

Chapter 1

Introduction

Jonathan B. Tucker

On March 20, 1995, the Japanese Aum Shinrikyo doomsday cult carried out a terrorist attack in the Tokyo subway system with the chemical nerve agent sarin, killing a dozen people, injuring more than a thousand, and frightening millions. This incident demonstrated that chemical and biological weapons (CBW) are within the technical reach of sophisticated terrorist organizations. Although the Tokyo subway attack probably inflicted fewer fatalities than a conventional bombing would have, the use of an invisible, lethal poison created a pervasive sense of fear and insecurity.

Since then, senior federal government officials and the news media have expressed alarm about the emerging threat of CBW terrorism, and the U.S. Congress has responded by appropriating billions of dollars for counterterrorism programs. Yet much of the discussion to date has focused on the *vulnerability* of large cities to terrorist attacks, while neglecting a careful assessment of the *threat*. Since the vulnerability of modern urban society to CBW attacks is potentially unlimited, such assessments do not provide a sound basis for policy decisions about the level and type of investment warranted to meet the emerging terrorist challenge.

In order to understand the actual nature of CBW use by non-state actors, it is essential to look at the historical record, which is more extensive than is generally believed. A 1994 study that defined terrorism broadly to include the deliberate contamination of food, water, and drugs identified more than 244 incidents of CBW terrorism in twenty-six countries since World War I. Of these episodes, 60 percent involved the actual use of chemical or biological agents, 30 percent involved threatened use, and 10 percent acquisition only. Only 25 percent of the surveyed incidents were linked to political motives; the rest were perpetrated by criminals,

psychotics, disgruntled employees, and others.¹ A more recent survey focusing on "bioterrorism and biocrimes" identified more than 110 alleged cases in which terrorists, criminals, or covert state operators employed, acquired, threatened to use, or took an interest in biological warfare (BW) agents.²

Ever since the Tokyo subway attack, incidents involving CBW have been on the rise. Before the late 1990s, the Federal Bureau of Investigation (FBI) typically encountered about a dozen cases a year involving threats or actual attempts to acquire or use chemical, biological, radiological, or nuclear materials. In 1997, however, the FBI opened 71 investigations of this type, and in 1998, it launched 146.³ Although about 80 percent of cases of alleged CBW terrorism have been hoaxes, some incidents have involved unsuccessful attempts to disperse toxic or infectious agents.⁴

Robert Blitzer, formerly the FBI's chief of domestic terrorism and counterterrorism planning, testified at a congressional hearing in 1998 that the perpetrators of domestic CBW incidents generally fall into two categories: "lone offenders" who are mentally unstable, seeking revenge for personal grievances, or pursuing vendettas against other citizens; and "extremist elements of right-wing groups" who believe in the violent overthrow of the federal government. Blitzer divided the major threats from foreign sources into three groups: state-sponsored terrorists, terrorist organizations, and loosely affiliated extremists, who pose the most urgent threat.⁵

The number of hoaxes involving chemical or biological agents also has risen sharply in recent years. The FBI recorded more than 150 hoaxes involving anthrax in 1998, compared to a single one in 1997.⁶ Responding

1. Harvey J. McGeorge, "Chemical and Biological Terrorism: Analyzing the Problem," in *The ASA [Applied Science and Analysis] Newsletter*, No. 42 (June 16, 1994), pp. 1, 12-13.

2. W. Seth Carus, *Bioterrorism and Biocrimes: The Illicit Use of Biological Agents in the 20th Century* (Washington, D.C.: Center for Counterproliferation Research, National Defense University, August 1998).

3. Gretchen Schuldt, "Area Law Enforcement Moves to Head Off Terrorism Threat," *Milwaukee Journal Sentinel*, January 25, 1999, p. 1.

