



The Evolving Role of Biological Weapons

By Mr. Reid Kirby

Historically, the role of biological weapons has been in parity with nuclear weapons, undergoing many dynamic compromises. Interest in biological weapons initially began as an extension of chemical weapons and a logistically favorable alternative to nuclear weapons. The general belief is that interest in biological weapons wanes after a nation acquires nuclear weapons; however, this was not the case with the United States during the Cold War. During a period of nuclear scarcity, the role of biological weapons continued as an augmentation to the nuclear arsenal. After the United States acquired an adequate number of nuclear weapons, the role of biological weapons evolved to find exclusive use in large-area coverage (LAC) and controlled temporary incapacitation (CTI).

Behind the term “covert,” the role of biological weapons spanned from off-target aerial spray attacks to the dirty tricks of sabotage and espionage. The third role of biological weapons—low-observable attribution (LOA)—eludes attributing an attack to an event or opponent. This role exploits the principle of surprise (verging on perfidy) and, therefore, produces the most fear in policy makers due to the possibility of anonymous biological attacks that escape retaliation.

Extension (1941–1944)

When nations began developing biological weapons after World War I, the programs were considered an extension of chemical-weapons technology. Biological weapons followed the same concepts of dosage as chemical weapons, only with greater agent potency (see Figure 1). The purpose of biological weapons retained the same intent as chemical weapons: produce mass casualties, deny terrain, and degrade performance.

Alternative (1945)

During World War II, the U.S. biological-weapons program was distinctly separate from the nuclear-weapons program. Although the programs often vied for the same scientific staff, resources were not shared due to secrecy. During a time when the feasibility of nuclear weapons

was questionable, policy makers familiar with both programs were assured that biological weapons provided a logistically reasonable alternative should the nation fail to build a nuclear weapon (see Figure 2).¹

At the end of World War II, the United States was on the cusp of a biological capability with 500-pound clusters of the Mark I 4-pound biological bomblet and the M47A2 100-pound biological bomb charged with anthrax. Although Great Britain selected several cities for Allied biological retaliatory strikes against Germany, there was no biological capability to support such plans.

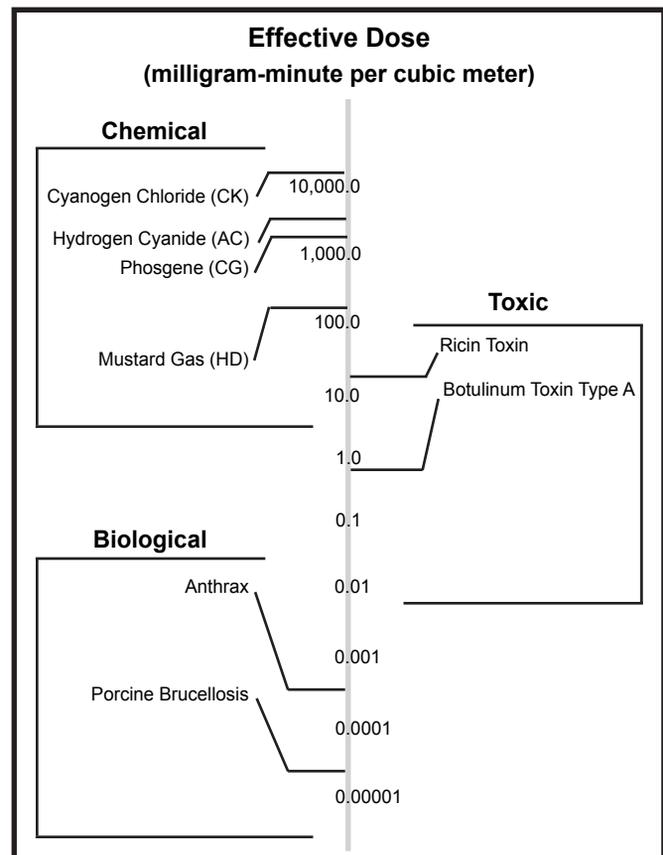


Figure 1. The effective-dosage spectrum of U.S. chemical, biological, and toxic agents during World War II

