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Chronology of Major Events in the History of Biological and Chemical Weapons*

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*Many definitions of chemical and biological weapons exist; this chronology relies upon the definition disclosed below.

For the purposes of this chronology, chemical weapons are defined in the same manner as Article II of the Chemical Weapons Convention (CWC): "Munitions and devices specifically designed to cause death through [their] toxic properties..."[\[1\]](#) The definition of biological weapons follows Article I of the Biological and Toxic Weapons Convention (BTWC) as paraphrased: microbial and biological agents employed for hostile purposes.[\[2\]](#)

Key	
	[CW] Chemical Weapons Event(s)
	[BW] Biological Weapons Event(s)
	[CBW] Chemical & Biological Weapons Event(s)
	[LF] Major Change(s) to Legal Framework

These definitions exclude some of the most frequently cited uses of chemical weapons, mainly those dating back to the Peloponnesian War. The reason for striking this instance from the chronology is that the recently translated version of Leonardo Da Vinci's notebooks shows a stark overlap between '*Greek Fire*' and the methods used by the Spartans and the Boeotians.[\[3\]](#) Moreover, the purpose of '*Greek Fire*' as a weapon of toxic properties appears faulty in that the primary and overarching purpose of it is for use to create a more persistent fire and not to poison. Finally, in Thucydides' account of the Peloponnesian War, he seems to explicitly show that the "coals of fire, brimstone, and pitch," were designed to burn down the walls of Delium and previously aimed for walling in and burning the Plataeans.[\[3\]](#)

- ~1770 B.C.E. [BW]- Sumerian cuneiforms created depicting an understanding of methods of contagion.[\[4\]](#)
- ~1200 B.C.E. [BW]- Some believe poison arrows were used in the Trojan War due to the descriptions of toxic weapons provided by Homer in the *Iliad*.[\[5\]](#)
- ~513 B.C.E. [BW]- The Scythians, who were known for their virulent toxic arrows, as described by Herodotus in 450 B.C.E., defeat Darius the king of Persia.[\[6\]](#)
- 331 B.C.E. [BW]- Scythians defeat one of Alexander the Greats' generals (Zopyrius) in a rout, likely utilizing the poison arrows described by Herodotus.[\[7\]](#)
- 326 B.C.E. [BW]- In the battle of Jhelum (Hydaspes) in Western India, Paurava led a large force of Indians utilizing poison arrows and darts against Alexander the Greats forces, which included Scythian archers.[\[8\]](#)
- 300 B.C.E. [LF]- Kautilya writes the *Arthasāstra*; in the treatise Kautilya advises his king, who eventually united India and controlled a much wider kingdom, to use chemical weapons extensively in attacks against enemy kings.[\[9\]](#)
- ~100 C.E. [LF]- Caraka-Samhita written in India, which discusses the ethics of medicine and forbidding medical practitioners from harming others. The Caraka-Samhita stands as one of the first examples of bioethics operationalized into doctrine.[\[10\]](#)
- 960-1279 C.E. [CW]- Arsenical smoke used in battle during China's Sung Dynasty.[\[11\]](#)
- 1346-1347 [BW]- Mongols catapult corpses contaminated with plague over the walls into Kaffa (in Crimea), forcing besieged Genoans to flee.[\[12\]](#)
- 1456 [BW]- City of Belgrade defeats invading Turks by igniting rags dipped in poison to create a toxic

cloud. [\[13\]](#)