4. Tim Weiner, "Reno Says U.S. May Stockpile Medicine for Terrorist Attacks," *New York Times*, April 23, 1998, p. A12.

5. Donna Abu-Nasr, "FBI: Domestic Terror Threats Grow," *Associated Press*, October 2, 1998.

6. *Associated Press*, "Anthrax Hoaxes Are On the Rise: Law Enforcement Officials Say Threats Are Difficult to Combat," *Boston Globe*, January 2, 1999, p. A4; Maria Elena

to such incidents can be disruptive and costly.⁷ One possible cause of this phenomenon may be the intense attention focused on the threat of CBW terrorism in the U.S. news media and in Hollywood movies, bestselling novels, and other mainstays of popular culture. This sensational and at times hysterical coverage may have had the unintended effect of popularizing and even glamorizing these weapons in the minds of potential perpetrators.

Characteristics and History of CBW

Many people tend to confuse chemical and biological weapons, which in fact have quite different characteristics. Chemical warfare (CW) agents are man-made, supertoxic chemicals that can be dispersed as a gas, vapor, liquid, aerosol (a suspension of microscopic droplets), or adsorbed onto a fine talcum-like powder to create "dusty" agents. Basic classes of chemical agents include choking agents that damage lung tissue (e.g., chlorine, phosgene), blood agents that interfere with cellular respiration (e.g., hydrogen cyanide), blister agents that cause severe chemical burns to the skin and lungs (e.g., mustard gas, lewisite), and nerve agents that disrupt nerve-impulse transmission in the central and peripheral nervous systems, causing convulsions and death by respiratory paralysis (e.g., sarin, VX). Chemical agents vary greatly in toxicity and persistence. Volatile agents such as sarin disperse rapidly, whereas persistent agents such as VX nerve agent or sulfur mustard remain toxic for days or weeks and require costly decontamination and clean-up.

Chemical weapons were first employed on a massive scale on the battlefields of Europe during World War I. Although all of the major combatants in World War II produced large chemical stockpiles, mutual restraint prevailed in the European theater, and chemical arms were used in significant amounts only by Japan against China. The chemical arms race continued throughout the Cold War, however, with both the United States and the Soviet Union accumulating tens of thousands of tons of blister and nerve agents. Although war between the superpowers fortunately never materialized, chemical weapons were employed in several

Fernandez, "Anthrax Hoaxes Are Sent in Mail," *Washington Post*, February 5, 1999, p. B8; Presentation by Special Agent Dave Baker, WMD Coordinator, FBI Regional Office in Los Angeles, for the Criminal Justice Course on "Terrorism" at the California Specialized Training Institute, San Luis Obispo, California, February 4, 1999.

7. Rene Sanchez, "Calif. Anthrax Threats Spawn Costly Wave of Fear," *Washington Post*, January 11, 1999, p. 2; Don Terry, "Treating Anthrax Hoaxes with Costly Rubber Gloves," *New York Times*, December 29, 1998, p. A10.

lesser conflicts such as the Yemen civil war (1963–67),⁸ the Iran-Iraq War (1980–88),⁹ and the war between South Africa and Mozambique (1992).¹⁰ Unproven allegations of chemical warfare include use by the Soviet Union in Afghanistan in 1980–83¹¹ and by Bosnian Serb forces in Bosnia in 1995.¹²

More than 125 countries, including several states with chemical arsenals such as the United States, Russia, China, India, and Iran, have signed and ratified the 1993 Chemical Weapons Convention (CWC). This global treaty, which entered into force in April 1997, mandates the internationally monitored destruction of all chemical stockpiles within ten years and bans their reacquisition. The United States is currently destroying its entire chemical stockpile with high-temperature incineration and chemical neutralization technologies. Russia has made a similar commitment to eliminate the vast chemical arsenal it inherited from the Soviet Union, although it faces major financial obstacles in doing so. Several countries suspected of retaining clandestine chemical weapons stocks have refused to join the CWC, however, including states that support terrorism such as Iraq, Libya, Syria, and North Korea.

Biological warfare (BW) agents are living microorganisms that cause fatal or incapacitating diseases, as well as toxins—nonliving poisons extracted from living bacteria, plants, and animals, or synthesized in the laboratory. Whereas chemical weapons act within minutes or hours, biological weapons typically have an “incubation period” of two days or more before acute symptoms develop. Microbial pathogens that have been developed in the past for military purposes include bacteria (e.g., the causative agents of anthrax, tularemia, and plague), viruses (Venezuelan equine encephalitis, Marburg hemorrhagic fever, and smallpox), and rickettsiae (Q fever). Early U.S. developers of biological weapons preferred veterinary diseases such as anthrax and tularemia that are not

8. W. Andrew Terrill, “The Chemical Warfare Legacy of the Yemen War,” *Comparative Strategy*, Vol. 10, No. 2 (1991), pp. 109–119.