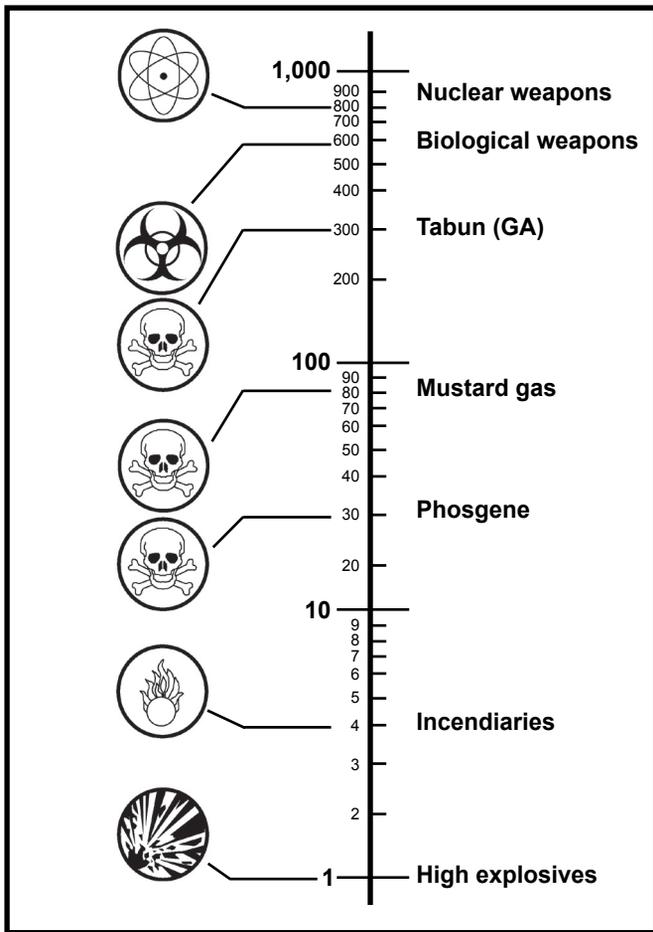


Figure 2. The comparative firepower of strategic bombardment sorties (1945–1951)

Augment (1946–1958)

During Operation Crossroads (the 1946 nuclear field trials at Bikini Atoll), the military recognized that biological weapons would have a synergistic effect if used in combination with nuclear weapons. In 1950, this possibility was affirmed by Navy research on the biological effects of radiation.

In June 1946, the United States created a war plan for nuclear strikes on the Soviet Union. Policy analysts foresaw a conflict between Great Britain and the Soviet Union, and U.S. Forces were too small to hold back a massive invasion of Soviet Forces in Western Europe and the Middle East. The plan, code-named *Pincher*, required dropping 50 nuclear weapons on 20 Soviet cities to destroy 90 percent of aircraft and armor industries and 65 percent of oil refineries. The target list gradually grew over the years (in keeping with the number of weapons in the arsenal).

Under President Harry Truman, the number of nuclear weapons in the arsenal was a closely guarded secret. Even military officials were unaware of the number of nuclear

weapons available until late 1947. The actual number was underwhelming.² During the Pincher era, only 11 nuclear weapons were in the arsenal. Policy analysts believed that the required number of weapons to keep the Soviet Union in check was in the thousands.

After the Soviet Union detonated its first nuclear weapon in 1949, the United States issued National Security Council (NSC) Report 68, a policy study that predicted that the Soviet Union would have 200 nuclear weapons by 1954 and that an attack using half of this number would devastate the United States. The Joint Chiefs of Staff made biological weapons capability a high priority, and the U.S. Air Force put them in the same organizational level as nuclear weapons.³ The Air Force acquired 500-pound clusters of M114 (improved Mark I) 4-pound bomblets, charged with brucellosis, from the Chemical Corps as an interim item to augment the nuclear arsenal.