- **1675 [LF]**- City of Strasbourg, a Franco-German treaty banning use of poisoned bullets is the first known international agreement banning chemical warfare. [\[14\]](#)
- **1710 [BW]**- Russian troops allegedly use plague-infected corpses against Swedes. [\[15\]](#)
- **1767 [BW]**- During the French and Indian Wars, the British give blankets used to wrap British smallpox victims to hostile Indian tribes. [\[16\]](#)
- **April 24, 1863 [LF]**- The U.S. War Department issues General Order 100, proclaiming, "the use of poison in any manner, be it to poison wells, or foods, or arms, is wholly excluded from modern warfare." [\[17\]](#)
- **August 27, 1874 [LF]**- At conference in Brussels fourteen European countries sign, but do not ratify a declaration declaring poison gasses, poison weapons and unusually cruel weapons against the customs of war. [\[18\]](#)
- **July 29, 1899 [LF]**- *Hague Convention (II) with Respect to the Laws and Customs of War on Land* is signed. The Convention declares "it is especially prohibited... To employ poison or poisoned arms." [\[19\]](#)
- **1914 [CW]**- French begin using tear gas in grenades and Germans retaliate with tear gas in artillery shells. [\[20\]](#)
- **April 22, 1915 [CW]**- Germans attack the French with chlorine gas at Ypres, Belgium. This was the first significant use of chemical warfare in WWI. [\[21\]](#)
- **September 25, 1915 [CW]**- First British chemical weapons attack; chlorine gas is used against Germans at the Battle of Loos, France. [\[22\]](#)
- **1916-1918 [BW]**- German agents use anthrax spores and glanders-causing bacteria to infect livestock and contaminate feed for export to Allied forces. Incidents include the infection of Romanian sheep with anthrax and glanders for export to Russia, infection of Argentinean mules with anthrax for export to Allied troops, and infection of American horses and contamination of feed with glanders bacteria for export to France. [\[23\]](#)
- **February 26, 1918 [CW]**- Germans launch the first projectile attack against U.S. troops with phosgene and chloropicrin shells. This marks the first major use of gas against American forces. [\[24\]](#)
- **June 1918 [CW]**- First U.S. use of gas in warfare, using British and French weapons. The U.S. produced phosgene; chloropicrin; mustard; chlorine; and sulfur trichloride, which it used in French and British shells due to the U.S. shortage of artillery rounds. [\[25\]](#)
- **June 28, 1918 [CW]**- The U.S. begins its formal chemical weapons program with the establishment of the Chemical Warfare Service. [\[26\]](#)
- **1918-1921 [CW]**- Use of chemical weapons in Russia to suppress uprisings in at least three separate locations during and following the Bolshevik rebellion. [\[27\]](#)
- **1919 [CW]**- British use Adamsite against the Bolsheviks during the Russian Civil War. [\[28\]](#)
- **1920s [CW]**- Libya accuses Italy of using sulfur mustard to quell Libyan uprisings. [\[29\]](#)
- **1921-1927 [CW]**- The Spanish use chemical weapons (mainly mustard) against the Rif rebels in Spanish Morocco. [\[30\]](#)
- **June 17, 1925 [LF]**- *Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare* is signed- but not ratified by U.S. and not signed by Japan. [\[31\]](#)
- **1936 [CW]**- Italy uses mustard gas against Ethiopians during its invasion of Abyssinia. [\[32\]](#)
- **1937-1945 [CW]**- Japan uses chemical weapons (sulfur mustard, chlorine, chloropicrin, phosgene, and lewesite) during invasion of China. [\[33\]](#)
- **1937 [BW]**- Japan begins its offensive biological weapons program. Unit 731, the BW research and

development unit, is located in Harbin, Manchuria. Over the course of the program, at least 10,000 political prisoners are killed in Japanese experiments. [\[34\]](#)