9. Lee Waters, “Chemical Weapons in the Iran/Iraq War,” *Military Review*, Vol. 70, No. 10 (October 1990), pp. 57–63.

10. Truth and Reconciliation Commission (South Africa), Chapter 6: “Special Investigation into Project Coast, South Africa’s Chemical and Biological Warfare Program, ‘Mozambican Incident’” *Final Report*, Volume II (Cape Town: Truth and Reconciliation Commission, October 29, 1998).

11. U.S. Department of State, *Chemical Warfare in Southeast Asia and Afghanistan: Report to the Congress from Secretary of State Alexander M. Haig, Jr.*, Special Report No. 98 (Washington, D.C.: U.S. Department of State, March 22, 1982).

12. Human Rights Watch, “Chemical Warfare in Bosnia? The Strange Experiences of Srebrenica Survivors,” *Human Rights Watch*, Vol. 10, No. 9 (D) (November 1998).

contagious in humans, making the effects of a BW attack more controllable. The Soviet Union, in contrast, weaponized highly contagious diseases such as pneumonic plague and smallpox for strategic attacks against distant targets, in the belief that the resulting epidemic would not boomerang against the Soviet population.

At least in theory, germ weapons are much more potent on a weight-for-weight basis than even the most lethal chemical weapons. Nerve agents such as sarin can kill in tiny doses if inhaled, but they must be delivered in massive quantities to produce lethal concentrations over large areas. For example, a chemical attack that caused 50 percent casualties over a square kilometer would require about a metric ton of sarin. In contrast, microorganisms infect people in minute doses and then multiply within the host to cause disease. For example, a mere 8,000 anthrax bacteria—an amount smaller than a speck of dust—are sufficient to infect a human being. As a result, a biological attack with a few kilograms of anthrax could inflict the same level of casualties over a square kilometer as a metric ton of sarin—provided that the anthrax was efficiently disseminated.

Despite the potential lethality of BW agents, their actual use in war has been extremely rare, with the only well-documented case in the twentieth century being Japan's use of plague and other bacterial agents against China during World War II.¹³ The United States unilaterally renounced its offensive BW program in 1969, and the development, possession, and transfer of biological and toxin weapons are banned by the 1972 Biological Weapons Convention (BWC). More than 140 countries are parties to the treaty, but about a dozen states—among them Egypt, Iraq, Iran, Israel, Libya, North Korea, Russia, and Syria—are suspected of possessing or of actively seeking biological weapons. Although Moscow was one of three key sponsors of the BWC, in April 1992 Russian President Boris Yeltsin admitted that the Soviet Union and then Russia had retained an offensive BW program for nearly two decades in violation of the convention. Yeltsin issued an edict dismantling the offensive program, but some analysts suspect that it still persists at a lower level. According to a U.S. government report, some former Soviet biological weapons-related facilities, "in addition to being engaged in legitimate activity, may be maintaining the capability to produce BW agents."¹⁴

13. John W. Powell, "Japan's Biological Weapons: 1930–1945," *Bulletin of the Atomic Scientists*, Vol. 37, No. 8 (October 1981), pp. 43–51; Sheldon H. Harris, *Factories of Death: Japanese Biological Warfare 1932–45 and the American Cover-Up* (New York: Routledge, 1994).

14. U.S. Arms Control and Disarmament Agency, *Threat Control Through Arms Control: Annual Report to Congress, 1996* (Washington, D.C.: ACDA, 1997), p. 87.

A dilemma associated with efforts to control the spread of biological weapons is that the equipment needed to produce them is "dual-capable," meaning that it has both civilian and military applications. Indeed, nearly any plant that produces vaccines, antibiotics, feed supplements, or fermented beverages could potentially be diverted to the illicit production of BW agents. The rapid diffusion of commercial biotechnology industries throughout the developing world has therefore created a burgeoning potential for biological weapons development.