Exclusivity

Interest in biological weapons waned after the number of nuclear weapons in the U.S. inventory numbered enough to saturate potential targets. The administration under Dwight D. Eisenhower started developing the Single Integrated Operational Plan (SIOP) to coordinate nuclear delivery systems. The first comprehensive plan, SIOP-62, outlined delivering 3,200 nuclear weapons against 1,060 targets throughout the Sino-Soviet block in a preemptive attack and 1,706 nuclear weapons against 725 targets in retaliation.⁴ This change in strategic nuclear planning resulted in overkill, making strategic biological weapons almost irrelevant. The role biological weapons finally adopted exploited areas that other weapon systems were incapable of achieving—LAC, CTI, and LOA.

Large Area Coverage (1958–1969)

Seeking a new edge after the Soviet Union detonated its first nuclear weapon, the United States initiated a hydrogen bomb program. When a nuclear-weapon designer consulted General Curtis LeMay, Commander of the U.S. Air Force Strategic Air Command, on the requirements for a nuclear weapon, LeMay retorted “Why don’t you guys make a bomb to blow up all of Russia?” The deterrent concept of the Cold War embraced total destruction of the enemy.

The United States detonated its largest nuclear weapon (15 megatons) during Operation Castle Bravo in 1954 at Bikini Atoll. Not only did the weapon have almost three times its designed yield of 6 megatons, fallout traveled off course over a larger area than estimated. If used in combat, significant thermal and blast destruction from such a weapon would have affected an area of 80 square

miles, covering an area of 50,000 square miles with serious to lethal fallout.

Around 1960, the Chemical Corps described biological weapons as capable of covering the width of a continent. A 1952 field trial with simulants demonstrated the technical feasibility of covering tens of thousands of square miles with a theoretically infective aerosol. The implications of this field trial went practically unnoticed until 1957, when the United States and Great Britain simultaneously (but independently) investigated the LAC concept.

The Chemical Corps conducted Operation LAC in 1957 and 1958. It was the largest open-air experiment series of its kind, conducted in an area over the continental United States east of the Rocky Mountains. C-119s (termed *Flying Boxcars*) flew along 1,400-mile routes, spraying 5,000 pounds of simulant over the Midwest. Sampling devices detected aerosols from as far as 1,200 miles downwind. In theory, Operation LAC demonstrated that a sortie spraying 4,000 pounds of a biological agent could infect half of the people within a 100,000-square-mile area. A single fighter sortie with a nominal armament of spray tanks was capable of covering 25,000 to 50,000 square miles with a similar casualty rate.

The LAC concept was a major change in weapon employment, even extending to on-target attacks with biological bomblets. Initially, the Strategic Air Command had a biological-capability coverage of 30 square miles per medium bomber sortie. When self-dispersing bomblets were developed, this coverage increased to 100 square miles. By the mid-1960s, improvements in biological-bomblet designs and delivery systems meant a single B-52 Stratofortress bomber with an expanded SUU-24/A dispenser and Flettner rotor bomblets could cover an area of over 10,000 square miles. Putting this example in perspective, the 120-square-mile city of Kiev required 40 nuclear weapons (two to five B-52 sorties). The LAC concept meant that biological weapons could surpass nuclear weapons in casualty potential without precisely locating concealed or hardened targets.

Controlled Temporary Incapacitation (1947–1969)

After World War II, many officers believed that strategic bombing was a mistake, especially with the United States rebuilding bomb damage in Germany and Japan. In 1947, Army Air Force Chemical Officer, Brigadier General Edward Montgomery, stated that “if it were possible to develop an agent with a very widespread effect and a persistency effect of weeks or months, the possibility of imposing our will on an enemy by political or military seizure of strategic and vital localities,

personalities, or facilities might be entirely feasible. The nation which can develop the atom bomb should be capable of developing such a nonlethal running mate.”

In October 1948, Major General Carl A. Brandt, Air Force Deputy Director of Requirements, outlined the Air Force position on biological warfare, requiring a weapon with temporary or permanent incapacitation and minimal postwar problems. In 1952, the Air Force changed its position and required “killer” biological weapons for strategic attacks, although the Chemical Corps continued to recognize the importance of incapacitants.

