁰

Disarmament Efforts Prior to the BWC

The history of mankind's efforts to proscribe, limit, and restrict the use of biological weapons is as long as the history of the use of such weapons. In approximately 100 BC an Indian treatise on the conduct of war urged combatants not to use poison.⁸¹ German gunners in the late Middle Ages pledged not to use "poisoned globes" or any poison since to use such devices was considered unjust and "unworthy of a real soldier."⁸² In 1675 French and German armies agreed not to use poisoned weapons against each other.⁸³ W.T. Sherman's memoirs contain an account of Confederate soldiers poisoning ponds by dumping the carcasses of dead animals into them. Incidents like this led to the issuance by the US Army of General Order No. 100 which stated "The use of poison in any manner, be it to poison wells, or food, or arms, is wholly excluded from modern warfare."⁸⁴ Finally, the Hague Convention No. III on the rules of war of 1907 prohibited the employment of "poison or poisoned weapons."⁸⁵

During World War I, bacteriological warfare became much more sophisticated after the causative organisms for many diseases were identified and cultured. However, most biological attacks were directed at livestock. The United States and other nations experimented with the use of biological agents, but by the

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1920's most nations had concluded that BW was impracticable, either because of inadequate delivery systems or improved public health systems. Consequently, as a result of a US initiative, biological agents (and chemicals) as a method of warfare were banned by the 1925 "Gas Protocol"⁸⁶ but the possession of such weapons was not. By World War II all the great powers had ratified the Protocol except the United States and Japan. However, most nations agreed to the ban on condition they could respond in kind if chemical or biological weapons were ever used against them, the so-called "second use reservation."

Efforts to ban the development or possession of biological weapons continued as part of the general disarmament efforts of 1930's. Notable was the 1933 British Draft Convention on Disarmament, which included provisions banning the materials for producing such weapons.⁸⁷ These efforts stalled with the outbreak of World War II and the perceived need to continue to do research on the potential for such weapons in the possible event that their use may be necessary in response to a chemical or biological attack. Nevertheless, such was the aversion to using these types of weapons that in 1943, President Roosevelt declared that these types of weapons were "outlawed by the general opinion of the civilized world."⁸⁸

During the late 1960s, there was increasing international concern regarding the indiscriminate nature, unpredictability, epidemiological risks, and lack of epidemiological control measures for biological weapons, as well as the ineffectiveness of the 1925 Gas Protocol for preventing biological weapons proliferation. In July 1969, Great Britain submitted a proposal to the Committee on Disarmament of the UN prohibiting the

development, production, and stockpiling of biological weapons and providing for inspections in response to alleged violations. During the following September, the Warsaw Pact nations submitted a biological disarmament proposal similar to the British proposal, but without provisions for inspections. Two months later, the World Health Organization issued a report regarding the potentially staggering consequences of biological warfare.⁸⁹

Amid growing doubts over the utility and morality of ever using these weapons, President Richard Nixon ended the US germ warfare program in 1969. Subsequently, in 1972, the United States, United Kingdom, and the Soviet Union, along with more than 100 other nations, signed the Biological Weapons Convention (BWC).

The BWC established a global ban on biological weapons. Under its terms, countries undertake not to develop, produce, stockpile, or acquire biological agents or toxins "of types and in quantities that have no justification for prophylactic, protective, and other peaceful purposes," as well as weapons and means of delivery. One hundred forty-five countries, including the United States, have joined the treaty. This complements the 1925 Gas Protocol which prohibits the use in armed conflict of biological weapons. In view of the fact that both the BWC and the Gas Protocol have near universal membership (and since 1969 no state has professed a right to possess and use such weapons) most international legal experts have concluded that biological weapons are prohibited by customary international law.⁹⁰ Signatories agreed to end their germ warfare programs, although they retained the right to continue research into defensive measures against such weapons. The United States destroyed its stockpile, along with

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most, if not all signatories, the notable and lamentable exception being the former Soviet Union, as previously discussed.

Rejection Of A “Maginot Treaty”: Why The Proposed “Verification” Protocol Failed

Not having a verification regime has long been considered by many as a weakness in the BWC regime, particularly the lack of on-site measures to address allegations of noncompliance. Politically binding confidence-building measures were endorsed and accepted in 1986 and 1991, but it was recognized that these voluntary measures would be inadequate to address the perceived weaknesses of the Convention.⁹¹

While most European members of the BWC “Western Group” negotiating bloc believed, and publicly stated,⁹² that verification was possible, the United States consistently and well prior to the adoption of the BWC took a different view. In a 1951 report to President Truman the authors opined that “it would be practically impossible to detect biological warfare activities by an inspection scheme.”⁹³ Forty years later, at the 1991 BWC Review Conference, US Ambassador Ronald Lehman, Director of the Arms Control and Disarmament Agency, would state unequivocally that

- The BTWC could not be verified effectively⁹⁴ because biological production facilities are dual-use and lack distinctive “signatures”;
- A negotiated regime could not be sufficiently intrusive to detect clandestine facilities, generating false confidence that a country was in compliance when in fact it was not; and
- Highly intrusive inspections by multinational teams could expose both government and commercial facilities to foreign espionage. In particular, the loss of valuable trade

secrets could weaken the competitive edge of the US biotechnology and pharmaceutical industries.⁹⁵

Nevertheless, the parties agreed in 1991 to convene a group of experts to explore the possibility of additional measures which would, from a scientific and technical standpoint, provide additional confidence that states were in compliance with their legal obligations under the BWC. It had no negotiation mandate. In 1993, after meeting four times in 1992 and 1993, the expert group issued a consensus report that concluded that some 21 confidence-building measures, either singly or in combination, could strengthen the “effectiveness and improve implementation of the” BWC by providing additional information on whether or not a party was engaged in prohibited or permitted activities.⁹⁶ Importantly, the experts did not recommend that these measures be made legally binding, and predicated their endorsement of verification measures by stating that “appropriate and effective verification could reinforce the Convention.”⁹⁷ This language was a compromise driven more by political considerations than any hard scientific evidence that methodologies and technology could effectively verify compliance or noncompliance.⁹⁸

A Special Conference of parties was called in September 1994 to review the report. Despite misgivings over the efficacy of a legally binding “verification” protocol to the BWC, the newly elected Clinton Administration agreed to the convening of an Ad Hoc Group (AHG) to develop a legally binding Protocol to the BWC, which most member states characterized as a “verification protocol.”

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When negotiations on the protocol began in 1995, the US Government reaffirmed its consistently held position that the BWC is not verifiable. As one of the chief negotiators recently stated: "the goal established by the administration was to promote measures that would provide some degree of increased transparency of potential biological weapons-related activities and facilities," not verification.⁹⁹ This, however, was not the view of most of the United States' allies. In 1999 the European Union issued its "Common Position" calling for the establishment of a "verification and compliance regime."¹⁰⁰

In April 2001, after six years of fruitless multilateral negotiations which produced a heavily bracketed "rolling" text,¹⁰¹ the chairman of the AHG proposed a compromise text¹⁰² of the Protocol that sought to bridge the remaining gaps among national positions. This text contained a number of key elements;

- Mandatory declarations of facilities and activities that could be diverted most easily to develop or produce biological weapons;
- Consultation procedures to clarify questions that might arise from declarations, including the possibility of on-site visits;
- Randomly selected transparency visits to check the accuracy of declarations; and
- Challenge investigations to pursue allegations that a country is developing, producing, or employing biological weapons.¹⁰³

This text proved to be just as unacceptable to the United States, and on July 25, 2001, the United States announced that it would formally oppose the Protocol.¹⁰⁴ An unidentified US official elaborated, saying that the Protocol added nothing to our verification capabilities and that "looking at this treaty in purely

cost-benefit terms, it has zero benefits. And it has three categories of substantial downsides.” The downsides are: “First, it would have caused risks in US biological warfare defensive preparations. Second, there was a risk of the loss of highly sensitive and highly valuable intellectual property from the US pharmaceutical and biotechnology industries, and finally the risk of the loss of integrity and utility in the multilateral export control regimes the US participates in.”¹⁰⁵

As one senior official explained, “We strongly believe in the importance of the Biological Weapons Convention and the need to strengthen it. But the anthrax attacks against Americans show that a treaty is not the be-all and end-all to stopping the spread of biological weapons or preventing and dealing with germ attacks.”¹⁰⁶ US officials argued, among other things, that it was useless to add more paperwork if countries such as Iraq, Iran, and North Korea were already flouting their obligations.

As an alternative to the “dead and not going to be resurrected” protocol, the United States offered a package of nine measures that could be implemented through national legislation. US views were explained in detail prior to the conference in a speech by President Bush proposing an alternative series of measures to strengthen the norm against biological weapons.¹⁰⁷ Subsequently, Undersecretary of State for Arms Control and International Security John Bolton explained in some detail the US alternatives. These included arrangements to enhance criminal extradition agreements with respect to BW offences and legislation making it a criminal offence for persons to engage in activities prohibited by the BWC. Furthermore, he believed that countries should (a) adopt and implement regulations restricting access to dangerous

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micro-organisms, as well as on domestic and international transfers; (b) report internationally any releases or adverse events that could affect other countries; and (c) sensitize scientists to the risks of genetic engineering, explore national oversight of high-risk experiments, and establish a code of conduct for scientists working with pathogens. The United States also sought the elaboration of a mechanism for international investigations of suspicious outbreaks of disease or alleged BW incidents. Countries would need to "accept international inspectors upon determination by the UN Secretary General that an inspection should take place." Washington also advocated "setting up a voluntary cooperative mechanism for clarifying and resolving compliance concerns by mutual consent."

Under the heading of assistance to victims and technical and scientific cooperation, Bolton proposed that countries "adopt and implement strict biosafety procedures, based on WHO [World Health Organization] or equivalent national guidelines," support the WHO's global disease surveillance and response capabilities, and develop a capacity for rapid emergency medical and investigative assistance in the event of a serious outbreak of infectious disease. Taken together, this range of measures to restrict access, strengthen international disease detection tools, and provide assistance in the event of an outbreak would "enhance collective security and collective well-being."¹⁰⁸

In view of these events, a key objective of the November 2001 Fifth Review Conference was to develop alternative strategies for strengthening the BWC. At the outset of the conference, the head of the US delegation, Undersecretary of State Bolton, accused six states of violating the BWC: Iran, Iraq,

Libya, and North Korea (all parties to the Convention); Syria (which has signed but not ratified); and Sudan (which has neither signed nor ratified). Bolton insisted that the Conference's Final Declaration refer to the problem of noncompliance, but several countries, led by Iran, objected.

In an attempt to develop a compromise formula, the European Union (EU) proposed annual meetings of BWC member-states and the creation of governmental "expert groups" that would assess the implementation of strengthening measures agreed by the Review Conference and consider new ones. The EU proposal appeared to offer a workable compromise. Nevertheless, late in the afternoon on the last day of the conference the United States said it would accept the EU formula only on the condition that the mandate of the Ad Hoc Group was "terminated." Because preservation of the Ad Hoc Group mandate (and hence the possibility of restarting the multilateral negotiations when the political climate improved) had long been a bottom line for many delegations, this last-minute US proposal blocked the consensus needed to adopt the politically binding Final Declaration.

The US proposal at the Conference angered other delegations and NGO advocates¹⁰⁹ not only because of its controversial content but also because of its late introduction, less than two hours before the meeting was scheduled to end. In a highly charged atmosphere, to prevent the Review Conference from failing completely, Chairman Tibor Tóth suspended the meeting for a year, to be re-convened in November 2002, allowing a year's "cooling-off" period.¹¹⁰ While it was clearly the United States refusal to agree to the protocol that was the reason for this unusual situation, the United States was not the only country opposed to

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the protocol. Rather, the United States was the one with such important interests at stake that it was willing to take the political heat for rejecting it.¹¹¹

The Basis for US Rejection of the Protocol

The concerns over the effectiveness and feasibility of the draft protocol, which led to its rejection by the United States, centered on the burdens declarations, investigations, and export controls would impose upon a state party and its bio-pharmaceutical industry. Undersecretary of State John Bolton described US objections to the Protocol this way:

The reason the United States rejected the protocol was best summarized by a 1993 Congressional report which stated: “While the controversy over [BWC] verification has focused largely on technical issues, it is fundamentally a political debate over whether the burden of uncertainty associated with verification would hamper more severely the verifier or the violator.”¹¹²

For the United States, with its massive biotechnology industry, and its sensitive bio-defense programs, the costs of putting these at risk outweighed the minimal gains. More specifically, the United States rejected the protocol for three reasons. First, it was based on a traditional arms control approach that will not work on biologically based substances. Second, it would have compromised national security and confidential business information. Third, it would have provided a “false sense of security,” and been used by proliferators to undermine other effective international export control regimes.¹¹³ Indeed, a number of BWC parties that have been publicly accused of possessing BW capabilities appeared to be quite prepared to sign up to the protocol; obviously not fearing that they would be

unduly exposed and expecting they would derive a degree of legitimacy by becoming a party to the protocol.

Even Protocol adherents agree that BW programs are inherently difficult to detect because BW-related activities lack unique, distinguishing features, are easily concealed, are often dual-use in nature, and may be nested within legitimate facilities. At best inspection activities have only the possibility of providing some useful information to enhance our understanding about suspect activities. As the United Kingdom contended,

If the objective is on greater levels of transparency, better tools for tackling non-compliance and focused scientific and technological co-operation measures, then a useful role can be demonstrated for the draft Protocol as an adjunct to other measures. Its defence does not lie in protestations that it is better than nothing, or that any agreement on these issues is worth having as an end in itself.¹¹⁴

Even if one ignores the risks to legitimate industry and bio-defense programs, this is thin gruel. Given the clearly marginal increase in confidence-building information, coupled with only the hope it will foster greater compliance and cooperation in stopping proliferators, it did not make much sense from the United States' point of view to put a heavy burden and large risk on the United States' biological defense programs and its pharmaceutical and biotechnology industries.

The United States has by far the largest biodefense program in the world. Department of Defense researchers are exploring a host of technologies and scientific advances, including biological agent detectors, decontamination equipment, and treatments or preventatives to counter the effects of BW agents. In addition, biologically based new technologies are being explored which

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hold the promise of new advances in the use of organisms for both military and peacetime uses. These efforts have the potential to transform the way the military conducts surveillance and communicates, and they open up additional possibilities for non-lethal uses of biologically based agents. Such programs involve both proprietary and classified information.

Under the proposed protocol the United States would have been obligated to reveal extensive details on these programs in complying with the protocol's requirements for declarations and inspections. Attempting to comply with this requirement without exposing the sensitive and classified details of such programs would be problematic. First, "[p]roviding extensive information about these efforts in an unclassified format to an international organization under the guise of 'transparency' runs the risk of providing a proliferator or terrorist with a roadmap to exploit our vulnerabilities."¹¹⁵ Terrorists and rogues would learn not only of promising defensive capabilities but also about areas of vulnerability. Second, in cases where for national security reasons the United States refused to provide a sufficient level of detailed information or access to highly classified programs there would be the inevitable allegations of a clandestine BW program and no way for the United States to satisfy those concerns without exposing the program(s) to international scrutiny.

Concerns over protecting the investments of the pharmaceutical and nascent bio-technology industries were also a key reason the United States rejected the protocol. In their zeal to achieve a verification protocol, most of our European allies downplayed the potential impact of intrusive investigations and

inspections on their industries. Interestingly, while the United States produces about 45% of all the drugs produced world-wide, Europe produces about 42%.¹¹⁶ The world's pharmaceutical industry cautioned against imposing onerous burdens on the industry and raised the specter of potentially major losses of commercial proprietary information; protocol advocates tended to ignore these warnings.

The United States \$120-billion-per-year pharmaceutical industry is the world leader in the research, development, and production of new drugs. Expenditures represent about 1.5% of Gross Domestic Product.¹¹⁷ The investment in terms of time and money is extraordinarily high. It takes on average 15 years and over \$500,000,000 to bring a potential product to market¹¹⁸ Protecting this huge investment is a key concern, particularly since the organisms, processes, and equipment are not patented or otherwise protected, and industrial espionage is rampant in this industry. A clandestine swipe of a laboratory desk top could result in the loss of years of research and hundreds of millions of dollars in investment.