Hurdles to Terrorist Acquisition of CBW

Although a terrorist would need only a few dozen liters of nerve agent to inflict significant casualties among unprotected civilians, the production of chemical weapons is not as easy as is often suggested in media accounts. The synthesis of nerve agents such as sarin and VX requires the use of highly reactive and corrosive ingredients that may be difficult to acquire and are dangerous to handle. Terrorists seeking a chemical capability would therefore have to overcome significant technical hurdles and would run major safety risks, particularly in the event of an accidental explosion or leak.

Aum Shinrikyo, whose vast financial resources enabled it to recruit trained organic chemists from Japanese universities and to build a sophisticated three-story chemical-weapons production plant known as "Satian 7," still failed in its attempt to carry out a devastating chemical attack against the population of Tokyo. Aum's release of sarin on the Tokyo subway caused mass disruption but limited fatalities: twelve people died, fewer than would have been killed by an explosive device. One reason was that the delivery system was crude. A diluted solution of sarin was poured into eleven two-ply plastic bags, which were then sealed. Cult members carried these bags, concealed in folded newspapers, on board subway cars. At the appointed time, the terrorists punctured the bags with sharpened umbrella tips, releasing puddles of nerve agent that slowly evaporated and exposed people nearby. Aum's sarin was also of poor quality, having been synthesized hastily the day before and diluted with solvent so that the perpetrators would have time to escape before being overcome by the fumes. Had Aum produced high-grade sarin and dispensed it as an aerosol—a fine, inhalable mist—the Tokyo attack could easily have inflicted thousands of casualties. Nevertheless, the fact that the cult did not succeed in its effort to inflict mass casualties suggests that chemical terrorism is not as easy as some analysts contend.

Development and production of a biological weapon by terrorists

would also entail significant technical challenges. First, the terrorists would have to obtain a sufficiently virulent strain of a lethal or incapacitating disease agent. Obtaining highly virulent strains from natural sources is not easy, however. Most of the pathogens developed as biological weapons have been deliberately bred or genetically modified for virulence, stability, ease of production, and other characteristics. The next step, cultivation of the agent, would be relatively easy for individuals trained in microbiology. Since all the necessary equipment is "dual-use," terrorists could use commercially available laboratory glassware or a desktop fermentor and standard nutrient media to brew up a batch of lethal bacteria. Viruses are significantly harder to mass-produce because they cannot multiply outside of living cells, but they can be grown in fertilized eggs. Even so, cultivating infectious pathogens can be hazardous to one's health. Because of sloppy laboratory practices, members of the Aum Shinrikyo cult reportedly became infected with Q-fever, a rickettsial disease they were preparing as a biological weapon. Even cult leader Shoko Asahara is believed to have acquired the debilitating illness.¹⁵

Dissemination of BW agents poses even greater technical hurdles. Whereas persistent chemical agents such as sulfur mustard and VX nerve gas are readily absorbed through the intact skin, no bacteria and viruses can enter the body by that route unless the skin has already been broken. Thus, BW agents must either be ingested or inhaled to cause infection. To expose large numbers of people through the gastrointestinal tract, possible means of delivery are contamination of food and drinking water, yet neither of these scenarios would be easy to accomplish. Large urban reservoirs are usually unguarded, but unless the terrorists dumped in a massive quantity of BW agent, the dilution effect would be so great that no healthy person drinking the water would receive an infectious dose. Moreover, modern sanitary techniques such as chlorination and filtration are designed to kill pathogens from natural sources and probably would be equally effective against a deliberately released agent.¹⁶ Bacterial contamination of the food supply is also unlikely to inflict mass casualties. Cooking, boiling, pasteurization, and other routine safety precautions are generally sufficient to kill pathogenic bacteria. Moreover, although the only known incident of biological terrorism in the United States involved

15. Sheryl WuDunn, Judith Miller, and William J. Broad, "How Japan Germ Terror Alerted World," *New York Times*, May 27, 1998, p. A10.