The 1958 Duer Reeves Committee urged the military establishment to adopt chemical-biological warfare, particularly nonlethal agents and agents that circumvent protective masks. A year later, Defense Research and Engineering Director, Dr. Herbert York, endorsed the findings. By this time, the Chemical Corps was investing three-fourths of its research and development budget on incapacitants. At the 435th National Security Council meeting (1960), Dr. York presented the concept of CTI. Using an array of chemical and biological agents, Dr. York stated that a 10,000-pound ballistic missile was capable of incapacitating a target more than one square mile in size (roughly equivalent to the effect of a tactical nuclear weapon). But unlike nuclear weapons, the effects of chemical and biological weapons have a controlled rate and duration of action, may not result in death or permanent debility, will not cause the destruction of material, and will not hamper force mobility due to debris.

Low-Observable Attribution (1944–1975)⁵

The U.S. Navy conducted a simulated large-scale attack on San Francisco in September 1950. The event went unnoticed by the public. Several miles offshore, a surface vessel sprayed 130 gallons of simulant. Additionally, underwater demolition teams infiltrated the dockyards and emplaced biological-aerosol generators. Around the same time, the Navy tested the E-4 mine, a submarine-delivered mine that surfaced at a preset time, generated a biological aerosol, and then scuttled itself. The trials demonstrated the peculiar covert nature of biological warfare. The enemy would not detect an attack until days later, likely upon the discovery of casualties. And even then, officials might lack evidence to locate the source.

The covert nature of biological warfare transcends its uses, from biological operations through biological crimes. LOA supplies operational security and the element of surprise. In the case of biological crimes, biological espionage, and biological sabotage, LOA extends into anonymity, making an attack indistinguishable from an act of nature rather than a specific opponent due to the

delay in casualty effects and the near nonexistent tangible evidence. Nonetheless, in cases involving bioterrorism, anonymity is counterproductive, as it does not assert the destructive reputation needed to promote a terrorist's social and/or political agenda. Additionally, the planned exploitation resulting from the use of biological weapons eliminates anonymity in military operations.

In a hypothetical situation involving an off-target spray attack of Q Fever by a stealth aircraft (where the target could be a heavily defended beachhead intermixed with civilian communities), the result would likely involve a large number of casualties but minimal fatalities (less than 1 percent). Such an attack would employ LAC and CTI, but it would also employ LOA. The defenders would be unaware that an attack had occurred until an amphibious force came ashore 14 days later, during an overwhelming outbreak of disease.

In October 1958, the Baldwin Report, a study on special biological operations, unequivocally stated that the United States was vulnerable to covert biological attacks. Personnel at Fort Detrick, Maryland, responded to the threat by creating the Special Operations Division (SOD), known as the *dirty tricks guys*. While the SOD created highly sensitive weapon systems in the Biological Warfare Program, the weapons were more tactical in nature and, therefore, not thought of as a significant contributor to biological capabilities. Nevertheless, SOD did provide the technical support to identify potential risks from LOA, including numerous field trials that demonstrated the vulnerability of critical facilities.

One device with unique LOA use was the E22 portable biological warfare (BW) generator. Due to the backpack design of the E22, Special Forces could emplace the generator upwind of a critical target, well outside of a detection security perimeter. Hypothetically, releasing an agent like shigella dysentery (a camp fever) could result in an outbreak that would bring enemy operations to a halt. Such an attack would go undetected and would lack physical evidence.

Legal and Ethical Restraints

The Geneva Protocol of 1925 was a no-first-use pledge not to use chemical or biological weapons. The Biological Weapons Convention of 1975 was an outright ban on the development, production, stockpiling, and use of biological weapons, including the transfer of such weapons to other parties. If nations respect these treaty commitments, the list of potential biological aggressors is very small. Maintaining these proscriptive norms is an essential part of biological security. Should proscriptive

norms fail, there are three legal and ethical principles that may restrict the use of these weapons: distinction, discrimination, and proportionality.⁶

Distinction

Distinction is a legal concept requiring openness between combatants. Although military expertise requires secrecy and deception, distinction draws a line between perfidy and legitimate actions. LOA is an aspect of biological warfare that many define as perfidy by nature. The principle of distinction applies mostly to treachery (such as Soldiers impersonating noncombatants).