Control over proprietary data would be extraordinarily difficult, if not impossible, under the proposed protocol. There is extreme risk that valuable proprietary information could be lost either through required declarations or as a result of a visit or investigation by inspectors. Managed access, the procedure used under the Chemical Weapons Convention, to try to protect information, is unlikely to protect, for example, formulae for newly developed drugs, or data on processes, methodologies, and materiel that give a company a competitive edge.¹¹⁹ Likewise, the

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mere fact a firm was the subject of a biological weapons inspection could result in the loss of consumer and investor confidence in the firm and its products. At a minimum, the potential exists that the firm's integrity and professional reputation could be called into question. Firms that participate in Government sponsored biodefense programs have been extremely reluctant to advertise their participation in these important programs primarily because of concerns over how that participation would affect the public's perception of the firm. The potential for this was dramatically revealed during US trial inspections at US pharmaceutical firms.

Finally, the United States conducted trial inspections demonstrated that how such inspections or so-called "visits" could have unintended consequences, creating ambiguities and generating suspicions rather than allaying them. As one of the participants noted, "Indeed, the inspecting teams in these mock exercises left with less confidence that a perfectly legal facility was in compliance with the convention than they had before the visit took place."¹²⁰ In other words, its perfectly legitimate activities could be construed as covers for illicit biological weapons activities. No wonder the United States was and remains skeptical about the viability and advisability of agreeing to the protocol which would require just these types of inspections and investigations. Given these potential losses and risks there would have to have been a significant return in terms of being able to verify if a state was engaged in illicit biological activities. Even protocol adherents agree that was not the case.

The Futility of Verification

In many cases you need to produce more biological agent for the vaccines than for the actual biological weapons.

- Mr. Ron Cochran, Bio warfare expert,
Lawrence Livermore National Laboratory¹²¹

Many protocol advocates have argued that verification is possible and that the United States was setting an impossible standard for verification noting that it had agreed to verification inspections in a number of other arms control agreements.¹²² The United States contended, however, that “verification” requires, at a minimum, that it be “more probable than not” that measures be able to come to a definitive conclusion with a greater than 50 percent probability that a suspect activity was or was not in violation of the BWC. Unlike other arms control agreements where treaty limited items were countable (for example, the Intermediate Range Nuclear Forces Treaty), visible (for example, the Limited Test Ban Treaty), measurable (for example, the Conventional Forces in Europe Treaty), or unique and non-naturally occurring (such as the toxic chemicals in the Chemical Weapons Convention), none of these characteristics pertain to biological weapons. The United States argued that “verification,” although imperfect in each of agreements noted above, has a standard that cannot be met for biological materials with current technologies. Interestingly, the “verification” standard, despite United States’ stated doubts about its efficacy in this area, was never discussed in detail by any other states party throughout the 10-year history of BWC protocol negotiations.

In order to accurately assess US conclusions about the futility of inspections and other measures in the protocol, the United States objectively conducted inspection exercises at a number of

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facilities likely to be targets for inspections or investigations. Scientific methods and controls were used in a scrupulously unbiased effort to fairly determine whether any of the proposed measures could provide sufficient evidence or information so as to make conclusive judgments about the presence or absence of a program. These inspections took place from 1994 to 1996 at vaccine production facilities, university laboratories, and US biodefense sites. The conclusions derived from these mock inspections were that the measures contained in the protocol for checking national declarations would not build confidence, and in all likelihood not unearth an illicit BW program. Indeed, the proposed measures of visits and investigations—euphemisms for inspections—would almost certainly result in more ambiguous data generating even more suspicion. Activities normally carried out in pharmaceutical and bio-defense facilities are indistinguishable from those that would be used to develop and produce BW agents. Absent the actual weaponization of the agent (filling a bomb or spray device for example), there are logical, rational, and perfectly innocent reasons for maintaining quantities and types of agents that have in the past been used as weapons.

Also, efforts by the visited site to protect data often raised more questions as well as more suspicions. Unauthorized efforts to exceed the boundaries of the agreed inspection areas, for example, heightened industry concerns over potential losses and objections simply increased the suspicions of the inspectors.¹²³ Ultimately, the difference is simply one of intent. While intent can be gleaned from other factors and sources (for example, intelligence gathering, analysis, defectors), the activities subject to

inspections and investigations hardly ever contribute anything to the “intent” assessment.

The mock inspections did, however, reveal that challenge inspections, in some situations, and disease-outbreak surveillance and inspection could be useful to a degree. For example, if a very specific allegation were to be made about BW use in a given location, and if immediate access (defined in terms of hours) to that place was obtained, there is a greater degree of likelihood illegal activity there would be discovered. On the other hand, a challenge inspection to a pharmaceutical facility, for example, would be exceedingly unlikely to uncover illicit activity even if it existed, due to the size and multiplicity of the processes taking place there.¹²⁴ For example, the author visited Monsanto Industries in St. Louis, Missouri where the plant facility was several hundred acres in size and there were 18 vaults each containing thousands of samples of biological agents. One of the scientists commented that he could hide anthrax in ears of corn growing in their experimental fields and finding it would be problematic. Large vaccine production facilities would also be ideal places to hide illicit BW activity since there would be legitimate requirements for maintaining large quantities of agents for production purposes.

It should be noted that there were some trial inspections conducted by other countries (notably the United Kingdom and the Netherlands) where results were at variance with mock inspections conducted by the United States, claiming that the results proved that verification was possible or more likely than the conclusions arrived at by the United States.¹²⁵ However,

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skepticism is called for since we only have the conclusions of those obviously biased in favor of such measures. The methodologies, the procedures, and the standards used have not been made available publicly for an objective assessment. As one of the chief scientists for the US mock inspections stated,

To the best of my knowledge, none—and I mean none—of these so-called mock inspections meet any of the scientific requirements of trial experiments. And none . . . have been published with their methodologies, hypotheses, and analyses intact for all to see. Trial inspections are difficult and expensive to execute properly. It is all too easy to construct a trial and populate it with hand-picked participants to get the answer one wishes to hear. We can do—and did do—better than this.¹²⁶

The results, shared with members of the Western Group, were anathema to BW verification advocates. “Confidence building,” “declaration checking,” and other transparency measures failed miserably in their ability to provide any usefully information to make a compliance determination. Indeed, the inspecting teams in these mock exercises left with less confidence that a perfectly legal facility was in compliance with the convention than they had before the visit took place. Given that the vast majority of activities advocated for the protocol would be time consuming and operationally onerous visits rather than formal investigations neither of which would provide very little if anything to the compliance-noncompliance calculus, the United States came to believe that the protocol could actually weaken the BWC. Further, given the real and substantial potential loss of intellectual property there was little incentive to “go along” with trying to create measures to verify that which was unverifiable in a benign environment.

The experience in Iraq with UNSCOM on-site inspections was the final nail in the coffin of BW verification. This experience conclusively demonstrated the futility of on-site inspections even under circumstances where inspectors could “go anywhere, any place, any time.” As Time Reporter Joanna McGeary recently wrote,

Despite more than 30 searches for various unconventional arms, inspectors did not even know of its existence until mid-1995, when Saddam's defecting son-in-law Hussein Kamal revealed that secret labs buried in Iraq's security, not military, apparatus were cooking up deadly germs. Iraq subsequently admitted it made batches of anthrax bacteria, carcinogenic aflatoxin, agricultural toxins and the paralyzing poison botulinum. Iraqi officials reported they had loaded 191 bombs, including 25 missile warheads, with the poisons for use in the Gulf War. They said they destroyed them after the conflict, but they presented no proof, and Western officials don't believe them.¹²⁷

As the Iraqi experience proved the absence of evidence is certainly not evidence of absence. If anything the Iraqis have since the end of inspections in 1998 become increasingly sophisticated and knowledgeable in the ways and methods of hiding clandestine BW labs and weapons facilities.¹²⁸ Even the most intrusive and coercive inspections are unlikely to reveal anything absent Hussein's unimaginable cooperation.¹²⁹

Obviously, if an intrusive inspection effort such as was undertaken by UNSCOM proved unable to find a clandestine BW program, it is hard to see how anything less would have any greater success. Even more disturbing, arguably the lessons learned out of the UNSCOM experience will likely give proliferators the knowledge necessary to circumvent their international legal obligations and effectively hide illicit

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programs. Arguably the lessons learned of the UNSCOM experience will likely give proliferators the knowledge necessary to circumvent their international legal obligations and effectively hide illicit programs.

In the face of a determined effort to hid such programs, short of a long-shot fortuitous discovery, the chances of finding any evidence of a BW program is virtually nil. A critic of recent efforts to resume inspections in Iraq best summed up this hopeless task.

Inspections can only do one thing well: verify that a country's declarations about a weapons program are honest and complete. It is feasible for inspectors to look at sites and equipment to see whether the official story about their use is accurate. Inspectors can rely on scientific principles, intelligence information and surprise visits to known weapons production sites to test what they are told. It is a different proposition altogether to wander about a country looking for what has been deliberately concealed. That is a task with no end.¹³⁰

Thus, the United States strongly opposed labeling the protocol as a “verification” regime and advocated only challenge inspections as a potentially meaningful contribution to strengthening the convention. This approach has met with profound disapproval within the Western Group, whose other members continued to insist that “verification” was an achievable goal in the new protocol.”¹³¹ Some experts, while agreeing with the United States’ position that the Protocol could not provide confidence that countries were not cheating, argued that “a pact establishing standards and verification measures would deter some countries while also helping to build norms of international behavior.”¹³² In response, Undersecretary of State John Bolton told delegates to last year's review conference that "the time for

'better-than-nothing' protocols is over. We will continue to reject flawed texts like the BWC draft protocol, recommended to us simply because they are the product of lengthy negotiations or arbitrary deadlines, if such texts are not in the best interests of the United States."¹³³

Obviously, if the protocol can do little to strengthen the norm prohibiting the development, possession, and use of these weapons, are there any alternatives? In fact, there are a significant number of initiatives and mechanisms being undertaken or proposed which will have a much greater impact on this problem than any of the proposals contained in the now defunct protocol.

**A NEW PARADIGM FOR STOPPING BW PROGRAMS:
THE SEAMLESS WEB OF MULTIFACETED
INTERNATIONAL COOPERATION**

A single arrow is easily broken, a bundle of ten is not.
- Japanese proverb¹³⁴

In October 2001 President Bush, in the face of mounting criticism over the Administration's rejection of the Protocol, proposed the following seven measures as alternatives and as measures that would by measurable standards have concrete results:

1. Enact strict national criminal legislation against prohibited BW activities with strong extradition requirements;
2. Establish an effective United Nations procedure for investigating suspicious outbreaks or allegations of biological weapons use;
3. Establish procedures for addressing BWC compliance concerns;
4. Commit to improving international disease control and to enhance mechanisms for sending expert response teams to cope with outbreaks;
5. Establish sound national oversight mechanisms for the security and genetic engineering of pathogenic organisms;

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6. Devise a solid framework for bioscientists in the form of a code of ethical conduct that would have universal recognition; and

7. Promote responsible conduct in the study, use,¹³⁵ modification, and shipment of pathogenic organisms.

The President's proposals have served as a useful blueprint for tackling the many-faceted threat of bio warfare and terrorism, and are a useful point from which to build additional proposals to be discussed in more detail here. They also served as the basis for discussion and agreement at the re-convened BWC Review Conference in November 2002.

In the year following the suspended November 2001 Review Conference, a number of nations, primarily from the Western Group, discussed alternative proposals with the United States which could form the basis for agreement on a work program at the resumed Review Conference. Ultimately, in early Fall, the Western Group, led by the United Kingdom, France, Germany, and European Union Chairman Denmark, presented to Conference Chairman Tibor Toth a package of proposals which they believed would command consensus at the resumed Review Conference. The United States signaled its willingness to accept the Western Group initiative as long as it was presented as a take-it-or-leave-it proposal. Desperate for a successful outcome, Chairman Toth agreed, albeit reluctantly, to present the proposal as his proposal and as the best and only hope to avoid a failed conference.¹³⁶

The proposal package followed closely President Bush's initial 2001 proposals and included the following:

1. The adoption of national measures to implement the prohibitions of the BWC;

2. National mechanisms to establish and maintain the security and oversight of pathogenic microorganisms and toxins;
3. Enhancing national capabilities for responding to, investigating and mitigating the effects of alleged use of biological weapons;
4. Strengthening national and international institutional efforts for the surveillance, detection, diagnosis and combating of infectious diseases; and
5. The creation, promulgation and adoption of codes of conduct for scientists.¹³⁷

In addition the parties would agree to meet twice a year with the first meeting being a two-week meeting of experts followed by a one-week meeting of the states parties to consider the prior work of the experts. Items one and two would be considered in the first year, items three and four in the second year, and item five in the third year. The results of this effort would then be considered at the Sixth Review Conference in 2006. After almost a week of tense behind the scenes meetings and discussions, the Western Group, Eastern Group, and Non-Aligned Group agreed to the proposal and the Review Conference concluded successfully.¹³⁸

While concerns remain over whether some states may try to expand the scope of these meetings and attempt to resurrect the verification protocol or use these opportunities to attempt to create a new international enforcement and compliance organization similar to the Chemical Weapons Convention Organization for the Prohibition of Chemical Weapons, the agreed program of work complements nicely with the efforts of national governments and existing international governmental organizations to stop or rollback the proliferation of biological weapons. As a first step, states parties will need to fully comply with their already existing

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legal obligations under the BWC, such as implementing criminal legislation and controlling and regulating the transfer of agents. One study indicated that only 14 out of the 146 states parties have implementing legislation.¹³⁹ The first-year work program will focus attention on this noncompliance issue and work to establish much needed national standards on criminalization and bio-safety. It is also expected that international governmental organizations, such as the World Health Organization and INTERPOL, will have active roles in the work program. This work program by states parties to the BWC complements the multitude of other initiatives currently ongoing which address the threat of biological warfare or terrorism.

Overall, with the encouragement of the United States and on their own initiative, dozens of international governmental organizations and regional cooperative groups have declared policies, undertaken initiatives, and instituted mechanisms for combating terrorism and the threat of weapons of mass destruction. Almost all of these have relevance to the special problem of biological warfare and bioterrorism. Significantly, contrary to critics who decried the United States rejection of the draft Protocol as unilateralist, the US has aggressively pursued cooperative, multilateral approaches in these other, more effective areas and forums to enhance national, regional and international peace and security. It is in the unique case of biological agents and weapons that the US quickly recognized that a cumbersome multilateral arms control negotiation arriving at an ineffective and potentially costly agreement was not the way to achieve a world free of this threat. Following on and complementary to the

agreement reached at the Fifth Review Conference for a three-year work program, the approach proposed here is that strengthening the prohibitory norm will only succeed by instituting a comprehensive set of denial mechanisms that involve national defensive measures, multiple measures by multitudes of subject matter specific international government organizations, national implementation of already-in-place compliance mechanisms, and the willingness of the community of nations to call to account BW—proliferators and terrorists alike.

The National Defense Imperative: First Responders And Bio-Security

While it is not the purpose here to discuss the full range of national initiatives to prevent and respond to a attack with biological weapons either by terrorists or rogue states,¹⁴⁰ it is nevertheless imperative that nations urgently develop defensive and responsive measures to protect their populations and send a message to would be attackers that they are fully prepared to respond to this type of attack, and that such attacks will not achieve the purposes for which they were intended. Further, because a biological defense security system would offer protection against both natural and nefarious transmission of disease, full implementation would directly benefit society even if no attack ever happened. Effective biological security requires that we fit the cure to the disease. Despite the fact that in 2002 an extra \$11 billion has been allocated for WMD defense, it has been provided without clear priorities or objectives.¹⁴¹

In any event, the United States is slowly but surely training, equipping and preparing for the likely eventuality of a BW incident. While some of these efforts are at the nascent stage, all

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are being assiduously developed and implemented as resources and technology make them available. These areas include the development of vaccines, establishing national disease surveillance networks, dramatically increasing the numbers and training of laboratory technicians with an emphasis on qualified microbiologists, training medical response teams, developing biological agent detection systems, developing advanced portable decontamination systems that can be immediately deployed in large numbers, creating special wings of isolation wards in existing hospitals to handle victims of BW, and conducting regular drills of the public safety and health systems to determine weaknesses in our response capabilities. As an added benefit, this kind of preparedness would also help to prevent unintentional outbreaks of disease.

All of these efforts will require additional state and Federal funding, greater coordination and cooperation, and a crash program in research and development of new technologies to detect rapidly the presence of biological agents.¹⁴² Admittedly, there are a number of scientific, financial, and legal hurdles to overcome in developing this comprehensive defense system. We are a long way from development of and approval for vaccines for the most common of biological warfare agents.¹⁴³ We still have not developed an effective biological agent detection system, and the funding for these measures is insufficient.

For all the other measures to work, it is essential that nations support national defensive measures. States of the former Soviet Union, in particular Russia, need to do more nationally as well as cooperatively with other nations to ensure that mistakes of the past do not become nightmares of the future.¹⁴⁴ Just as importantly,

because infected passengers can travel the world in less time than it takes for a disease to incubate, it is crucial, for the national interest as well as for humanitarian reasons, to improve cooperative efforts, such as disease surveillance, with other nations and international organizations. Disease cannot be stopped at the border. The United States must act internationally as well as nationally. This is one area the United States needs to do more.