16. Sydney J. Freedberg, Jr. and Marylyn Werber Serafini, "Be Afraid, Be Moderately Afraid," *National Journal*, No. 13 (March 27, 1999), p. 810.

the deliberate contamination of food, the method of delivery was crude and inherently limited: the terrorists sprinkled cultures of *Salmonella* bacteria onto restaurant salad bars (see Chapter 8).

The only potential way to inflict mass casualties with a BW agent is by disseminating it as a respirable aerosol: an invisible cloud of infectious droplets or particles so tiny that they remain suspended in the air for long periods and can be inhaled by large numbers of people. A high-concentration aerosol of anthrax or some other germ weapon, released into the air in a densely populated urban area, could potentially infect thousands of victims simultaneously. After an incubation period of a few days, depending on the type of agent and the inhaled dose, the exposed population would experience an outbreak of an incapacitating or fatal illness.

Although aerosol delivery is potentially the most lethal way of delivering a biological attack, it involves major technical hurdles that most terrorists would be unlikely to overcome. To infect through the lungs, infectious particles must be microscopic in size—between one and five microns (millionths of a meter) in diameter. Terrorists would therefore have to develop or acquire a sophisticated delivery system capable of generating an aerosol cloud with the necessary particle size range and a high enough agent concentration to cover a broad area.

An important trade-off exists between ease of production and effectiveness of dissemination. The easiest way to produce microbial agents is in a liquid form, yet when such a “slurry” is sprayed into the air, it forms heavy droplets that fall to the ground so that only a small percentage of the agent is aerosolized. In contrast, if the bacteria are first dried to a solid cake and then milled into a fine powder, they become far easier to aerosolize, yet the drying and milling process is technically challenging. Some experts believe that only a major state-sponsored BW program could overcome these hurdles; others are less convinced.¹⁷ Conceivably, terrorists might seek to obtain the necessary weaponization know-how by recruiting germ weapons scientists formerly employed by the Soviet Union, South Africa, or some other country that had a technically advanced BW program.

Even if aerosolization is achieved, the effective delivery of biological agents in the open air is highly dependent on atmospheric and wind conditions, creating additional uncertainties. Only under highly stable atmospheric conditions will the aerosol cloud remain close to the ground where it can be inhaled, rather than being rapidly dispersed. Moreover, most microorganisms are sensitive to ultraviolet radiation and cannot

17. Ibid., p. 810–811.

survive more than thirty minutes in bright sunlight, limiting their effective military use to nighttime attacks. The one major exception is anthrax bacteria, which can be induced to form spores with tough outer coats that enable them to survive for several hours in sunlight. Terrorists, of course, could stage a biological attack inside an enclosed space such as a building, a subway station, a shopping mall, or a sports arena. Such an attack, if it involved a respirable aerosol, might infect thousands of people, but even here the technical hurdles would be by no means trivial.

Indeed, Aum Shinrikyo failed in ten attempts to conduct BW attacks with either anthrax or botulinum toxin between 1990 and 1995, suggesting that despite the cult's extensive scientific and financial resources, it was unable to overcome some or all of the technical hurdles associated with acquisition of a virulent strain, cultivation of the agent, and efficient delivery. According to Larry Johnson, former deputy director of the State Department's Office of Counter-Terrorism, "Producing these types of weapons requires infrastructure and expertise more sophisticated than a lab coat and a garage. Besides being tough to produce, these weapons also are difficult to use."¹⁸ In sum, only a small subset of terrorist groups or organizations is likely to possess the technical know-how needed to carry out an effective chemical or biological attack.

A "New Breed" of Terrorists?

To pose a real threat of toxic terror, a group must have both the capability and motivation to acquire and use chemical or biological weapons. What can one say about the motivational side of the equation? Terrorism expert Bruce Hoffman has argued that a terrorist act is conceived and executed in a manner that simultaneously reflects the group's particular aims and motivations, fits its resources and capabilities, and takes account of the target audience at which the act is directed. "The tactics and targets of various terrorist movements, as well as the weapons they favor," he writes, "are . . . eluctably shaped by a group's ideology, its internal organizational dynamics and the personalities of its key members, as well as a variety of internal and external stimuli."¹⁹

To examine terrorist motivations, it is first important to define the

18. Testimony by Larry Johnson before the National Security, International Affairs and Criminal Justice Subcommittee of the House Government Reform and Oversight Committee, October 2, 1998, cited in *The CBW Conventions Bulletin*, No. 42 (December 1998), p. 35.