Discrimination

Discrimination requires that military operations distinguish between combatants and noncombatants. The belligerents of World War II openly bombed civilian populations, an act that, on the surface, violates the principle of discrimination. The Allies ultimately legitimated their strategic bombings as attacks on the enemy war industry, and that double effect resulted in civilian casualties. The problem with Cold War era biological warfare was the matured acceptance to target enemy war industries. As the norm exists today, there is an ethical lapse in targeting civilian workers without inflicting physical destruction of the industries themselves.

The principle of discrimination originates under the presumption of lethal force, while CTI entreaties nonlethal force toward noncombatants. The term *nonlethal* should be more appropriately termed *less than lethal*, as some fatalities are expected. Discrimination remains a valid ethical consideration.

Proportionality

Proportionality restricts the use of force in excess of what is required to attain an objective. The data from field trials demonstrates that biological weapons could effectively cover vast areas; however, the data also demonstrates poor controllability in placement, requiring a disproportionately larger area to attack a target.

Scenarios and Policies

Since World War I, the chemical and biological policies of the United States were limited to retaliation. However, the policy changed in 1956 to permit chemical and biological use when militarily advantageous. But the policy was an incomplete gesture. President Eisenhower stated that he did not intend to approve agent use but changed the policy to give appropriate prioritization to the chemical and biological programs and develop a credible

retaliatory capability. In December 1966, the White House Science Advisory Committee wrote a memorandum to President Lyndon Johnson recommending a no-first-use policy and acknowledged that civilian and military planners could not conceive a single scenario where the United States would initiate biological warfare.

When Harvard professor Matthew Meselson (working for the Arms Control Disarmament Agency) inquired on the benefit of biological weapons, his contacts at Fort Detrick could only convey one—they were inexpensive. In 1968, Dr. Meselson wrote a U.S.-centric policy paper recommending that the United States ratify the Geneva Protocol of 1925. For the United States, a nation with the financial resources to maintain a nuclear arsenal, it was counterproductive to lead the way in a weapons technology that benefited less affluent nations.

President Richard Nixon announced an end to the U.S. biological warfare program in 1969. The program was dismantled, the weapons were destroyed, and the United States ratified the Geneva Protocol of 1925 and ascended to the Biological Weapons Convention of 1975. While biological warfare invokes fear in many, as a political artifact, its use must coincide with the values of the military and political establishments. It is unlikely that a scenario for using biological weapons will gain acceptance outside a global nuclear conflict, the terminus of a protracted war of attrition, or the replacement of our current international norms with an intrepid alternative. ☹☹

Endnotes:

¹This figure is based on munitions expenditure estimates for various strategic weapons, in comparison with the Mark III nuclear weapon, on a ton-per-square-mile basis.

²This fact is based on the numbers of strategic nuclear weapons shown on Web site <<http://www.nrdc.org/nuclear/nudb/datab9.asp>>.

³The Air Force created the Biological Warfare—Chemical Warfare

(BW-CW) Directorate in the Air Force Office—Atomic Testing (AFOAT), giving biological weapons the same level of priority as nuclear weapons (at least on paper).

⁴A good series of documents on SIOB 62 appear on Web site <<http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB130/index.htm>>.

⁵Even though the United States officially ended its biological warfare program in 1969, the Central Intelligence Agency maintained a small stockpile of biological agents for espionage use until 1975, when the agency was investigated by the U.S. Senate Select Committee to Study Governmental Operations with Respect to Intelligence Activities (also termed the *Church Committee*).

⁶International agreements prohibiting biological warfare and the principle of distinction and rules against perfidy are discussed in Ingrid Detter's book, *The Law of War*, 2d ed., Cambridge University Press, 2005. The war ethics of discrimination and proportionality, including the double-effect argument, are discussed in Michael Walzer's book, *Just and Unjust Wars: A Moral Argument with Historical Illustrations*, 3d ed., Basic Books, 2000.

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