The United States has slowly embarked on cooperative research and development initiatives in the detection and response to biological weapons. For example, in July, 2002, the Department of Energy and the British Ministry of Defense signed an agreement to collaborate on ways to detect and address the threat of biological (and chemical) weapons.¹⁴⁵ Other similar cooperative efforts are in the works. Currently however, there exists no national body to coordinate the multitude of national defense efforts with the initiatives of other nations and organizations. There should be a central clearing house for health, customs, police, military, financial, and intelligence organizations to share information on what initiatives and measures they are pursuing, whether or not there is any overlap in their efforts and for the encouragement of cooperative arrangements across specialized fields. As discussed below, while specialized international organizations are already embarked on similar efforts, there is as yet no organized effort to tie in national defensive initiatives with the multilateral efforts of the international community in which the United States is playing a key role.

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The soon-to-be-instituted Homeland Security Department will have as its goals the consolidation and synchronization of the efforts of Federal agencies, and to establish national policy and guidelines for state and local governments. With respect to the BW threat, since early detection of biological attacks will be crucial to saving lives, the new department will be tasked with developing, deploying, managing, and maintaining a national detection system.¹⁴⁶ That system will most likely consist of a national public health data surveillance system and a sensor network to detect and report the release of biological agents in densely populated areas. Logically, this new department would be best situated to lead the effort to integrate domestic efforts with international efforts at defending and responding to this threat, to include the integration of the national public health data surveillance system with the global networks being developed by WHO. In any event, for any of the other deterrence and denial strategies to have a chance at success, nations must be willing to commit to their BW national defense.

The Vital Importance of Compliance Diplomacy: Enforcing the Prohibitory Norm

In the days of the Cold War, we were able to manage the threat with strategies of deterrence and containment. But it's a lot tougher to deter enemies that have no country to defend. And containment is not possible when dictators obtain weapons of mass destruction and are prepared to share them with terrorists who intend to use them to inflict catastrophic losses on the United States.

- Vice President Dick Cheney¹⁴⁷

It is also not the purpose of this paper to discuss what mechanisms are available to deter would-be proliferators and WMD terrorists.¹⁴⁸ While the threat of complete annihilation may be sufficient to deter despots with BW, it may be of limited use in

preventing biological attacks by terrorists or doomsday cults such as Aum Shinrikyo. Biological terrorism could remain largely immune to the threat of force. Hopefully, a nation that harbors such terrorists could be compelled to stop them or allow the international community to intervene to eradicate the threat. As previously noted, absent the “smoking gun” it is difficult to detect an actual attack. The incubation times of most diseases—for example, seven to 17 days for smallpox—may lead terrorists to hope they can cover their tracks through covert releases of biological agents. Obviously, an attacker who cannot be identified cannot be threatened.

So, if all the other measures and mechanisms discussed here are to be fully successful they must be backed up with a willingness of nations, regions, and the world to take swift and effective action against those who would threaten to use BW. Through appropriate Security Council Resolutions, many of which already form the basis for action,¹⁴⁹ statements by regional collective organizations, and a demonstrated willingness to use force when necessary, will augment and reinforce other non-coercive, cooperative measures and mechanisms. This willingness to be serious about the threat will forcefully communicate to other BWC member states that we take seriously their commitments and so should they.

This includes the obligation to submit Confidence and Security Building data they agreed to at the 1986 and 1991 Review Conferences. Next, those who are named suspect proliferators should be pressured by all member states, but particularly the Western Group, to “come clean” with respect to their programs. In addition, as will be discussed below, nations

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must institute police and regulatory measures so that the suspicious activities of members of groups like Aum Shinrikyo will be detected, interdicted, and punished for their actions. Nations must demonstrate the political will to pass on information regarding proliferation activities and act on it when received. The forceful determination of like-minded states should leave no room for doubt that the consequences of failing to live up to the obligations of the BWC and adhering to the norm against such weapons will be severe.

It should be made quite clear that continued noncompliance could lead to territorial occupation or regime change. As Vice President Cheney stated, “Wars are never won on the defensive. We must take the battle to the enemy. We will take every step necessary to make sure our country is secure, and we will prevail.”¹⁵⁰ The enemies of civilization, peace, and security must be assured that conspiring to use biological or other weapons against America or her friends will fail, and they will face a swift, certain, and devastating response. It would go a long way to maintaining the norm against these weapons if the international community through the United Nations, a regional cooperative security arrangement, or coalition of the willing demonstrated an equal commitment of intolerance towards noncompliance.

International Institutions: The Role of the United Nations

Investigating and Responding to Non-Compliance. Under Article VI of the BWC any state party who suspects another state is violating the provisions of the BWC may “lodge a complaint” with the Security Council, and all states parties are obligated to cooperate with the Security Council in its investigation. The assumption of Article VI is that if a violation is found it will be

left up to the Security Council to decide what measures, if any, to take in response. While finding an illicit BW program is problematic, the Security Council and the United Nations secretariat could serve as a vehicle for reinforcing the norm of nonuse of biological weapons by committing itself to investigating any use of such weapons by non-state parties to the BWC.¹⁵¹ At a minimum, the Security Council should signal its willingness through an appropriate resolution(s) that any development, production, or use of such weapons or agents for hostile purposes will be subject to sanctions and collective enforcement actions. For example, by resolution, the Security Council could buttress the BWC by making an explicit and unqualified commitment:

- a. To treat any use of weapons prohibited by the Convention as a crime against humanity, not open to be excused or palliated by any claim of justifying considerations;
- b. To regard any regime guilty of the crime, or of sheltering or supporting perpetrators, as having forfeited legitimacy;
- c. to pursue individually as criminals, by international process, any such regime's leaders and any others participating in the crime; and
- d. To reverse any advantage secured by its commission, and to succor its victims.¹⁵²

This type of commitment should reinforce to any would-be proliferator that the costs of noncompliance would not only be world opprobrium but a swift, certain, severe, and collective response. A more traditional but no less important role for the UN would be in providing a forum for developing standards for the regulation and criminalization of illicit activities related to biological weapons. This was proposed by the United States as one of the many alternatives to the draft protocol.

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Forum for Criminalizing the Development, Possession, and Use of Biological Weapons. Article IV of the BWC requires member states to take “all necessary measures” to prevent the development, acquisition, and production of biological agents for hostile purposes. This article commits states parties to extend the obligations contained in the BWC to their citizens and residents.¹⁵³ However, only about one-third of the BWC states parties had reported the enactment of implementing legislation.¹⁵⁴ And only a few, mostly Western, states have enacted legislation criminalizing such activities and even fewer have established the necessary regulatory schemes, with inspectors and approval/licensing arrangements to investigate and inspect facilities which have the potential of becoming a biological weapons facility. Likewise, few states have extradition arrangements whereby miscreants who have acquire, produced, or developed such weapons could be extradited for prosecution. If we are to have any hope of going after indigenous terrorist groups who are hell bent on acquiring these agents for terrorist use, this needs to be a high priority.

National legislation often differs drastically from country to country. Article IV of the BWC requires all states to undertake measures to prohibit the development, possession, or acquisition of agents, toxins, weapons, or delivery systems for use as biological weapons. This would require nations to implement national legislation criminalizing such acts and creating the necessary administrative and regulatory bodies to ensure that agents, materials, and technology are not diverted from legitimate and peaceful purposes to a biological weapons program or for

terroristic use. Treaties defining international crimes are based on the concept that certain crimes are particularly dangerous or abhorrent to all and that all states therefore have the right and the responsibility to combat them. Certainly in this category, threatening to the community of nations and to present and future generations, are crimes involving the hostile use of disease or poison and the hostile exploitation of biotechnology.

Compiling data on national implementing legislation and working to help states parties draft legislation and coordinate legislation regionally would be a prospective task for the UN Secretariat and interested NGOs. For example, at a recent workshop on an international law approach to biological terrorism, various draft international conventions were discussed in which state parties would agree to (1) establish jurisdiction with respect to the specified crimes extending to all persons in its territory, regardless of the place where the offense is committed or the nationality of the offender; (2) investigate whenever any person alleged to have committed the listed crimes is present in the nation's territory, and (3) to prosecute or extradite any such alleged offender if satisfied that the facts so warrant.¹⁵⁵

This is another possible and promising avenue for UN active participation. Pursuing such a convention under the auspices of the UN's Sixth (legal) Committee has a great deal of merit and should be pursued. Adoption and widespread adherence to such a convention would create a new dimension of constraint against biological weapons by applying national criminal law to hold individual offenders responsible and punishable should they be found in the territory of any state that supports the convention. Such individuals would be regarded as *hostes humani generis*,

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enemies of all humanity. The norm against biological weapons would be strengthened, deterrence of potential offenders would be enhanced, and international cooperation in suppressing the prohibited activities would be facilitated.

**Other International Governmental Organizations (IGOs):
Cooperative Mechanisms**

The United States has placed great emphasis on working multilaterally and with likeminded groups to combat the BW threat. The benefits of international cooperation and coordination to address with the threat are self-evident. Recognizing that the traditional “arms control” approach, with so-called verification and confidence-building measures incorporated into new agreements that proliferators know they can ignore with impunity, has failed to stem the proliferation of this threat, a new diverse and multi-faceted, multilateral approach is needed. This approach requires the determined cooperation of nations and international organizations, and the support of industry and the scientific community.

In addition to national initiatives to protect and prepare for an eventual attack with biological weapons, the United States must work within the panoply of international governmental mechanisms to develop and support a determined and multifaceted approach emphasizing the need for better coordination and cooperation among these organizations and the member states. There are currently a number of international governmental organizations (IGOs) engaged with their member states in creating mechanisms, initiating programs, and supporting national and international efforts at stopping illicit BW activities. The following descriptions of such efforts are a representative but not a comprehensive listing of those endeavors.

Despite the frustration and bitterness that the United States' strong stand ignited at the BWC Review Conference among the arms control crowd of diplomats and NGOs, a wide and growing array of national governments and IGOs is working together to develop concrete and effective measures to meet the challenge of stopping illicit and clandestine biological weapons programs. These new initiatives currently lack coordination and often occur without public knowledge or appreciation for the contribution to nonproliferation. One of the ways this recognition could be accomplished is by inviting these organizations to the BWC Review Conference to give reports on their efforts. Putting these efforts "under the umbrella" of the BWC would go a long way to demonstrating that the norm is not in danger and that the world, including the United States, is actively engaged in this effort. Meetings could even be held every year to provide a forum for these organizations to report on their efforts at stopping and deterring BW proliferators or would-be biological terrorists.

The G-8 Summit Process. Recently, the major powers took a significant step in a cooperative effort at stemming the proliferation of WMD. This was the June 2002, G-8 Summit Statement announcing the "G-8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction."¹⁵⁶ The United States pledged \$10 billion toward this effort and urged other G-8 states to donate \$10 billion over 10 years, with the aim of enhancing projects underway in the former Soviet Union, including projects dedicated toward reducing the potential loss of technology, materials, and information from the clandestine BW program. Assuming full implementation, this is a major step in eliminating one of the most significant proliferation concerns.

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The G-8 Statement also adopted six principles for fighting the spread of weapons of mass destruction and international terrorism. These included the adherence to current norm-building treaties, strict enforcement of export controls, and providing assistance to other states that lack the financial ability to deter or stop terrorist groups within their borders from acquiring these weapons. This statement, along with the many similar such statements that have been promulgated before, reinforces the commitment of the major countries to taking whatever steps are necessary to limit access by terrorist groups, their supporters and proliferators to the materials, information, and technology for making such weapons.

World Health Organization. One constructive provision in the draft protocol proposed to conduct investigations in event of a disease outbreak is to determine whether the origin is natural or a deliberate release. To limit and successfully interdict the spread of disease, it is very important to understand the origin and means by which it is spreading. This requires researchers to be able to interview victims and health care workers at the site of the outbreak. Also, countries suffering from a disease outbreak are inevitably sensitive to outside interference and wary of accusations that the disease is caused by BW activity. For this reason, cooperation is more likely to be forthcoming if there is no initial assumption that foul play may be involved. Therefore, depending on the type of outbreak, it makes more sense for the relevant epidemiological investigations to take place under the mantle of the World Health Organization, the Food and Agriculture Organization, or the World Organization for Animal Health; organizations that are not directly associated with the BWC.

One of the critically important areas for early warning and identification of a potential biological attack is the worldwide monitoring of the spread of dangerous infectious diseases. The United States and others have strongly supported the creation of a global infectious disease surveillance network as a tool to detect biological attacks and combat naturally occurring outbreaks of diseases. The US Centers for Disease Control (CDC) is currently working with the World Health Organization (WHO)¹⁵⁷ to create a “network of networks” comprised of national public health authorities, military laboratories, UN agencies, media, and nongovernmental organizations.¹⁵⁸ In that regard, there are a number of hurdles that need to be overcome. These include the extremely poor health care infrastructures of many nations and the reluctance of governments to allow outside organizations into their countries fearing possible negative impacts on trade and tourism if a disease outbreak is announced. Additionally, WHO is particularly protective of its reputation as a neutral and its general policy of confidentiality.

WHO is currently engaged in a project to expand its surveillance coverage, which currently only covers three diseases: yellow fever, plague, and cholera (small pox is also monitored although there has been no reported case since 1979). While WHO, in order to preserve its global access, has purposefully distanced itself from any initiative to support national and international efforts against proliferators, it has recognized that it is particularly well placed to strengthen public health surveillance and response activities for naturally or deliberately occurring outbreaks of disease. As a result, the 55th World Health Assembly passed a resolution¹⁵⁹ urging member states to collaborate “in the

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rapid analysis and sharing of surveillance data of international humanitarian concern,” and “to treat any deliberate use . . . of biological agents . . . as a global public health threat.” It has also recently published a guide on how populations and governments should respond to biological and chemical weapons.¹⁶⁰ Further, it directed WHO to strengthen and expand its global surveillance of infectious diseases, coordinate information gathering on potential disease outbreaks, and to work with other international organizations to develop “new tools, within the mandate of WHO, including modeling of possible scenarios of natural occurrence, accidental release or deliberate use of biological . . . agents.”

WHO is actively engaged in a number of initiatives to prevent the spread or deliberate release of biological agents. For example, it recently, at UN request, completely revised the Model Regulations for the Transport of Dangerous Goods establishing security standards for the transportation of hazardous biological substances to prevent theft or accidental release.¹⁶¹ WHO is also working on developing a civilian-military health network to monitor and report outbreaks of diseases. They are currently working with the US Armed Forces Medical Intelligence Center and other national military health systems to develop a global military health surveillance system. The Department of Defense has established a Global Emerging Infections System for the detection and reporting of biological attacks and outbreaks of disease,¹⁶² and this system will hopefully be incorporated eventually into WHO’s developing worldwide civilian-military health surveillance network. This has particular promise since almost every country in the world has a military but not all have

public health services. Military reporting could be extremely useful in the early detection of suspicious outbreaks of disease.

Following the 2001 anthrax attack in the United States, a Chemical and Biological Working Group was established to provide information and resources on preventing, preparing for, and responding to deliberate releases of chemical and biological agents.¹⁶³ It has also subsequently strengthened its biosafety training programs, begun work on model practices for security issues of pathogens, and will soon re-issue its Laboratory Biosafety Manual.¹⁶⁴

WHO has already established a comprehensive health surveillance and alert system via the Internet called the Global Outbreak Alert and Response Network.¹⁶⁵ Global Alert allows the sharing of information with over 1000 other organizations and countries on outbreaks of diseases and other public health information. Likewise, member countries usually share information with the WHO because of the resources WHO can bring to bear on any public health problem, the fact that WHO officials are usually co-located with the health ministry, and the maintenance of a neutral non-political reputation.¹⁶⁶ This data base can be accessed by any person or organization. So, while WHO avoids formal relationships with military or law enforcement agencies, such as NATO or INTERPOL, those organizations still have access to WHO medical intelligence information. WHO will also readily consult with any organization seeking information on preventing or detecting outbreaks of diseases. WHO efforts to expand their surveillance system to cover other diseases and to support an increased capability around the world to rapidly detect and respond to any outbreak of disease,

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whether deliberately released or naturally occurring, Congress has proposed an addition \$70 million dollars be provided to WHO for this purpose.¹⁶⁷

We are a long way from a comprehensive and global network for detection and syndrome surveillance for rapidly detecting new patterns of disease outbreaks, but this should be one of our highest priorities in the fight against biological warfare. This will depend on educating, training, and collaborating with scientists and health officials throughout the world, and utilizing the on-going development of rapid throughput methodologies and new technologies to create this global network. And it will be WHO that plays a critical role in building and strengthening this vitally important mechanism.