19. Bruce Hoffman, *Inside Terrorism* (New York: Columbia University Press, 1998), p. 157.

term "terrorism." According to the definition adopted by the U.S. Department of State, terrorism is "premeditated, politically motivated violence perpetrated against noncombatant targets by subnational or clandestine agents, usually intended to influence an audience."²⁰ The case studies in this book suggest that the traditional definition is problematic, however, because apolitical or personal motivations may lead terrorists to acquire and use CBW agents. A better working definition might be as follows: "Terrorism is the instrumental use or threatened use of violence by an organization or individual against innocent civilian targets in furtherance of a political, religious, or ideological objective."

Historically, terrorist organizations with concrete political agendas, such as social-revolutionary or nationalist-separatist groups, have not sought to acquire or use chemical or biological weapons. Likely explanations for this pattern include unfamiliarity with the relevant technologies; the hazards and unpredictability of employing toxic and infectious agents; and moral constraints. The most important consideration, however, is that politically motivated terrorists generally view mass-casualty attacks as counterproductive. Since such groups are trying to extract a political concession of some kind or to gain attention for their cause in the court of public opinion, they must carefully calibrate their use of violence. Indiscriminate attacks could kill supporters as well as enemies, would alienate current or future supporters of the group, and would probably provoke severe government repression that could result in the group's destruction. Finally, the decision to acquire or employ CBW agents may create strong tensions within the group and jeopardize its cohesion if some members object on moral grounds. Such individuals may defect and become informants for law enforcement agencies, putting the survival of the group in jeopardy.

Despite the disincentives to CBW use by politically motivated terrorists, several analysts have argued that a "new breed" of terrorists has appeared on the scene that may be willing to employ mass violence for a variety of motives unrelated to clear political goals.²¹ Indeed, the conventional bombings of the World Trade Center in New York in 1993 and the Alfred E. Murrah Federal Building in Oklahoma City in 1995 were clearly intended to inflict indiscriminate civilian casualties, and have raised the specter of a more virulent form of terrorism. Examples of

20. U.S. Department of State, *Patterns of Global Terrorism*, Office of the Coordinator for Counter-terrorism (Washington, D.C.: U.S. Department of State, April 1997), p. vi.

21. Jose Vegar, "Terrorism's New Breed," *Bulletin of the Atomic Scientists*, Vol. 54, No. 2 (March/April 1998), pp. 50-55.

apolitical terrorist groups include nationalist-religious terrorists whose hatred and fanaticism are so intense that they are prepared to resort to any weapon to destroy their enemies; millenarian sects and cults that believe that God or some higher power has ordered them to bring about an apocalyptic final battle in which the unbelievers will be vanquished and the righteous will receive their reward; white supremacists lashing out at hated minority groups; and radical ecologists who believe that the human race must be decimated to preserve the natural balance.

Some of the most serious new threats of mass-casualty terrorism come from professional terrorists who have associated themselves with nationalist-religious causes such as pan-Islamic identity. Ramzi Yousef, the mastermind behind the World Trade Center bombing, sought “eye-for-an-eye” retribution for U.S. and Israeli attacks on Arab states that claimed civilian lives. Similarly, Osama bin Laden, believed responsible for the August 1998 terrorist bombings of the U.S. embassies in Kenya and Tanzania, declared in an interview, “We don’t consider it a crime if we tried to have nuclear, chemical, biological weapons. Our holy land is occupied by Israeli and American forces. We have the right to defend ourselves and to liberate our holy land.”²² Bin Laden stressed that any American citizen who pays taxes and supports the U.S. government is a legitimate target “because he is helping the American war machine against the Muslim nation.”²³