WHO is primarily concerned with diseases affecting humans and usually does not concern itself with diseases affecting plants or animals specifically. Two other international organizations address issues associated with food and agriculture and animals. There are a much larger number of animal and plant pathogens and pests that could be used as a weapon against the economic viability of a society. Fungi, viruses, and bacteria cause more than 50,000 diseases of plants in the United States, for example. There is also a clear intersection between crops and livestock in the case of animal feed, and it is quite possible that an undetected crop disease could adversely affect livestock if not caught and treated or isolated in time.

Food and Agriculture Organization. The Food and Agriculture Organization (FAO), with 175 member states, provides technical and humanitarian assistance to natural and man-made disasters affecting crops.¹⁶⁸ The FAO has not formally

been involved in any effort to prevent the spread and use of biological weapons. It is, however, prepared to play an active part within its broad mandate of providing humanitarian assistance and protecting crops and food resources. The FAO is well placed to serve as a clearinghouse on information concerning suspicious outbreaks of crop diseases and provide resources to combat outbreaks. Here is another international governmental organization that the United States and other like-minded countries could utilize in their efforts at stopping BW proliferation. FAO has long been engaged in efforts at biosafety in food and agriculture, and it has produced a number of codes of conduct for ensuring the continued safety and viability of food stocks and agricultural products. These have included the Code of Conduct for the Import and Release of Exotic Biological Control Agents (1995), the Code of Conduct on Biotechnology as it relates to Genetic Resources for Food and Agriculture (under negotiation), and the International Code of Conduct for the Plant Germplasm Collecting and Transfer of Germless (1993).

World Animal Health Organization. The Office International Des Epizooties (OIE), with 157 member states, reports on the occurrence and course of animal diseases worldwide, and of ways to control these diseases, provide international coordination of research on, and control of, important animal diseases, and works toward the harmonization of trade regulations for animals and animal products.¹⁶⁹ OIE has established an information system to collect and disseminate information on outbreaks of animal diseases, and routinely sends missions to developing countries in need of technical assistance in fighting animal diseases. Currently OIC has no program or initiative with the specific objective of

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preventing or reacting to biological warfare. The United States should encourage the OIE to develop a reporting and prevention program for its members in order to more rapidly identify and respond to suspicious outbreaks of animal diseases. One proposal worth considering is the establishment of regional (and international) risk assessment units and a centralized database on surveillance and disease data. This would include a near continuous review of the data to provide early warning of animal disease threats.¹⁷⁰ Just as there is currently no United States national system that can report diseases and infestations of animal pathogens and pests, there is no international system.

The FAO, WHO, and OIE set standards for food safety and the protection of animal health. These three organizations could be used as a forum for establishing international policy and creating a regulatory framework for biosecurity in toto. There is a need for a coordinated approach to biosecurity and a need to have these organizations work together with their member partners to ensure the response and regulatory resources are in place to address any potential biological threat. As already noted, terrorist threats to use or steal biological agents and nuclear materials must now be taken far more seriously. Indeed, unlike traditional chemical weapons, just a few kilograms of these agents or materials can inflict enormous harm. This, in turn, increases the importance of monitoring the spread of dangerous infectious diseases to know if and when one has been attacked and to be able to take timely remedial action.

World Customs Organization. In the wake of the September 11 terrorist attack no international governmental organization has been more proactive than the World Customs Organization

(WCO). WCO, with 159 member states, is actively engaged in and aggressively pursuing a wide array of cooperative measures with dozens of international organizations and NGOs in addition to appealing to its members to institute previously approved compliance and enforcement measures to thwart the smuggling of materials for weapons of mass destruction. First, they have developed an action plan to improve border security and prepared initiatives for adoption by the member states on securing and inspecting international cargo traffic. For countries which lack the financial capability or expertise, WCO provides technical experts for training and arranges for grants and loans to buy the necessary equipment to fully implement these measures. Second, WCO has signed over 40 agreements with international organizations, such as INTERPOL and WHO, and business-related NGOs such as the International Association of Ports and Harbors, to share information, provide subject-matter expertise, and to develop strategies for combating the smuggling of biological, chemical, and radioactive materials.¹⁷¹

In addition, WCO works closely with member states customs authorities and it has created a restricted Customs Enforcement Network (CEN) database for sharing intelligence information among the members. It has established eleven Regional Intelligence Liaison Offices (RILO), one recently opened up in Moscow, that put information into the database along with national customs authorities.

WCO has recognized that there is a vital need to secure and protect the international trade supply chain but has also recognized the vulnerability of that supply chain to terrorist attack or being utilized by terrorists and rogue states for transporting weapons of

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mass destruction. The only way to interdict this illicit traffic is through the cooperation and exchange of information among all its members. In that regard, WCO is working on a number of cooperative initiatives with member countries. This includes examining the possibility of doing “bio alerts” similar to the International Atomic Energy Agency’s alerts for the theft of radioactive materials. The idea is that items could be identified as being in danger of diversion to illicit BW programs and an alert issued. WCO could then use their tariff trade codes as “identity” trackers for items of concern to places of concern. So, any terrorist group that was trying to acquire materials or equipment for a BW program through international trade routes would have a much greater chance of being picked up by national customs officials. WCO could work with export control groups, such as Australia Group, to help identify items of concern. Finally, WCO has embarked on a campaign to work with business NGOs to develop mechanisms for reporting suspicious activities at each link in the chain of transport. This would go from the exporter to the freight forwarders to the handlers (air, land, sea) to the importers to the end users. One example is the Business Anti-Smuggling Coalition, which WCO is working with to institute measures to interdict WMD smuggling.¹⁷²

International Maritime Organization. The United States is leading an effort within the International Maritime Organization (IMO) to stop the shipping of biological agents for hostile purposes and to criminalize the use of BW on maritime vessels. IMO currently has 162 member states, has concluded cooperative arrangements with 37 international governmental organizations, and routinely consults with over 60 NGOs. One of the key

objectives of the IMO is to take all action necessary to proactively respond to any threat to the safety of ships and those on board, and to the maritime environment. The IMA agreed to hold a Conference on Maritime Security in December 2002, to adopt new regulations to enhance ship and port security and avert shipping from becoming a target of international terrorism. In addition adopting and enforcing among its members practical preventative measures, it is also important to ensure that criminals who have perpetrated acts of violence at sea be properly brought to trial and punished. IMO's legal committee is currently reviewing the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation, 1988 and the Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf, 1988 (the SUA treaties).¹⁷³

The United States has proposed amendments to these treaties to broaden the list of offenses to include using biological agents to harm persons on board ships and to use the cargo as a biological weapon. As a follow-up to this initiative, member states should also consider new rules for maritime boarding of ships suspected of transporting weapons of mass destruction. This could be modeled after the hot pursuit, boarding at sea, and other interdiction agreements negotiated among various states to stop drug smuggling. Similar arrangements could be negotiated under the auspices of the IMO using the drug cooperation agreements as a model.¹⁷⁴

Regional Collective Security Organizations

One of the key areas of multilateral cooperation in fighting the threat of biological weapons is the ability of collective security

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and cooperation organizations to band together and develop comprehensive plans for defending and responding to threats and the actual use of BW. There is probably no greater deterrent to a prospective proliferator or terrorist group than the knowledge that targeted countries are prepared to defend and protect themselves from these weapons and the certainty that the capability is there to respond overwhelmingly to an actual use. Recognizing that there is a long way to go, the United States and other nations are acting promptly and effectively to defend against and limit the damage of any BW attack. However, national solutions will not be sufficient, and the United States is working on a number of levels with its allies and friends to respond to any collective threat.

North Atlantic Treaty Organization. The most obvious and important of these relationships is with the NATO alliance. After the September 11 attack the NATO alliance declared that the attack was, under Article V of the Alliance Charter,¹⁷⁵ an attack against all 19 NATO allies. As one senior NATO official declared, "There is a broad recognition now in the alliance—but there was not on Sept. 10, 2001—that the combination of terrorism and weapons of mass destruction is the single greatest threat, not just to the United States but to every member of the alliance."¹⁷⁶ NATO subsequently agreed to provide its assets and capabilities to support operations undertaken by other international organizations or by coalitions involving Allies to respond to any threat of use of biological or other WMD and other acts of international terrorism.¹⁷⁷ NATO has evidenced a willingness to act as the primary responder to international acts of terrorism world-wide and support out-of-area non-NATO operations. Subsequently, the Alliance leadership has agreed on a number of

enhancement measures to strengthen NATO's ability to respond, but unfortunately these promises have yet to be fully funded by America's NATO partners. For example, in May 2002, NATO's Defense Group on Proliferation set forth a number of initiatives to improve NATO's ability to combat and counter any biological weapons attack, including stockpiling medicines and protective equipment. These initiatives have yet to bear fruit.¹⁷⁸ If NATO is truly going to develop the response capabilities to affect a proliferator or state-sponsored terrorist group it must follow through on its political commitments to transform NATO.

NATO has also laid out a blueprint for improving its ability to assist national authorities in protecting civilian populations and critical infrastructure. This includes five new initiatives: "a prototype Deployable Nuclear, Chemical and Biological Analytical laboratory; a prototype NBC Event Response Team; a Virtual Center of Excellence for NBC Weapons Defense; a NATO Biological and Chemical Defense Stockpile; and a Disease Surveillance System."¹⁷⁹ Admittedly, the work on these initiatives is proceeding at a snail's pace primarily due to a lack of funding on the part of the Alliance members. Nowhere is this more starkly apparent than in the staffing of NATO's Weapons of Mass Destruction [intelligence collection and coordination] Center.

While promising to upgrade the Center from its current staff of 12,¹⁸⁰ there is no funding forthcoming for upgrading the Center, and there is no effort to enhance its role as an intelligence sharing and analytical center.¹⁸¹ Originally established with the idea that the Center would employ as many as 200 scientists, economists, intelligence, and criminal experts to produce analytical reports based on intelligence and information from Alliance members and

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other sources, the Center is a shell of the original concept. The CIA is the only national intelligence agency to maintain a liaison officer, but there is little flow of information to the Center from any source. There is a biologist on the staff to work on biological-related issues, and the Center does generate some high-quality assessments, but clearly the role of the Center needs to be enhanced. The Center is active in the development of the Virtual Center of Excellence, and work has finally begun on creating an information-sharing database with connectivity to all NATO member capitals on chemical, biological, and nuclear terrorism and proliferation threats.¹⁸² Success, of course, will depend in large part on the willingness of members to provide national intelligence information.

One of the promising proposals, hopefully to be approved soon by the Alliance, is to combine military and civilian health surveillance data among NATO members and then to combine that information with other databases from multinational reference laboratories to provide NATO-wide surveillance to detect outbreaks of diseases including BW attacks. This would be a useful and appropriate role for the WMD Center. The Center could be custodian of databases, and these databases would be improved, upgraded, and integrated into a useful comprehensive system. For example, one idea being considered is to have a stockpile of antibiotics/vaccines, which would be made available for all of NATO as required. The Center would track the location and stock availability and provide that information to members as required. The Center would maintain databases for nuclear, chemical, and biological (NBC) defense schools, NBC equipment, and national response capabilities.¹⁸³

The Center would also be the logical place for maintaining a “virtual staff” for accessing expertise in times of crisis, which would alleviate some staffing costs. While NATO officials are already working with WHO to create a medical surveillance data base, as discussed above, it would increase the effectiveness of NATO’s efforts in combating terrorism and responding to WMD threats by creating the same cooperative working and coordinating relationships with international police and regulatory organizations such as Interpol, Europol, and the World Customs Organization. Certainly combining NATO’s capabilities with police, regulatory, and health organizations along with the national capabilities of its members would be far more effective than some hollow inspection or verification regime in stopping and responding to the threat of biological terrorism or warfare.

NATO’s efforts and initiatives should serve as models for other regional organizations as they grapple with the threat of BW. While NATO is now the world’s only collective security organization with committed military forces, other regional organizations in their commitment to fighting terrorism could approve and encourage member states to collectively adopt measures and share information on potential proliferators or terrorist groups.

Organization for Security and Cooperation in Europe. For example, the Organization for Security and Cooperation in Europe (OSCE), with its 55 member states covering an area from Vancouver to Vladivostok, recently affirmed its collective commitment to battle all forms of terrorism including the use of WMD.¹⁸⁴ Recognizing that these weapons pose a threat to international peace, security, and stability, the OSCE has

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expressed its political support for export control groups such as the Australia Group and proposed organization-wide standards for effective licensing and enforcement procedures covering the BW-relevant pathogens and BW-related dual-use equipment.

Accordingly, it has sponsored a series of conferences to urge member states to comply with relevant international standards, cooperate with enforcement organizations, and continue to examine ways to cooperate and coordinate nonproliferation efforts.

Within OSCE member states sub-regional cooperation is also beginning. Recently, the defense ministers of southern European nations began a series of meetings to develop common assessments and promote cooperation among themselves in responding to the threats of WMD. Proposed measures to be developed included regional defense intelligence and information sharing among militaries and border security.¹⁸⁵ These types of regional and sub-regional efforts need to be encouraged, strengthened, and recognized as the front line in defending and responding to WMD terrorism and proliferation.

Other Regional Organizations. Other regional organizations such as the European Union,¹⁸⁶ Organization of American States (OAS),¹⁸⁷ and the Association of Southeastern Nations (ASEAN)¹⁸⁸ could and are implementing similar measures. For example, ASEAN recently signed a joint declaration with the United States to continue and improve intelligence and terrorist financing information sharing; enhance liaison relationships with law enforcement agencies to counter terrorism; strengthen capacity-building efforts through training and education programs, and joint operations; and provide mutual assistance on

transportation, border, and immigration controls.¹⁸⁹ Other regional organizations such as the African Union (formerly the Organization of African Unity), the Arab League (where most of the countries of proliferation concern and sponsoring terrorism reside), the South Asian Association for Regional Cooperation, and the British Commonwealth could embark on similar and complementary efforts. Of course, political commitments of this sort often do not translate into concrete action. But it is the all-important first step towards full regional cooperative efforts in fighting both terrorism and the proliferation of WMD. These concrete, day-to-day cooperative efforts in tracking illicit financial transactions; law enforcement; intelligence gathering; military exchanges; training and education programs; customs, immigration and border patrol cooperation demonstrate the world's commitment to stopping this world threat.

Industry Associations and Other Nongovernmental Organizations

It is clear that the pharmaceutical and biotechnology industries have a large role to play in both domestic and international preparedness, prevention, denial, and responses to the use of biological weapons. On the defense/response side, the industry will have the lead in developing new vaccines and medicines, although this will be a challenging, difficult, and time-consuming endeavor.¹⁹⁰ In regards to prevention and denial of access to the agents, technology, and related materials, industry should also be committed and willing to work with national governments, IGOs, and other NGOs to further reduce the likelihood of proliferation or the use of such agents.

One way the biotechnology industry can support and contribute to the struggle against the illicit use of biologic agents

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is through cooperative measures with NGOs and strict enforcement of standards for safety and security and ethical practices. For example, recently the International Institute for Strategic Studies and the Chemical and Biological Arms Control Institute initiated a biotechnology “project” with the objective of establishing “a world association of biotechnology companies, to encourage safe and secure operation of facilities and business practices. So far, the response has been favorable and the project team continues to be engaged in bringing together biotechnology and pharmaceutical companies, along with other government and non-governmental organizations interested in public safety and security in relation to developments in biotechnology.”¹⁹¹

One of the US alternatives to the BWC protocol included the need to “sensitize scientists to the risk of genetic engineering,” and to establish “national oversight of high-risk experiments.”¹⁹² Life sciences researchers can no longer ignore the national security implications of their work and must participate in limiting the potential proliferation of new modes of bioterror. This is not to say that areas of research should be prohibited. Rather, boundaries need to be defined where the freedom of research is not impeded, but access to certain forms of research data should be limited to those with bona fide credentials. Certainly freedom of intellectual enquiry must be protected. However, researchers in physics, chemistry, and engineering have long had to accept constraints on public domain knowledge. Biology and medicine should not escape the same responsibilities. As one expert proposes,

In 1975, at the dawn of the biotechnology era, scientists were concerned that new gene splicing methods and cross-species transfer of genes might convert harmless

microbes in the body into virulent pathogens or produce long-term genetic damage. These concerns stimulated the Asilomar conference, which led to a voluntary moratorium on certain forms of genetic manipulations until the risks were evaluated. Asilomar is a model for how science can independently regulate its own inquiries. This ethos must now be reawakened.¹⁹³

There are several additional ways industry and its representatives, such as the Pharmaceutical Manufacturers of America (PHRMA) and the Association of American Microbiology (AAM), can “fill in the gaps” of national and international efforts at stopping the BW threat. In an effort to raise the conscious level of academics and scientists they could help draft and implement codes of conduct for the sharing of information and transfers of technology across borders. Using their expertise they could develop, in concert with WHO, WCO, and interested national agencies, indications and warning signs of unusual or suspicious activities, requests, or organizations. Suspicious requests would be logged and reported to a central database that would be monitored by export control and/or police agencies. Obviously misguided or criminally minded scientists will pay scant attention to ethical codes of behavior. No doubt Russian medical personnel in their BW program took the Hippocratic oath yet still engaged in weapons research. Nevertheless, establishing a code of conduct will increase awareness and equip those engaged in legitimate, peaceful research with the tools to help identify and report illicit activities.

PHRMA and AAM could also establish ethics committees within their organizations to develop standards or practice and ethical codes of conduct for sharing of information that could be used for the development and production of BW. In conjunction,

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the licensing of life sciences specialists should include testing on ethics, codes of conduct, and patterns of behavior, which could lead to a conclusion that activities were not legitimate research. This type of requirements is standard in the legal and medical professions. It is more than appropriate under the clear and present danger we face that these professionals receive the training and understand the consequences of the inappropriate sharing of sensitive information. Since industry already imposes severe restrictions on the transfer of commercial proprietary information it would have much to contribute in the development and promulgation of ethic standards and codes of conduct.

WHO has already begun work on model practices for security issues related to pathogens? It has engaged the American and European Biosafety Associations on issues related to the custody of pathogens and how they should or should not be distributed, similar to the US Select Agent regulations that prohibit the unauthorized shipment of selected agents. Active participation and agreement by industry, NGOs, and national governments in such practices will heighten awareness, prevent inadvertent loss, and make more difficult the deliberate unlawful transfer of pathogens.

Biosecurity is another area where industry has a significant role to play. Currently, there are hundreds of companies and laboratories around the world that work with dangerous pathogens. While the United States has regulations which require anyone shipping or receiving listed pathogens or toxins to register with CDC and demonstrate a legitimate necessity for the material, most nations lack this type of regulation, and there is no international standard for regulating, licensing, and registering

companies, labs, or universities which work with these dangerous agents. One idea that has merit is the negotiation and implementation of an international insecurity convention, building on the ongoing implementation of the 1992 Biological Diversity Convention and its 2000 Cartagena Protocol on Biosafety.¹⁹⁴

The proposed convention would “include provisions for the safe handling, transfer, and use of genetically modified organisms.” Nations would agree on a set of basic obligations and guidelines, which would be implemented in detail by each member state through enactment of legislation and regulation. While the authors of this proposal support a legally binding instrument,¹⁹⁵ it might be done just as effectively through the voluntary agreement of member states. Those nations or companies that did not follow the new international standards established by the convention would not be allowed to participate in the sharing of technology and information that other member states would have access to. The technology and economic advantages in the sharing of this knowledge is self-evident and forms the basis for most export control regimes, which are all voluntary restraint mechanisms. Industry participation and endorsement of either a legally binding or voluntary convention is both necessary and desirable since the standards must accommodate both safety and commercial concerns.

Export Controls

One of the many critical areas of cooperation is the control of exports which may have relevance to the development of biological weapons. Most BWC members have national export control laws and regulations regarding the transfer of BW-related technologies and materials. Countries that do not or are unable for

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financial reasons to implement appropriate export control regulations can receive direct assistance from the United States through the Export Control Assistance Program.¹⁹⁶ It is essential that member states keep sensitive BW-related goods and technologies out of the hands of terrorists and their state sympathizers. To do so requires not only the enactment of national measures but to also work bilaterally to assist other countries in upgrading their tracking and enforcement capabilities and to use a multilateral forum for ensuring supplier cooperation in curbing illicit BW-related trade.

One export control group established specifically for the control of chemical and biologically related materials and technology is the Australia Group (AG).¹⁹⁷ The AG is an informal network of 33 countries plus the European Commission that consult on and harmonize their national export licensing measures on chemical and biological items. All participants are members of the BWC, which legally obligates states parties not to assist in any way the development and production of BW. AG participants agree, through a series of agreed guidelines, to prevent any inadvertent contribution to a BW program. While it is true that proliferators and terrorists can undertake BW research, development, and production with off-the-shelf items, restricting their access to more advanced technologies, information, and strains of pathogens will impede their programs to varying degrees.

Recently, the AG adopted formal guidelines governing the licensing of biological items and applying more rigorous controls on the export of fermentors, lowering the threshold from 100 liters to 20 liters, and adding eight new toxins to the Group's biological

control list (currently a total of 19).¹⁹⁸ The Group also for the first time controlled the “intangible transfer of information and knowledge which could be used for BW programs.”¹⁹⁹ Australia Group participants also share information regarding proliferation concern. The AG participants contend that export licenses operate to deter proliferation by monitoring trade in relevant materials, and provide authority to stop a sale in the infrequent cases where a prospective export is likely to contribute to a BW program. The licensing measures applied by AG participants affect only a small number of countries where there is evidence of developing or maintaining a BW capacity.

Currently, the AG does not have any formal working or coordination relationships with any other international organization, governmental or otherwise, except the European Commission. Several inter-governmental organizations have expressed interest in participating in AG activities.²⁰⁰ This has merit since these organizations, like individual nations, recognize that to effectively counter proliferation of bioterrorist activities will require cooperation over a wide area of activities.

International Law Enforcement Initiatives

International law enforcement organizations have been at the forefront of developing cooperative relationships with numerous national and international crime fighting and regulatory organizations to stop the proliferation of WMD. The best known is the International Criminal Police Organization, better known as Interpol. It currently has 179 member nations and its goals are “to ensure and promote the widest possible mutual assistance between criminal police authorities within the limits of laws existing in the different countries and in the spirit of the Universal Declaration of

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Human Rights.”²⁰¹ Interpol’s Public Safety and Terrorism sub-directorate (PST) deals with matters relating to terrorism and weapons of mass destruction. PST coordinates the widest possible cooperation and exchange of information among member law enforcement agencies by utilizing its extensive communications network and central records archives. It collects, stores, analyzes, and disseminates intelligence about suspect terrorists groups. Interpol’s Safety and Terrorism Branch also assesses potential BW threats and issues alerts and warnings as appropriate. Finally, Interpol enters into a number of cooperative relationships with other police (Europol), regulatory (WCO), subject matter expert (for example, the International Atomic Energy Agency) agencies, or other international organizations (for example the International Association of Law Enforcement Intelligence Analysts) to monitor, track, interdict, and arrest terrorists or smugglers of biological, chemical, or radiological material.

One agency Interpol has a close relationship with is the European police organization or Europol. Europol works mainly through formal agreements with law enforcement, security services, national police, military police, and customs agencies to coordinate policies and share intelligence.²⁰² It has a cooperation agreement with the United States and other out-of-area countries. So far, Europol is hampered by its inability to share only generic information on types of threats. It cannot share information on particular individuals suspected of crimes.²⁰³ To be an effective intelligence sharing organization this will have to change. Europol also has a serious crime unit which deals exclusively with terrorism and the illegal trafficking of NBC materials. It is currently working to establish a link between normal police-type

activities and response efforts in the wake of a biological attack. In recognition of the bio threat it is proposing a “center of excellence” on bio terrorism, which would be a database and virtual staff of experts on biological warfare and how to respond to an attack. It also is attempting to establish a database of “best practices” of law enforcement on how best to respond to a particular crisis such as a BW attack.²⁰⁴ These initiatives require a minimum of additional funding. They do, however, require the political will and commitment of member nations to share national information and participate actively in these international efforts.

The United States has been very active in providing training and equipment and expertise in a number of areas. However, there remains much more to be done in the information sharing area due to the sensitivities of methods and means in the acquisition of such information and differing laws and perspectives on the safeguarding of personal information. In the wake of the September 11 terrorist attacks these barriers are slowly being removed.

Financing the Spread of Bio Terror: Interdiction Initiatives

One of the most significant and critical international cooperative initiatives is the set of on-going efforts at interdicting the financing networks of terrorists. There are a multitude of national, regional, and international initiatives underway to dry up the financing of those groups secretly engaged in acquiring the capacity to use WMD. Briefly, UN Security Council resolution 1373 requires all states to stop financing terrorism and freeze without delay the assets of terrorists and their associates and close their access to the international financial system.²⁰⁵ In that regard, nations should quickly ratify the UN Convention for the

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Suppression of the Financing of Terrorism.²⁰⁶ Regional organizations are meeting to institute region-specific plans to cooperate in the interdiction of financial transactions by terrorist groups. For example, the United States recently hosted a meeting of the ASEAN Regional Forum on this topic. It endorsed a work plan for implementing specific measures to eliminate these financial networks and seize the assets of terrorist groups.

Specifically, it called on member states to

[W]ork co-operatively and in collaboration with the International Monetary Fund (IMF) and World Bank, Financial Action Task Force on Money Laundering (FATF) and FATF-style bodies, Financial Stability Forum (FSF), Basle Committee of Banking Supervisors (BCBS), and other relevant international and regional bodies to promote the adoption, implementation, and assessment of international standards or recommendations to combat the abuses of the financial system, including in respect of terrorist financing, financial regulation, and money laundering.²⁰⁷

In addition, like-minded states should consider implementing similar initiatives against rogue nations bent on acquiring BW or sponsoring surrogate terrorist groups. In the last year the US Department of Treasury, in cooperation with its EU counterparts, has blocked the assets of 210 entities and individuals, and 161 countries have “taken concrete action to block the assets” of terrorist groups and individuals with, so far, \$116 million frozen.²⁰⁸ Similar actions can and should be taken against the sponsors of these terrorist groups and those who would violate international legal obligations by engaging in WMD proliferation. Nations which cannot participate in world-wide financial markets worry about their assets being frozen in foreign banks and other financial institutions, cannot get loans for development projects, generally suffer the same deprivations applied to their terrorist

counterparts, and may re-think their decision to develop and produce biological weapons. In any event, without financial resources states and terrorist groups will have little chance to acquire WMD capabilities no matter how much the desire and determination.

**ARMS CONTROL WITHOUT ARMS CONTROL:
FITTING THE CURE TO THE DISEASE**

We stand on the threshold of a new era in which hundreds of millions of people will at last be safe from some of the world's most terrible diseases. . . . We also stand on the brink of a global crisis in infectious diseases. No country is safe from them. No country can any longer afford to ignore their threat.

~ Hiroshi Nakajima, Director General of WHO²⁰⁹

In the wake of the events of 11 September, controlling such horrific and morally abhorrent weapons was given an even greater imperative and wider global attention. While it is unlikely that the protocol will be resurrected, it is important we maintain the norm that relegates those that acquire or use BW to the status of international criminals and enemies of civilized society. To do so, the United States and its allies must remain creative, vigilant, and forward-looking in dealing with the multi-dimensional threat posed by biological weapons. The proposals submitted here posit a new paradigm for addressing this problem. It is one that recognizes that the only real chance for success in this war is through a multi-disciplinary approach involving as many IGOs and nations as possible.

It is easily demonstrable and compelling that in the case of stopping biologically based threats to international peace and security traditional arms control will not work. The road to international hell is often paved with the best of bad conventions, and the protocol was surely a prime example. The traditional

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approach—declarations, visits/inspections, and challenge investigations in a “verification” treaty—simply provides no greater level of confidence in compliance. It is fairly easy to count and inventory missiles and tanks and have a high degree of confidence that you have counted them all. It is virtually impossible to count microscopic bugs. Even assuming you could, the dual-use nature of these biologic agents—unlike tanks and missiles, which have only one purpose—means you cannot verify intent with traditional arms control measures. Given the real dangers to national biodefense programs and vital commercial interests in one of the major industries of the 21st century, it is difficult to see how accepting a broad-based, elaborate, multilateral but totally ineffective regime advances United States and international security interests. On top of a totally ineffective treaty, adding another major international bureaucracy dedicated to inspecting declared facilities in countries that do not have a BW program and that could not find one in those countries that do, is a price too high to pay.

As extensively discussed, this is a real and present danger to national security and to the security of our friends and allies. The threat is more serious than ever. Clearly, biological weapons can be developed secretly and used without warning, leaving little time for the targeted nation to discern intentions or formulate a response. It is a hard fact that we now and for the foreseeable future live in a world in which biological weapons (and other weapons of mass destruction) not only exist, but are proliferating. It is clear that there are terrorist states that currently possess these weapons or are actively seeking to develop or acquire them. Likewise, state-sponsored terrorist groups, terrorist networks, and

doomsday cults exist which are actively pursuing such weapons. And, as recent revelations about the Al Qaeda terrorist network has revealed, any one or combination of these enemies of freedom would not hesitate to use these weapons if they believed it would serve their purposes. Further, new technologies and genetic modification of traditional agents could defeat protective measures, including vaccines. Biological weapons-related activities lack unique distinguishing signatures, can be small-scale and very easily concealed, and do not require a large production infrastructure to make significant amounts, either for terroristic or military purposes. The protocol, or any arms control agreement for that matter, is incapable of addressing these sophisticated threats to national and international security.

The BWC is not the only possible—although extremely important—mechanism for preventing the acquisition and use of BW. Indeed, while it and the Gas Protocol remain the international basis for condemning any possession or use of biological agents as a crime against humanity, serving as the written embodiment of the BW nonproliferation norm, there are a number of alternative institutions and mechanisms that offer realistic and concrete methods for detecting, stopping, rolling back, and deterring clandestine BW programs. The painstaking and deliberate construction of this web of measures, some of which are described in detail here, along with holding nations accountable for their compliance failures, is the best hope for ultimately ending the threat of these weapons of mass destruction.

As biological weapons sophistication and the threat increase, so should our approaches to combating it. The overarching concern, however, is the inherent difficulty of crafting a single

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mechanism to address this unique threat. The threat of biological weapons and bioterrorism is a threat that cannot be appeased, cannot be ignored, but must not be allowed to dominate our future or the future of the world. So, in sum, the prescription for fighting this threat is not another traditional arms control verification regime but rather a web of carefully crafted and directed measures and initiatives instituted by nations and technically proficient international governmental organizations backed by no-nonsense enforcement and compliance mechanisms to bring would-be miscreants, either individuals or governments, to justice for violating the norms of humanity.

A united world, acting in concert across a broad front of areas utilizing the full panoply of financial, diplomatic, economic, and military resources at our disposal, with the firm determination to rid the world of these weapons of terror is, frankly, our best hope for success. Those that pursue the acquisition and use of such weapons must learn that to do so is a huge miscalculation. Specifically, that using such weapons will not spell success for their perverted aims but bring about with certainty the end of them and any chance of achieving their aspirations. Once these enemies of mankind understand no legitimate government will support them, that international police and other regulatory international organizations are actively seeking to impede, stop, and punish them; once nations which would attempt to acquire them understand that the costs far outweigh any perceived benefit; and once the scientific and industrial sectors accept a responsibility to safeguard the technology and information which makes possible the development and use of these horrible

weapons; only then can we confidently hope that this threat to mankind will be eliminated.

Making this broad commitment will take time, money, effort and political will. But the multi-faceted efforts proposed and described here are already being undertaken as more and more nations and institutions realize this is the only effective way to stop this scourge. As the late Ambassador Robert Strausz-Hupé presciently commented, “I have lived long enough to see good repeatedly win over evil, although at a much higher cost than need have been paid. This time we have already paid the price of victory. It remains for us to win it.”²¹⁰ By moving beyond the “arms control” solution and adopting this approach our victory over this threat to civilized society is within sight.

NOTES

¹ Quoted in Biohazard News at <http://biohazardnews.net>.

² The term "Weapons of Mass Destruction (WMD)" is a short-hand way of referring to chemical, biological, or nuclear or radiological weapons and their means of delivery, usually ballistic missiles. It is noted and understood that other weapons could easily produce mass casualties. Radiological dispersion devices and information or cyber attacks have also been described as WMD. Any definition of WMD always includes “biological” weapons.

³ Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, 26 UST. 583; TIAS 8062; 1015 U.N.T.S. 163. Signed on April 10, 1972 and entered into force March 26, 1975. There are currently 145 states parties and 18 signatories.