Ever since the Aum Shinrikyo attack on the Tokyo subway, the frightening potential of CBW use has transformed terrorism from little more than an irritant into a perceived threat to national security. Will the “new breed” of terrorists break the deep-seated moral taboo against the large-scale use of these weapons? Terrorism has traditionally relied on relatively unsophisticated weapons such as guns and bombs, which have been used in a small number of ways to inflict relatively modest damage with limited social and political impact.²⁴ At the same time, the historical record includes hundreds of cases in which individuals or groups motivated by criminal, economic, political, or religious objectives have employed CBW agents. None of these incidents has involved mass casualties, either because the motivation or the capability to conduct such an

22. Jamal Ismail, “I Am Not Afraid of Death” [interview with Osama bin Laden], *Newsweek*, January 11, 1999, p. 37.

23. *Ibid.*, p. 37.

24. Philip B. Heymann, *Terrorism and America: A Commonsense Strategy for a Democratic Society*, BCSIA Studies in International Security (Cambridge, Mass.: The MIT Press, 1998), p. 8.

attack was lacking. Accordingly, it is difficult to extrapolate the probability of such events in the future or to predict their potential impact.²⁵

Terrorism expert Walter Laqueur contends that the danger of CBW terrorism has become particularly great because of the confluence of two trends: the growing accessibility of mass-casualty weapons and the emergence of new and more ruthless forms of religious and ideological fanaticism.²⁶ It is not yet clear, however, whether Laqueur's lines of capability and motivation have actually intersected.

Purpose of this Book

Although the technical hurdles involved in producing and disseminating CBW have been extensively analyzed,²⁷ the motivational side still re-

25. Whether terrorists will employ CBW has been a topic of heated debate among specialists, with some contending that such attacks are inevitable and others that they are extremely unlikely. Examples of articles and books reflecting different assessments of the threat include: Jonathan B. Tucker, "Chemical/Biological Terrorism: Coping with a New Threat," *Politics and the Life Sciences*, Vol. 15, No. 2 (September 1996), pp. 167–183, with roundtable commentaries on pp. 185–247; Walter Laqueur, "Postmodern Terrorism," *Foreign Affairs*, Vol. 75, No. 5 (September/October 1996), pp. 24–36; John F. Sopko, "The Changing Proliferation Threat," *Foreign Policy*, No. 105 (Winter 1996/97), pp. 3–20; Brad Roberts, ed., *Terrorism with Chemical and Biological Weapons: Calibrating Risks and Responses* (Alexandria, Va.: Chemical and Biological Arms Control Institute, 1997); James K. Campbell, "Excerpts from Research Study 'Weapons of Mass Destruction and Terrorism: Proliferation by Non-State Actors,'" *Terrorism and Political Violence*, Vol. 9, No. 2 (Summer 1997), pp. 24–50; Richard A. Falkenrath, Robert D. Newman, and Bradley A. Thayer, *America's Achilles' Heel: Nuclear, Biological, and Chemical Terrorism and Covert Attack*, BCSIA Studies in International Security (Cambridge, Mass.: The MIT Press, 1998); Ehud Sprinzak, "The Great Superterrorism Scare," *Foreign Policy*, No. 112 (Fall 1998), pp. 110–124; Walter Laqueur, "The New Face of Terrorism," *Washington Quarterly*, Vol. 21, No. 4 (Autumn 1998), pp. 169–178; David C. Rapoport, "Terrorists and Weapons of the Apocalypse," paper prepared for the Nonproliferation Policy Education Center short course titled "Three Nonproliferation Dialogues: Grand Terrorism, Counterproliferation, and Dual Containment," Annual Meeting of the American Political Science Association, Boston, Mass., September 2, 1998; Ashton Carter, John Deutch, and Philip Zelikow, "Catastrophic Terrorism: Tackling the New Danger," *Foreign Affairs*, Vol. 77, No. 6 (November/December 1998), pp. 80–94; Richard A. Falkenrath, "Confronting Nuclear, Biological and Chemical Terrorism," *Survival*, Vol. 40, No. 3 (Autumn 1998), pp. 43–65; comments on the previous article by Karl-Heinz Kamp, Joseph F. Pilat, and Jessica Stern, and a response by Richard A. Falkenrath in "WMD Terrorism: An Exchange," *Survival*, Vol. 40, No. 4 (Winter 1998/99), pp. 168–183; and Jessica Stern, *The Ultimate Terrorists* (Cambridge, Mass.: Harvard University Press, 1999).