⁴ Biological agents are either replicating agents (bacteria or viruses) or nonreplicating materials (toxins or physiologically active proteins or peptides) that can be produced by living organisms. Some nonreplicating biological agents can also be produced through either chemical synthesis, solid-phase protein synthesis, or recombinant expression methods. Office of the Surgeon General, US Army, *Medical Aspects of Chemical and Biological Warfare*, 1997, 4. Biological agents which may be used as weapons can be classified as

follows: Bacteria (free-living organisms), viruses (requiring living cells in which to replicate), rickettsia (microorganisms which have characteristics common to both bacteria and viruses), chlamydia (intracellular parasites incapable of generating their own energy source), fungi (primitive plants which do not utilize photosynthesis, are capable of anaerobic growth, draw nutrition from decaying vegetable matter, and most form spores), and toxins (poisonous substances produced and derived from living plants, animals, or microorganisms).

⁵ See Jonathan B. Tucker, “A Farewell to Germs: The US Renunciation of Biological and Toxin Warfare, 1969-70,” *International Security*, Vol. 27, No. 1 (Summer 2002).

⁶ For a comprehensive blow-by-blow account of the Fifth Review Conference see Jenni Rissanen, “Left in Limbo: Review Conference Suspended On Edge of Collapse” located at website <http://www.acronym.org.uk/dd/dd62/62bwc.htm>.

⁷ Sheryl Gay Stolberg and Judith Miller, “Many Worry That Nation Is Still Highly Vulnerable To Germ Attack,” *The New York Times*, September 9, 2002, 1.

⁸ In January, 2002 President Bush signed a bill authorizing \$1.1 billion for bioterrorism preparedness, with the bulk of it, \$930 million, designated to be parceled out among the states for improvements in public health. Obviously, much needs to be done to prepare the United States for a likely WMD attack. However, the focus of this study is on international cooperative measures not on domestic preparedness. See Chemical and Biological Arms Control Institute, *Bioterrorism in the United States: Threat, Preparedness, and Response*, November 2000; National Research Council, *Making the Nation Safer: The Role of Science and Technology in Countering Terrorism* (National Academy Press: Washington DC, 2002).

⁹ The literature on these efforts is quite extensive. See, for example, Chemical and Biological Arms Control Institute, *Bioterrorism in the United States: Threat, Preparedness, and Response*, November 2001.

¹⁰ Attributed to Yogi Berra at website http://www.workinghumor.com/quotes/yogi_berra.shtml.

¹¹ Letter to Jack Woodall posted at <http://praxis.md/post/friendlyfire/071200/1>.

¹² Jozef Goldblat, “The Biological Weapons Convention: An Overview,” *International Review of the Red Cross* 318 (June 30, 1997), 251-265 at 253.

¹³ *Ibid.*, at 253-54 (citing World Health Organization, *Health aspects of the use of chemical and biological weapons*, Geneva, 1970). Also see Joint Pub 1-02, Department of Defense Dictionary of Military and Associated Terms (Washington DC: US Government Printing Office, 1998), defining “biological weapons” as “items or material which project, disperse, or disseminate biological agents including arthropod vectors.”

¹⁴ See *Biological Weapons Primer*, Federation of American Scientists at <http://www.fas.org/nuke/intro/bw/intro.htm>.

¹⁵ Steve Sternberg, “Building the Ultimate BioWeapon,” *USA Today*, November 14, 2001, 9D.

¹⁶ Maura Lerner, “Pretty Poison Botox is All the Rage,” *Washington Times Weekly Edition*, April 29-May 5, 2002, 2; Sarah Womack, “Get a Botox Facelift in the High Street for £200,” *Daily Telegraph*, May 24 2002, 1.

¹⁷ A virulence factor is an organism’s capability to cause disease by breaking down the protective mechanisms of the host.

¹⁸ See Melinda Willis, “Genetic Threat: Scientific Advances Could Help Make New Biological Weapons,” at website http://abcnews.go.com/sections/living/DailyNews/WTC_weaponsengineering011005.html.

¹⁹ Others might include the rabies virus transmitted by bats, and the orbivirus (blue tongue disease) transmitted by biting flies. See M. Willis, R. Casagrande, L. Madden, “Biological Attack on Agriculture: Low Tech High Impact Bioterrorism,” at website www.fas.org/bwc/index.html.

²⁰ William Broad, “Australians Create a Deadly Mouse Virus,” *New York Times*, January 23, 2001, International Section, 1.

²¹ Andrew Pollack, “Scientists Create a Live Polio Virus,” *New York Times*, July 12, 2002, 1.

²² *Ibid.*

²³ There was actually a series of exercises called Elfin. This one was denominated Elfin Mayhem. A copy of the report of the exercise is on file with the author.

²⁴ See Mark Hewish, “On Alert Against Bio Agents,” *International Defense Review*, vol. 31, no. 11 (November 1998): 53.

²⁵ For a detailed discussion of these technological barriers and other problems associated with “weaponizing” biological agents, see Karl

Lowe, “Analyzing Technical Constraints on Bio-Terrorism: Are They Still Important?” in *Terrorism with Chemical and Biological Weapons: Calibrating Risks and Responses*, ed., Brad Roberts (Alexandria, VA: The Chemical and Biological Arms Control Institute, 1997), 53-64.

²⁶ See Judith Miller and William Broad, “The Germ Warriors: A Special Report; Iranians, Bioweapons in Mind, Lure Needy Ex-Soviet Scientists,” *New York Times*, December 8, 1998, A1.

²⁷ Malcolm Dando, “‘Discriminating’ Bio-Weapons Could Target Ethnic Groups,” *International Defense Review*, vol. 30, no. 3 (March 1997), 77; Barbara Starr, “Bio Agents Could Target Ethnic Groups, Says CIA,” *Jane’s Defense Weekly*, June 25, 1997, 6.

²⁸ See William Broad, “US Selling Papers Showing How to Make Germ Weapons,” *New York Times*, January 13, 2002, 1.

²⁹ George Poste, “Biotechnology and Terrorism,” at www.prospect-magazine.co.uk (May 2002), 2.

³⁰ Ibid.

³¹ The book of Exodus describes 10 plagues that affected both humans and animals in Egypt. The fifth plague was a murrain, a cattle-pest, which killed the Egyptians' livestock. In the sixth plague, boils erupted on men and beasts. One of the symptoms of anthrax is boils.

³² See “Patho-Factlets: Examples of How Disease Altered History,” at <http://www.science-projects.com/Pathlets.htm>. For example, Measles and smallpox wiped out 95% of native South Americans in the early 1500's leaving the continent safe for the Spanish to settle with families. Cortez took over Mexico City when 1,000 Aztecs per day were dying. Seventy percent of the 300,000 core troops that marched with Napoleon out of France died of typhus before reaching Moscow. During the Civil War, 90% of the deaths on both sides were due to disease rather than direct death from military trauma. Nearly a third to half of all babies born in the USA in 1900 never saw their 5th birthday. Whooping cough, diphtheria, and both rheumatic fever and scarlet fever (strep throat gone really serious) were major killers. See also Robert Gottfried, *The Black Death: Natural and Human Disaster in Medieval Europe* (New York: Free Press, 1990); William McNeill, *Plagues and Peoples* (New York: Anchor Boosk, 1976); Arno Karlen, *Man and Microbes: Disease and Plagues in History and Modern Times* (Boston: Simon & Schuster, 1996); Michael B. A. Oldston, *Viruses, Plagues & History* (Oxford: Oxford University Press, 1998); Jeanette Farrell, *Invisible Enemies: Stories of Infectious*

Disease (New York: Farrar Straus Giroux, 1998); Gina Kolata, *Flu: The Story of the Great Influenza Pandemic of 1918* (New York: Simon & Schuster, 2001).

³³ There are a number of books and articles on the history of biological warfare. The best include LTC George W. Christopher, USAF, MC; LTC Theodore J. Cieslak, MC, USA; MAJ Julie A. Pavlin, MC, USA; COL Edward M. Eitzen, Jr, MC, USA, “Biological Warfare: A Historical Perspective,” *Journal of the American Medical Association*, Vol. 278 No. 5, August 6, 1997; Kenneth V. Iverson, “Demon Doctors: Physicians as Serial Killers” (Chapter 8: History of Biological Warfare) (Tucson: Galen Press, 2002).

³⁴ Stockholm International Peace Research Institute (SPIRI), *The Rise of CB Weapons: The Problem of Chemical and Biological Warfare*, (New York, NY: Humanities Press; 1971), 1.

³⁵ Stubbs M., “Has the West an Achilles heel: possibilities of biological weapons,” *NATO's Fifteen Nations*, June/July 1962, 94-99.

³⁶ For a chronological viewing of the history of biological warfare see http://www.bioterry.com/History_of_Biological_Terrorism.asp.

³⁷ Ibid.

³⁸ V.J. Derbes, “De Mussis and the great plague of 1348: a forgotten episode of bacteriological war.” *Journal of American Medicine Association* 196 (1966): 59-62.

³⁹ F. Parkman, *The Conspiracy of Pontiac and the Indian War After the Conquest of Canada* (Boston: Little Brown & Co Inc., 1901); C.H. Sipe, *The Indian Wars of Pennsylvania*. (Harrisburg, Pa: Telegraph Press, 1929); E.W & A.E. Stearn, *The Effect of Smallpox on the Destiny of the Amerindian* (Boston, Mass: Bruce Humphries; 1945). But see M Hugh-Jones, “Wickham Steed and German biological warfare research,” *Intelligence & National Security*, Vol. 7, 379-402, 1992 (Smallpox epidemics among immunologically naive tribes of Native Americans following initial contacts with Europeans had been occurring for more than 200 years. In addition, the transmission of smallpox by fomites was inefficient compared with respiratory droplet transmission).

⁴⁰ *Supra*, note 36.

⁴¹ Sheldon Harris, “Japanese biological warfare research on humans: a case study of microbiology and ethics,” *Annals of New York Academy of Science*, 1992; 666: 21-52; Hal Gold, Unit 731: Testimony (Tokyo: Charles Tuttle Co., 1996); Peter Williams and

David Wallace, Unit 731: Japan's Secret Biological Warfare in World War II (London: Hodder & Stoughton Ltd., 1989); Doug Struck, "Tokyo Court Confirms Japan Used Germ Warfare in China," *Washington Post*, August 28, 2002, 15.

⁴² See Sheldon H. Harris, *Factories of Death: Japanese Biological Warfare 1932–45 and the American Cover-up* (New York: Routledge, 1994).

⁴³ See US Dept of the Army. *US Army Activity in the US Biological Warfare Programs*, Washington, DC: US Dept of the Army; February 24, 1977; 2. Publication DTIC B193427 L.

⁴⁴ See generally, Harris R, Paxman JA. *A Higher Form of Killing* (New York, NY: Hill & Wang; 1982).

⁴⁵ Ibid.

⁴⁶ US Dept of the Army. *US Army Activity in the US Biological Warfare Programs*, Washington, DC: US Dept of the Army; February 24, 1977; 2. Publication DTIC B193427 L. See also, Ed Regis, *The Biology of Doom: The History of America's Secret Germ Warfare Project* (London: Henry Holt & Co., 1999); Judith Miller, Stephen Engelberg, William J. Broad, *Germs: Biological Weapons and America's Secret War* (New York: Simon & Schuster) 2001.

⁴⁷ See US Senate, "Unauthorized Storage of Toxic Agents: Hearings before US Senate Intelligence Committee," 94th Cong, 1st Sess. Washington, DC: US Senate; September 16-18, 1975.

⁴⁸ See Anthony H. Cordesman, "The Evolving Threat From Weapons Of Mass Destruction In The Middle East," at <http://usinfo.state.gov/journals/itps/0702/ijpe/cordesman.htm>. Estimated costs for producing mass casualties per square kilometer are:

\$1 for biological
\$600 for chemical (nerve agent)
\$800 for nuclear
\$2,000 for conventional

See Richard Danzig, "Biological Warfare: A Nation at Risk—A Time to Act," *Institute for National Strategic Studies* 58 (January 1996): 1.

⁴⁹ The unclassified literature detailing the allegations and evidence of current illicit programs is vast and compelling. See Gideon Rose, "Expert: Russia Retains Biological Weapons Ability," *Dallas Morning News*, October 21, 1999, 1; Graham S. Pearson, "The Threat of Deliberate Disease in the 21st Century" at website <http://www.brad.ac.uk/acad/sbtwc/other/disease.htm>; Jong-Heon Lee,

North Korea Amasses Chemical Weapons, *Washington Times*, September 17, 2002, 1.

⁵⁰ Jeremy Laurence, "US on Alert for Smallpox Terror Attack," *The Independent*, April 22, 2001 at web site <http://news.independent.co.uk/world/americas/story.jsp?story=68020>. One of the most comprehensive listing of these incidents can be found in W. Seth Carus, *Bioterrorism and Biocrimes: The Illicit Use of Biological Agents in the 20th Century*, Center for Counterproliferation Research, National Defense University, July 1999.

⁵¹ See Johanna McGeary, "What Does Saddam Have?" *Time*, September 16, 2002.

⁵² The list includes, in addition to Russia and Iraq, China, Iran, North Korea, Syria, Cuba, Libya, Sudan, Taiwan, Egypt and Israel. *Countering the Chemical and Biological Weapons Threat in the Post-Soviet World*, Committee on Armed Services, House of Representatives (US Government Printing Office: Washington, DC, 23 February 1993). See also Bill Gertz, "China has biological arsenal, Congress told," *Washington Times*, July 15, 1995, 2; David Seagrist, "Not So False Alarm," *Washington Post*, August 28, 1999, 17; Jim Lea, "North Korea Stockpiling Chemical Weapons, South Reports," *Pacific Stars and Stripes*, November 2, 1999, 1; Martin Arostegui, "Fidel Castro's Deadly Secret," *Insight*, July 20, 1998, 1; Nicholas Kravlev, "Havana Pursues Biological Warfare," *Washington Times*, May 7, 2002, 1; Office of the Secretary of Defense, *Proliferation: Threat and Response*, January 2001 at web site www.defenselink.mil.

⁵³ For an extensive discussion of the South African BW program see Stephen Burgess and Helen Purkitt, *The Rollback of South Africa's Biological Warfare Program*, INSS Occasional Paper No. 37 (USAF Institute of National Security Studies 2001); "Mad Scientists: South Africa's Chemical and Biological weapons Program on the internet at http://www.geocities.com/project_coast/. The head of the program, Dr. Wouter Basson, a respected South African cardiologist, became known as "Dr. Death" when it was revealed in 1998 that he headed the decade-long effort to develop biological weapons for the apartheid South Africa government.

⁵⁴ Alibek defected in 1992 and wrote about his experiences (with Stephen Handelman) in *Biohazard* (New York: Delta/Dell Publishing, 1999). Frighteningly, he noted with some pride that a genetically modified strain of anthrax was named after him. He documents how Russian scientists have created genetically altered antibiotic-resistant strains of plague, anthrax, tularemia and glanders,

and were working to create a strain of anthrax that will overcome the immune system. They have been developing methods for genetically altering smallpox virus while preserving its virulence, and they have developed techniques for cultivating the almost-always –fatal Marburg and Machupo viruses.

⁵⁵ David Hoffman, “Deadly Germs From Cold War,” *Washington Post*, June 7, 2000, 24; Lesley McKenzie, “Threat Seen in Russia’s Biological Agents,” *Washington Times*, October 6, 2000, 1.

⁵⁶ Robert Galucci, former Assistant Secretary of State for Nonproliferation, quoted in Lesley McKenzie, “Threat Seen in Biological Agents,” *Washington Times*, October 6, 2000, 1.

⁵⁷ Judith Miller, “US Warns Russia of Need to Verify Treaty Compliance,” *New York Times*, April 8, 2002, 1; Philip C. Bleek, “Bush Refuses to Certify Russian Chem-Bio Compliance,” *Arms Control Today*, May, 2002 at web site www.armscontrol.org/act/2002_05/threatredmay02.asp.

⁵⁸ Dana Lewis, “A Deadly Soviet threat Lives On: In a Kazakh Institute, Living Germs Designed for Warfare are a ‘Terrorist’s Treasure,’” January 19, 2001, at website, www.msnbc.com.

⁵⁹ Joby Warrick, “Russia Denies US Access on Bioweapons,” *The Washington Post*, September 8, 2002, p. 25.; Peter Eisler, “US, Russia Tussle Over Deadly Anthrax Sample,” *USA Today*, August 19, 2002, 1. Russian recalcitrance has put in jeopardy US funding for a number of programs associated with the dismantlement of the former Soviet Union’s weapons of mass destruction programs.

⁶⁰ Jeanne Guillemin, “The 1979 Anthrax Epidemic in the USSR: Applied Science and Political Controversy,” *Proceedings of the American Philosophical Society*, March 1, 2002, 18. Also, a 1971 smallpox outbreak in Kazakhstan may have been the result of a Soviet biological weapons test. See Jonathan B. Tucker and Raymond A. Zilinskas, eds., “The 1971 Smallpox Epidemic in Aralsk, Kazakhstan, and the Soviet Biological Warfare Program,” *CNS Occasional Papers: #9*, August 2002, located at website <http://cns.miis.edu/pubs/opapers/op9/index.htm>.

⁶¹ Under the Soviet Nuclear Threat Reduction Act of 1991, P.L. 102-228, 25 USC. § 2551, a program was established in the Department of Defense entitled the Cooperative Threat Reduction Program. Its purpose is to assist the states of the former Soviet Union in the destruction, protection and accounting of its weapons of mass destruction. While primarily focused on nuclear materials and delivery systems, there are initiatives underway to enhance the

security of biological pathogen collections and to eliminate the biological weapon organization that existed under the Soviet Union.

⁶² *Iraq's Weapons of Mass Destruction: A Net Assessment*, International Institute for Strategic Studies located at website www.iiss.org.

⁶³ Judith Miller, "An Iraqi Defector Tells of Work on at Least 20 Hidden Weapon Sites," *New York Times*, December 20, 2001, 1; Judith Miller and Michael Gordon, "White House Lists Iraq Steps to Build Banned Weapons," *New York Times*, September 13, 2002, located at web site www.nytimes.com/2002/09/13/international/middleeast/13ARMS.html.

⁶⁴ Vice President Speaks at VFW 103rd National Convention Located at <http://www.whitehouse.gov/news/releases/2002/08/20020826.html>.

⁶⁵ Etgar Lefkovits, "Iraq Brags of Biological Weapons to 'Deal with Zionist Entity,'" *Jerusalem Post*, July 18, 2000, 1.

⁶⁶ Ibid.

⁶⁷ Josh Tyrangiel, "What Saddam's Got," *Time*, May 13, 2002, 34.

⁶⁸ Marie Colvin and Nicholas Rufford, "Saddam's Arsenal Revealed," *London Sunday Times*, March 17, 2002, 1.

⁶⁹ Anthony Cordesman, *Terrorism, Asymmetric Warfare, and Weapons of Mass Destruction* (Praeger/CSIS: Washington DC, 2002) at website <http://www.iiss.org/news-more.php?itemID=88>.

⁷⁰ Vice President Cheney Speech to Korean War Veterans, 29 August 2002, located at website <http://www.whitehouse.gov/news/releases/2002/08/20020829-5.html>.

⁷¹ See Nicholas Wade, "Germ Weapons: Deadly, but Hard to Use," *New York Times*, November 21, 1997, available on the internet at www.mtholyoke.edu/acad/intrel/germ.htm; Jessica Stern, "Taking the Terror Out of Bioterrorism," *New York Times*, April 8, 1998, available on the internet at www.mtholyoke.edu/acad/intrel/stern.htm.

⁷² Ken Alibek, "Russia's Deadly Expertise," *New York Times*, March 27, 1998 available on the internet at www.mtholyoke.edu/acad/intrel/rusbio.htm.

⁷³ Indeed, the literature, both fiction and non-fiction is voluminous. See, for example, Judith Miller, Stephen Engelberg, William J. Broad, *Germs: Biological Weapons and America's Secret War* (New York: Simon & Schuster, 2001); Richard Preston, *The Cobra Event* (New York: Ballantine Books, 1997); John S. Marr & John Baldwin,

The Eleventh Plague (New York: Harper Collins Publishers, 1998); Jonathan Tucker, ed., *Toxic Terror: Assessing Terrorist Use of Chemical and Biological Weapons* (Boston: MIT Press, 200); Richard Falkenrath, et. al, *America's Achilles' Heel: Nuclear, Biological and Chemical Terrorism and Covert Attack* (Boston: MIT Press, 1998); K.C. Bailey, *Death for Cause*; Ken Alibek with Stephen Handelman, *Biohazard*, *supra*, note 54; Joshua Lederberg, ed., *Biological Weapons: Limiting the Threat* (Boston: MIT Press, 1999); Jonathan Tucker, *Scourge: The Once and Future Threat of Smallpox* (New York: Atlantic Monthly Press, September 2001).

⁷⁴ David Kay, "WMD Terrorism: Hype or Reality," in James M. Smith and William C. Thomas, ed., *The Terrorism Threat and US Government Response: Operational and Organizational Factors* (US Air Force Academy: INSS Book Series, 2001), 75.

⁷⁵ Carus, *supra*, note 50.

⁷⁶ David Brown, "Biological, Chemical Threat Is Termed Tricky, Complex," *Washington Post*, September 30, 2001, 12.

⁷⁷ Recently, news reporters, "posing as middlemen for a medical laboratory in North Africa, were offered samples of anthrax, plague and brucella by a laboratory in the Far East" for around \$1000 a sample. See "Need a Biological War? Labs Sell Anthrax Germs by Mail Order," *London Sunday Times*, November 22, 1998, 1.

⁷⁸ Guido Olimpio, "Islamic Cell Preparing Chemical Warfare, Toxins, Gases Against West," *Milan Corriere della Sera*, 8 July 1998, 9 (translation by Foreign Broadcast and Information Service).

⁷⁹ Judith Miller, "Lab Suggests Qaeda Planned to Build Arms, Officials Say," *New York Times*, September 14, 2002, 1.

⁸⁰ Interview with Dr. Ken Alibek online at New Scientist website www.newscientist.com/hottopics/bioterrorism/bioterrorism.jsp?id=22994800.

⁸¹ Bühler, G. (trans.), *The Laws of Manu* (Oxford University Press: Oxford, 1886), reprinted under UNESCO sponsorship as *The Sacred Books of the East*, vol. 25 (Motilal Banarsidass: Delhi, 1975), 230, 251-52.

⁸² Siemienowicz, C. *Grand Art d'Artillerie* (1650), as quoted by Appfel, J. 'Les projectiles toxiques en 1650,' Mar. 1929, 234. Available on the SIPRI website at <http://projects.sipri.se/cbw/docs/cbw-hist-pledge.html>.

⁸³ The 1675 Strassbourg Agreement, available on SIPRI at web site <http://projects.sipri.se/cbw/docs/cbw-hist-strassbourg.html>.

⁸⁴ Article 70, Instructions For The Government Of Armies Of The United States In The Field, prepared by Francis Lieber, promulgated as General Orders No. 100 by President Lincoln, 24 April 1863 located at website <http://www.yale.edu/lawweb/avalon/lieber.htm>. Article 16 also prohibited the use of poison. General Orders No. 100 is regarded as one of the first extensive formulations of the laws of armed conflict.

⁸⁵ Hague Convention No. III Relative to the Opening of Hostilities, 18 October 1907, US Treaty Series No. 538, 36 Stat. 2259.

⁸⁶ The 1925 Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, 17 June 1925, 26 UST. 571, TIAS 8061, reprinted in 14 Int'l Leg. Mat's 49 (1975), entered into force for the United States on 10 April 1975. There are currently 147 state parties.

⁸⁷ See Articles 50-52 of the Draft Convention available on website <http://projects.sipri.se/cbw/docs/cbw-hist-britishdraft.html>. See also J. Goldblat, *The Problem of Chemical and Biological Warfare, Volume IV: CB Disarmament Negotiations 1920-1970* (SIPRI and Almqvist & Wiksell: Stockholm, 1971), 167-170, for a discussion of the disarmament efforts during this period.

⁸⁸ Quoted in Thomas Graham, "Biological Weapons and International Law," *Science*, March 29, 2002, at 2325.

⁸⁹ WHO Group of Consultants, *Health Aspects of Chemical and Biological Weapons* (Geneva, Switzerland: World Health Organization; 1970).

⁹⁰ See Leslie Green, *The Contemporary Law of Armed Conflict*, 47-48 (New York: Manchester Press, 1993); Oeter, "Methods and Means of Combat," in Dieter Fleck, *The Handbook of Humanitarian Law in Armed Conflict* at 151-152 (New York: Oxford University Press, 1995); Levie, "Nuclear, Chemical and Biological Weapons," in H Robertson, *The Law of Naval Operations* (Newport: Naval War College, 1991) at 342-45.

⁹¹ Marie Isabelle Chevrier and Iris Hunger, "Confidence building Measures for the BTWC: Performance and Potential," *Nonproliferation Review* (Fall/Winter 2000).

⁹² See *Arms Control: US and International Efforts to Ban Biological Weapons*, Government Accounting Office Report GAO/NSIAD-93-113 (GAO:Washington DC, December 1992), 20-21. Germany, for

example, stated that “a verification regime need not be 100-percent foolproof and that anything that provides for a level of assurance exceeding 50 percent makes sense.”

⁹³ Frederick Aandahl et al., eds., “Formulation of a United States Position with Respect to the Regulation, Limitation, and Balanced Reduction of Armed Forces and Armaments, July 6, 1951,” *Foreign Relations of the United States, 1951*, vol. 1 (Washington DC: US Government Printing Office, 1979), NSC-112, 489.

⁹⁴ The verification standard commonly accepted in the US policy community was that a measure should make it more likely than not that noncompliant activity could be identified before that activity resulted in a significant security risk to the US and to US allies.

⁹⁵ Statement before the Third Review Conference, September 10, 1991, cited in United States Congress, Office of Technology Assessment, *Technologies Underlying Weapons of Mass Destruction*, (Washington, DC: US Government Printing Office, 1993), 74.

⁹⁶ United Nations, *Summary Report, Ad Hoc Group of Governmental Experts to Identify and Examine Potential Verification Measures from a Scientific and Technical Standpoint*, Fourth Session, Geneva, BWC/CONF.III/VEREX/9, 24 September 1993, ii.

⁹⁷ *Ibid.* For a detailed summary of the US view on the results of the experts group meetings see ACDA 1996 Fact Sheet on the Biological Warfare Convention at web site www.fas.org/nuke/control/bwc/news/bwcover.htm, and the ACDA 1993 Fact Sheet at web site <http://www.fas.org/nuke/control/bwc/news/931123-bwc.htm>.

⁹⁸ The author participated in the experts group meetings and was involved in the interagency and multilateral negotiations where this language was drafted, debated and negotiated.

⁹⁹ Dr. Edward Lacey, Principal Deputy Assistant Secretary of State for Verification and Compliance, Testimony before the US House of Representatives, Committee on Government Reform, Subcommittee on National Security, Veterans Affairs, and International Relations, July 10, 2001.

¹⁰⁰ *BTWC Protocol: European Union Common Position*, adopted by the Council on the basis of Article 15 of the Treaty on European Union, May 17, 1999, located at website <http://projects.sipri.org/cbw/docs/btwc-EU-commpos.html>.

¹⁰¹ Available for viewing at the Federation of American Scientists web site <http://www.fas.org/bwc/papers/doc56-1.pdf>.

¹⁰² The so-called “Chairman’s” text may be viewed at Federation of American Scientists web site <http://www.fas.org/bwc/papers/chairtxt.htm>. The 210 page document—totaling 30 articles, 3 annexes, and 9 appendices—was formally introduced on April 23, 2001 at the AHG’s 23rd session.

¹⁰³ For a detailed discussion of this see articles in “Special Section: The Chairman’s Text of the BWC Protocol,” *Arms Control Today*, May 2001 on web site http://www.armscontrol.org/act/2001_05/default.asp.

¹⁰⁴ Merle D. Kellerhals, US Department of State, “Proposed Biological Weapons Protocol Unfixable, US Official Says,” at website <http://usinfo.state.gov/topical/pol/arms/stories/01072503.htm>.

¹⁰⁵ *Ibid.*

¹⁰⁶ Judith Miller, “US Seeks Changes in Germ War Pact,” *New York Times*, November 1, 2001, 1.

¹⁰⁷ “Strengthening the International Regime Against Biological Weapons,” Statement by President George W. Bush, The White House, Office of the Press Secretary. November 1, 2001.) located at website <http://usinfo.state.gov/topical/pol/terror/01110110.htm>.

¹⁰⁸ Undersecretary of State John Bolton Briefing on Biological Weapons Pact, November 19, 2001, reported at website <http://usinfo.state.gov/topical/pol/terror/01112003.htm>.

¹⁰⁹ See FAS Comments on US Rejection of the BWC Protocol, delivered by Barbara Hatch Rosenberg at NGO Seminar for Ad Hoc Group, 25 July 01 at FAS web site <http://www.fas.org/bwc/news/fasgenevastate.htm>.

¹¹⁰ “Misstep on Germ Warfare,” *Boston Globe*, December 13, 2001, p. 18; Elizabeth Olsen, “US Calls for Global Action to Counter Germ Weapons,” *New York Times*, November 20, 2001, 1. For a discussion of the 2002 reconvened Review Conference, see text accompanying footnotes 135-139, *infra*.

¹¹¹ See D. Feakes and J. Littlewood, “Hope and Ambition Turn to Dismay and Neglect: The Biological and Toxin Weapons Convention in 2001,” *Medicine, Conflict and Survival*, vol. 18 (2002): 170.

¹¹² United States Congress, Office of Technology Assessment, *Technologies Underlying Weapons of Mass Destruction*, (Washington, DC: US Government Printing Office, 1993), 75

¹¹³ Under Secretary of State Bolton, “Bolton Cites Need to Respond to Biological Weapons Threat,” August 27, 2002 in Tokyo Japan reported at website <http://usinfo.state.gov/topical/pol/arms/>.

¹¹⁴ This is, frankly, the best and most candid case for inspection/investigation activities. United Kingdom White Paper on *Strengthening the Biological and Toxin Weapons Convention: Countering the Threat from Biological Weapons* (London, 2002).

¹¹⁵ Testimony of Ambassador Donald Mahley before the US House Government Reform Committee, Subcommittee on National Security, Veterans Affairs and International Relations, July 10, 2001. See also, G. Pearson, M. Dando, & N. Sims, “The US Rejection of the Composite Protocol: A Huge Mistake Based on Illogical Assessment,” *Evaluation Paper No. 22*, University of Bradford, Department of Peace Studies, August 2001; Elisa Harris, “The BWC After the Protocol: Previewing the Review Conference,” *Arms Control Today*, December 2001, 10.

¹¹⁶ Pharmaceutical Research and Manufacturers of America, *Pharmaceutical Industry Profile 2000: Research for the Millennium*, Washington DC, 2000, 90.

¹¹⁷ *Ibid.* at 50.

¹¹⁸ *Ibid.* at 25. Inflation and added regulatory costs have greatly increased that figure.

¹¹⁹ This point was proven at a December 1993 trial inspection at a US company’s pharmaceutical facility. Company officials, in cooperating with inspectors (whose roles were played by US and UK officials), found that they revealed too much information piecemeal. At the end of the exercise, they felt they had, in aggregate, revealed both process and throughput proprietary information. Were such information to be acquired by a competitor, the company almost certainly would have suffered severe losses.

¹²⁰ Alan P. Zelicoff, “An Impractical Protocol,” *Arms Control Today*, May, 2001 (available at http://www.armscontrol.org/act/2001_05/zelicoff as of 6/8/02).

¹²¹ Presentation on Future Arms Control Treaties and Agreements, International Arms Control Conference, 18-20 April 2002, Sandia National Laboratories.

¹²² See G. Pearson, M. Dando, & N. Sims, “The US Rejection of the Composite Protocol: A Huge Mistake Based on Illogical

Assessment,” *Evaluation Paper No. 22*, University of Bradford, Department of Peace Studies, August 2001; Elisa Harris, “The BWC After the Protocol: Previewing the Review Conference,” *Arms Control Today*, December 2001, 10.

¹²³ Letter from Mr. Steere, Chairman of the Board, Pfizer Incorporated to Secretary of Commerce William Daley, February 27, 1998 (noted that unlimited access to facilities and the right to take samples, video and audio recordings and documents would result in “substantial” loss of intellectual property and proprietary information, and complained about unauthorized taping of by the inspectors, interference with legitimate commercial operations and the difficulties of managing the inspection teams). Letter on file with author.

¹²⁵ That is not to say that other states parties did not carry out trial inspections or investigations. In fact, a number of states did conduct limited trial visits or inspections under extremely controlled circumstances and without reporting on the methodologies used. It is clear from reading the reports of these exercises that problems encountered were minimized and the positive results of these efforts pre-ordained. Copies of these reports may be found at the Federation of American Scientists web site <http://www.fas.org/bwc/papers/protaptrial.htm>.

¹²⁶ Alan P. Zelicoff, Testimony before the US House of Representatives, Committee on Government Reform, Subcommittee on National Security, Veterans Affairs, and International Relations, June 5, 2001, 2 at www.sandia.gov/news-center/resources/congress-testimony/pdf/010605.pdf.