26. Laqueur, "The New Face of Terrorism," p. 171.

27. See, for example, U.S. Congress, Office of Technology Assessment, *Technologies Underlying Weapons of Mass Destruction*, OTA-BP-ISC-115 (Washington, D.C.: U.S. Gov-

mains obscure, a gap in current knowledge that this study seeks to address. What types of terrorist groups or individuals are most likely to acquire and use such weapons, and for what purpose? Further, what types of CBW agents are most likely to be produced, and how would they be delivered? Faced with these questions, most analysts have engaged in *a priori* speculation about terrorist motivations without taking the time and effort to examine historical cases in which individuals or groups have actually sought to acquire or use CBW agents. Even more problematic, information on past incidents of CBW terrorism in the academic literature is anecdotal and often factually incorrect.²⁸ Without a realistic threat assessment based on solid empirical data, government policymakers lack the information they need to design prudent yet cost-effective programs for preventing or mitigating future incidents.

To remedy this situation, the Chemical and Biological Weapons Non-proliferation Project at the Center for Nonproliferation Studies of the Monterey Institute of International Studies commissioned leading scholars in the CBW and terrorism fields to prepare in-depth case studies of twelve groups or individuals who, over the period from 1945 to 1998, sought to acquire or use CBW agents. The cases selected were those most often cited in the academic terrorism literature, including religious cults, right-wing and left-wing terrorist organizations, and "amateur" terrorists. Each case study was researched from primary sources including court documents, declassified government files, and interviews with law enforcement officials, attorneys, judges, and, where possible, the former terrorists themselves.

The case-study method, like every other methodological approach employed in political science, has drawbacks when it comes to assessing a bewilderingly complex reality. Some analysts contend that historical case studies are of limited value for predicting the future threat of CBW terrorism because the nature of terrorism is changing, making it more difficult to extrapolate from past events. In fact, many of the seemingly "new" trends described in the terrorism literature, such as groups or individuals motivated by religious fanaticism, right-wing ideology, or white supremacism, are already well represented in the historical record. Neo-Nazi cells, religious cults, and other unconventional groups have

ernment Printing Office, December 1993); and Karl Lowe, "Analyzing Technical Constraints on Bio-Terrorism: Are They Still Important?" in Roberts, ed., *Terrorism with Chemical and Biological Weapons*, pp. 53–64.

28. The contradictory and often erroneous information on incidents of CBW terrorism contained in the secondary literature is amply documented in Ron Purver, *Chemical and Biological Terrorism: The Threat According to the Open Literature* (Ottawa: Canadian Security Intelligence Service, June 1995).

existed for decades, but in the past they were treated as an epiphenomenon and largely ignored because of the tendency of academic specialists and intelligence analysts to focus narrowly on traditional, politically motivated terrorist organizations. Given this fact, the study of past incidents involving apolitical terrorists should provide insights into motivations and behaviors of individuals and groups that have become of much greater concern today because of their potential acquisition and use of CBW agents.

Others may object that the small number of case studies in this volume constitutes far from a comprehensive universe or even a statistically representative sample, and that the historical record itself is flawed and incomplete. Indeed, an unknown number of incidents of CBW terrorism may have occurred but remained undetected if they did not produce recognizable casualties or were not covered by the news media—a situation analogous to Bishop Berkeley's proverbial tree falling in the woods with no one around to hear it. Definitional problems also exist in distinguishing incidents of CBW terrorism from strictly criminal acts, such as cases of extortion or murder involving poisons.

Despite these methodological limitations, however, the study of the past can provide important insights for the present and the future. Assessing the risk of future incidents of CBW terrorism requires identifying which types of terrorist groups have the technical capability to produce, weaponize, and disseminate these agents; the motivation to inflict mass casualties; and the organizational structure needed to evade law enforcement penetration and arrest. Case studies are invaluable for this purpose because they help us to think concretely about the problem.