¹²⁷ *Supra*, note 51. See also Anton La Guardia, “Terror of Saddam’s Hidden Arsenal,” *London Daily Telegraph*, March 13, 2002, 1 (UN does not believe Saddam has destroyed his biological agents and, in fact, may have even more than was accounted for during the UNSCOM inspections which ended in 1998).

¹²⁸ See Helen Kennedy, “Defector: I Bought Iraq Nukes,” *New York Daily News*, April 3, 2002 (The defector explains how he bought eight trucks which became mobile germ making labs moving on short notice to undisclosed locations throughout Iraq); David Rose “Iraq’s Arsenal of Terror,” *Vanity Fair*, May 2002, 120; Marie Colvin and Nicholas Rufford, “Saddam’s Arsenal Revealed,” *London Sunday Times*, March 17, 2002, 1. For a critique of UN Monitoring, Verification and Inspection Commission (UNMOVIC), the successor to UNSCOM, see Gary Milhollin and Kelly Motz, “Why Iraq Will Defeat Arms Inspectors,” *New York Times*, September 16, 2002, 1.

¹²⁹ Khidhir Hamza, “Inspectors in Iraq? Hiding His Weapons is Easy for Saddam,” *International Herald Tribune*, September 18, 2001, 5; Gary Milhollin and Kelly Motz, *supra*.

¹³⁰ Milhollin & Motz, *supra*, note 128.

¹³¹ Zelicoff, *supra* note 120.

¹³² Peter Slevin, “US Drops Bid to Strengthen Germ Warfare Accord,” *Washington Post*, September 19, 2001, 1.

¹³³ Bolton, *supra*, note 108.

¹³⁴ *Ibid.* Quoted by Undersecretary of State John Bolton.

¹³⁵ Statement by President George Bush, The White House Office of the Press Secretary, 1 November 2001 at website www.whitehouse.gov/news/releases/2001/11/20011101.html.

¹³⁶ The drafting and negotiations that led up to the draft proposal was a complicated process that stretched over several months. Initially the United States was content to have a short conference where the parties simply agreed to meet again in 2006, the date for the next Review Conference. However, given the crisis with Iraq in 2002/2003, the need for coalition building, and constant pressure from key allies, particularly the UK, the US agreed to accept a minimalist work program in the intervening years along the lines of President Bush’s 2001 proposal as long as it was to be a take-it-or-leave-it proposal and there was to be no flexibility in the work programs which would potentially resurrect the “verification” protocol. Personal knowledge of the author who served as Deputy Head of the US Delegation to the 2002 resumed BWC Review Conference.

¹³⁷ Draft Decision of the Fifth Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) Weapons and on Their Destruction, BWC/CONF.V/CRP.3, 6 November 2002 (Copy on file with the author).

¹³⁸ Report of the Fifth Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) Weapons and on Their Destruction, BWC/CONF.V/L.1, 14 November 2002 (Copy on file with the author).

¹³⁹ Interview with UK official who did a preliminary review of implementing legislation, December 10, 2002. This represents roughly 10% of the states parties to the BWC. While this figure may

be low, clearly the vast majority of states have not bothered to live up to their legal obligations under the Convention.

¹⁴⁰ See the references *supra*, note 9.

¹⁴¹ See The Patriot Act, Public Law No: 107-56, signed by President Bush on October 26, 2001.

¹⁴² See, for example, Dan Vergano, “Laser 'Breakdown' Technique Focuses On Terrorist Weapons,” *USA Today*, September 17, 2002, 11D (System that 'makes the invisible visible' could detect chemical, biological agents).

¹⁴³ “Experts: DOD Vaccine Program Limited By Organization, Not Science,” *Inside The Pentagon*, September 12, 2002, 1. Nine of the 14 vaccines remain unlicensed and available only in IND status, making their long-term availability uncertain. This list includes Eastern equine encephalitis vaccine; Q fever vaccine; and Rift Valley fever vaccine. Licensed vaccines used by the program include Anthrax Adsorbed, Hepatitis B, Rabies and Yellow Fever.

¹⁴⁴ Russia has instituted new criminal code provisions prohibiting the production, stockpiling and transferring of biological weapons, added new customs regulations and established stricter controls over the export of agents of human, animal and plant diseases as well as “dual purpose” equipment. They have also agreed to establish a WCO intelligence center in Moscow and implemented a number of other measures. Much more needs to be done, however, given the sorry state of Russia’s economy and a society rift of graft and corruption, a topic beyond the scope of this paper. See Vladimir Kotliar, “Statement at the Workshop on Bio-Terrorism,” Washington DC 14-17 May 2002, on file with the author.

¹⁴⁵ “United States and United Kingdom Scientists to Collaborate on Ways to Detect Chemical and Biological Weapons,” National Nuclear Security Administration News Release NA-02-14, July 3, 2002.

¹⁴⁶ The Department of Defense is also participating in this effort committing \$300 million to this effort. See Pamela Hess, “Pentagon to Track Disease Outbreaks,” *Washington Times*, August 28, 2002, 1.

¹⁴⁷ Speech by Vice President Dick Cheney to Korean War Veterans, 29 August 2002, reported at website <http://www.whitehouse.gov/news/releases/2002/08/20020829-5.html>.

¹⁴⁸ See Kenneth Watman and Dean Wilkening, *US Regional Deterrence Strategies* (Santa Monica, CA: RAND, 1995).

¹⁴⁹ Over the years the Security Council has passed a number of resolutions on international peace and security condemning any and all acts of terrorism, including the use of biological weapons and other weapons of mass destruction. See, for example, Security Council Resolutions 687 (3 April 1991, Iraq), 1189 (13 August 1998, terrorism), 1269 (19 October 1998, terrorism), 1377 (12 November 2001, international peace and security), 1373 and 1368 (September 2001, terrorism). These resolutions may be found at website www.un.org/documents/scres.htm.

¹⁵⁰ *Supra*, note 143.

¹⁵¹ UN General Assembly Resolution 42/37C of November 1988 mandated the Secretary-General to investigate reports “concerning the possible use of . . . biological or toxin weapons.” The Secretary-General has established a panel of experts for carrying out on-site investigations. It has never been used and it is unlikely it ever will be because of the vast potential of abuse by endlessly responding to charges and counter-charges and Western concerns over allowing an international body access to the proprietary information of its biotechnology industries.

¹⁵² Dr. Lewis Dunn and Michael Quinlan, “Tackling Biological Weapons,” unpublished paper, 2002 (on file with the author). I am indebted to Dr. Dunn for kindly providing me a copy of this paper and discussing the ideas with me.

¹⁵³ See Statement of Ambassador James Leonard in Senate Report 101-210 on the Biological Weapons Anti-Terrorism Act of 1989, November 16, 1989, 189.

¹⁵⁴ The US law implementing the BWC is P.L. 101-298 enacted in the US Code at 18 USC. §§ 175-178.

¹⁵⁵ See Matthew Meselson and Julian Robinson, “A Draft Convention to Prohibit Biological and Chemical Weapons Under International Criminal Law,” available at website www.fas.harvard.edu/~hsp/crim01.pdf. The proposed convention is the work of the Harvard Sussex Program on CBW Armament and Arms Limitation and is known as the Harvard Sussex Draft Convention. Professor Barry Kellman of the International Weapons Control Center at DePaul University School of Law, who ran the workshop, also tabled a Draft Convention on the Prohibition and Prevention of Biological Terrorism. Available at website <http://www.law.depaul.edu/>.

¹⁵⁶ The G-8 includes the US, Canada, Japan, Russia, France, Germany, the UK, Italy and the European Union. Statement available at website http://www.g8.gc.ca/kan_docs/globpart-e.asp.

¹⁵⁷ WHO is a specialized agency of the United Nations with 191 member states. It is headquartered in Geneva, and has six regional offices and 141 country offices, over 270 collaborating centers and partnerships with nongovernmental organizations and industry.

¹⁵⁸ See *Global Health: Challenges in Improving Infectious Disease Surveillance Systems* (GAO-01-722, Government Printing Office: Washington DC, August 31, 2001).

¹⁵⁹ Fifty-Fifth World Health Assembly Resolution , *Global Public Health Response to Natural Occurrence, Accidental Release or Deliberate Use of Biological and Chemical Agents or Radionuclear Material that Affect Health*, WHA 55.16, 18 May 2002 at website www.who.int/gb/EB_WHA/PDF/WHA55/ewha5516.pdf.

¹⁶⁰ *Public Health Response to Biological and Chemical Weapons, WHO Guidance*, Second Edition, WHO, November 2001.

¹⁶¹ Interviews with WHO officials, 27 June 2002.

¹⁶² Interviews with WHO Officials; Unattributed, “Study: Military System Can Detect Epidemics,” *Washington Post*, September 22, 2002, 15.

¹⁶³ See website www.who.int/emc/deliberate_epi.html.

¹⁶⁴ Interviews with WHO officials, 27 June 2002.

¹⁶⁵ WHO, in partnership with Health Canada, also developed the Global Public Health Intelligence Network (GPHIN). This is a semi-automated electronic system that continuously scours world communications for rumors of unusual disease events. It is more comprehensive than Global Alert, covering some 30 communicable diseases. For more information on GPHIN see website www.hc-sc.gc.ca/hpb/transitn/gphin_e.pdf.

¹⁶⁶ Interviews with WHO officials 27 June 2002.

¹⁶⁷ Senate bill 2487, the Global Pathogen Surveillance Act of 2002, passed the Senate and is pending in the House. As of this writing it has widespread bipartisan support.

¹⁶⁸ The FAO website is at www.fao.org.

¹⁶⁹ The OIE website is at http://www.oie.int/eng/en_index.htm.

¹⁷⁰ The British Royal Society has made a number of proposals to increase the ability of OIE to monitor, report, respond and contain animal disease threats whether naturally occurring or deliberately caused. See The Royal Society, *Infectious Diseases in Livestock* (Latimer Trend Ltd: Plymouth, July 2002).

¹⁷¹ Interviews with WCO Officials, July 1, 2002.

¹⁷² Ibid.

¹⁷³ Available at website http://www.imo.org/home.asp?topic_id=161.

¹⁷⁴ The comprehensive model agreement includes standing authority to take the following enforcement actions:

1. Board and search vessels claiming the flag of a signatory nation;
2. Embarkation of a coastal state shiprider empowered to authorize patrols, boardings, searches, seizures, and arrests in sovereign waters;
3. Pursuit of suspect vessels into sovereign waters with permission to stop, board, and search;
4. Entry into sovereign waters to investigate suspect vessels and aircraft, also with permission to stop, board, and search;
5. Overflight by state aircraft of sovereign airspace in support of counterdrug operations; and
6. Authority to relay an order-to-land in the territory of a signatory nation.

See Statement Of Rear Admiral Ernest R. Riutta On Maritime Bilateral Counterdrug Agreements Before The Subcommittee On Criminal Justice, Drug Policy, And Human Resources Committee On Government Reform U. S. House Of Representatives May 13, 1999, At website <http://www.uscg.mil/hq/g-o/g-opl/testimony/13may99.htm>.

¹⁷⁵ Article V states that “The Parties agree that an armed attack against one or more of them in Europe or North America shall be considered an attack against them all. . . .” The Alliance Charter may be found at website <http://www.nato.int/docu/basicxt/treaty.htm>.

¹⁷⁶ John Hendren, “September 11th, Changing NATO’s Scope,” *Los Angeles Times*, September 24, 2002, 1.

¹⁷⁷ Speech by the Secretary General of NATO Lord Robertson at the American Enterprise Institute’s New Atlantic Initiative, 20 June 2002, Washington, D.C.

¹⁷⁸ Past promises in Europe to boost defense spending proved empty. The US currently spends more than twice as much on defense as the other 18 allies combined. France, a rare European country with forces able to deploy overseas, recently made good on a promise to boost defense budgets. But others have reneged; the EU’s proposed A400-

M cargo plane can't get off the ground, for example, as European governments can't seem to find the money to pay for it.

¹⁷⁹ *Supra*, note 154.

¹⁸⁰ See Final Communiqué, Ministerial Meeting of the North Atlantic Council, Reykjavik, 14 May 2002, at website www.natio.int/docu/pr/2002/p02-059e.htm.

¹⁸¹ Interviews with NATO WMD Center staff, 2 July 2002.

¹⁸² *Ibid.*

¹⁸³ *Ibid.*

¹⁸⁴ OSCE Bucharest Ministerial Declaration, Ninth Meeting of the Ministerial Council, December 3-4, 2001 at website www.osce.org/docs/english/1990-1999/mcs/9buch01e.htm#21. Also See OSCE 1994 Budapest Summit Declaration at website www.osce.org/docs/english/1990-1999/summits/buda94e.htm#Anchor_PRINCIPLE_37449.

¹⁸⁵ Otakar Mika, "SEDM Initiative on Defence/Military Support to WMD Counterproliferation, Border Security, and Counter Terrorism," *Concept Paper*, 2002 (on file with author).

¹⁸⁶ See for example the Joint EU-US Action Plan (on Nonproliferation) at website http://europa.eu.int/comm/external_relations/us/action_plan/1_promoting_peace_stability.htm. There are currently some 34 agencies in the EU that are engaged in the fight against terrorism and the spread of WMD.

¹⁸⁷ Resolution on Strengthening Hemispheric Cooperation To Prevent, Combat, And Eliminate Terrorism, /Ser.F/II.23 RC.23/RES.1/01 adopted at the first plenary session, held on September 21, 2001 of Foreign Ministers at website <http://www.oas.org>.

¹⁸⁸ 2001 ASEAN Declaration on Joint Action to Counter Terrorism, 5 November 2001, at website www.aseansec.org/viw.asp?file=/newdata/2001_asean_declaration.htm.

¹⁸⁹ ASEAN-United States Of America Joint Declaration For Cooperation To Combat International Terrorism, 1 August 2002 at website <http://www.aseansec.org/newdata/6.htm>.

¹⁹⁰ See G. Woolett & S. Radcliffe, "Bioweapons, Bioterrorism and the New Threats of the 21st Century," *Regulatory Affairs Focus*, March 2002, 7.

¹⁹¹ Interview with Terry Taylor, IISS, and Mike Powers, CBACI, 10 June 2002. See also International Institute of Strategic Studies News, Autumn 2002, 10.

¹⁹² See P.L. 107-56, the USA Patriots Act, passed in October 2001, which imposes security background checks for scientists working with those pathogens deemed most likely to be used by terrorists.

¹⁹³ *Supra*, note 29.

¹⁹⁴ M. Barletta, A. Sands & J. Tucker, “Keeping Track of Anthrax: The Case for a Biosafety Convention,” *Bulletin of Atomic Scientists*, May/June 2002, 57.

¹⁹⁵ *Ibid.* at 61.

¹⁹⁶ See “Improving US Export Control Technical Assistance to Prevent Proliferation,” at website <http://wwics.si.edu/NEWS/digest/bunton.htm>.

¹⁹⁷ So-called because it was an Australia initiative and the meetings are held in the Australian embassy in Paris.

¹⁹⁸ See Australia Group website www.australiagroup.net for AG activities related to BWC related items.

¹⁹⁹ Australia Group Press Release, June 7, 2002, at website www.australiagroup.net/press_07_06_02.html.

²⁰⁰ Interviews with WCO and Europol officials, 1-2 July 2002.

²⁰¹ See Interpol Website at www.interpol.int/Public/Icipo/default.asp.

²⁰² Interviews with Europol Counter-terrorism official, 3 July 2002.

²⁰³ *Ibid.*

²⁰⁴ *Ibid.*

²⁰⁵ UN Security Council Resolution 1373, Threats To International Peace And Security Caused By Terrorist Act, September 23, 2001, at website <http://daccess-ods.un.org/doc/UNDOC/GEN/N01/557/43/PDF/N0155743.pdf?OpenElement>.

²⁰⁶ Available at website <http://www.un.org/law/cod/finterr.htm>. The Convention was unanimously adopted by the UN General Assembly on December 9, 1999, and has been open for signature since January 10, 2000. It will enter into force when ratified by 22 states.

²⁰⁷ See ARF Statement on Measures Against Terrorist Financing, 30 July 2002, at website <http://www.aseansec.org/newdata/3.htm>.

²⁰⁸ See *US-EU Terrorism Financiers Fact Sheet*, June 11, 2002 at website www.treas.gov/press/releases/po3070.htm.

²⁰⁹ World Health Organization, *Fighting Disease, Fostering Development: 1996 World Health Report*, 1996, v.

²¹⁰ Robert Strausz-Hupé quoted in Daniel Pipes “Death to America,” *New York Post*, September 8, 2002, at website <http://www.danielpipes.org/article/460>.