- **1939 [BW]**- Nomonhan Incident: Japanese poison Soviet water supply with intestinal typhoid bacteria at former Mongolian border. First use of biological weapons by Japanese. [\[35\]](#)
- **1940 [BW]**- The Japanese drop rice and wheat mixed with plague-carrying fleas over China and Manchuria. [\[36\]](#)
- **1942 [BW]**- U.S. begins its offensive biological weapons program and chooses Camp Detrick, Frederick, Maryland as its research and development site. [\[37\]](#)
- **1942 [CW]**- Nazis begin using Zyklon B (hydrocyanic acid) in gas chambers for the mass murder of concentration camp prisoners. [\[38\]](#)
- **December 1943 [CW]**- A U.S. ship loaded with mustard bombs is attacked in the port of Bari, Italy by Germans; 83 U.S. troops die in poisoned waters. The only CW "attack" in WWII. [\[39\]](#)
- **April 1945 [CW]**- Germans manufacture and stockpile large amounts of tabun and sarin nerve gases but do not use them. [\[40\]](#)
- **May 1945 [BW]**- Only known tactical use of BW by Germany. A large reservoir in Bohemia is poisoned with sewage. [\[41\]](#)
- **September 1950-February 1951 [BW]**- In a test of BW dispersal methods, The U.S. Army sprays biological simulants from Navy ships over San Francisco. The U.S. Army determines that this form of attack would expose nearly all residents of the San Francisco Bay Area to a lethal dose. [\[42\]](#)
- **1962-1970 [CW]**- U.S. uses tear gas and four types of defoliant, including Agent Orange, in Vietnam. [\[43\]](#)
- **1963-1967 [CW]**- Egypt uses chemical weapons (phosgene, mustard) against Yemen. [\[44\]](#)
- **June, 1966 [BW]**- The U.S. conducts a test of vulnerability to covert BW attack by releasing a harmless biological simulant into the New York City subway system. [\[45\]](#)
- **November 25, 1969 [BW]**- President Nixon announces unilateral dismantlement of the U.S. offensive BW program. [\[46\]](#)
- **February 14, 1970 [BW]**- President Nixon extends the dismantlement efforts to toxins, closing a loophole which might have allowed for their production. [\[47\]](#)
- **April 10, 1972 [LF]**- [Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological \(Biological\) and Toxin Weapons and on Their Destruction](#) (BTWC) is opened for signature. [\[48\]](#)
- **1975 [LF]**- U.S. ratifies Geneva Protocol (1925) and BTWC. [\[49\]](#)
- **1975-1983 [CW]**- Alleged use of Yellow Rain (trichothecene mycotoxins) by Soviet-backed forces in Laos and Kampuchea. There is evidence to suggest use of T-2 toxin, but an alternative hypothesis suggests that the yellow spots labeled Yellow Rain were caused by swarms of defecating bees. [\[50\]](#)
- **1975-1980 [CBW]**- Rhodesia (became Zimbabwe in 1980) uses chemical and biological weapons against the resistance movement in the civil war between 1973-1979. Many argue South African apartheid military participated directly in these events along with extensive collaboration with the Portuguese government. During the tail end of the civil war Rhodesia/Zimbabwe experienced the largest recorded outbreak of anthrax among humans. [\[51\]](#)
- **1978 [BW]**- In a case of Soviet state-sponsored assassination, Bulgarian exile Georgi Markov, living in London, is stabbed with an umbrella that injects him with a tiny pellet containing ricin. [\[52\]](#)
- **1979 [CW]**- The U.S. alleges the Soviet Union used chemical weapons in Afghanistan, including Yellow Rain. [\[53\]](#)
- **April 2, 1979 [BW]**- Outbreak of pulmonary anthrax in Sverdlovsk, Soviet Union. In 1992, Russian president Boris Yeltsin acknowledges that the outbreak was caused by an accidental release of anthrax spores from a

Soviet military microbiological facility.[\[54\]](#)

- **1981-1993 [CBW]**- The apartheid regime in South Africa runs Project Coast, which designs and uses a variety of chemical and biological weapons against South Africa's native population, as well as in conflicts with Mozambique.[\[55\]](#)
- **August, 1983 [CW]**- Iraq begins using chemical weapons (mustard gas), in Iran-Iraq War.[\[56\]](#)
- **1984 [CW]**- First ever use of nerve agent tabun on the battlefield, by Iraq during Iran-Iraq War.[\[57\]](#)
- **1987 [CW]**- Libya uses chemical weapons (mustard) during a hot and cold conflict with Chad.[\[58\]](#)
- **1987-1988 [CW]**- Iran begins use of chemical weapons (mustard, phosgene, hydrogen-cyanide) in Iran-Iraq War. The use was sporadic and generally ineffective.[\[59\]](#)
- **1987-1988 [CW]**- Iraq uses chemical weapons (hydrogen cyanide, mustard gas) in its Anfal Campaign against its Kurdish populated northern region, most notably in the Halabja Massacre of 1988.[\[60\]](#)
- **September 3, 1992 [LF]**- [Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction](#) (CWC) approved by U.N.[\[61\]](#)
- **April 29, 1997 [LF]**- Entry into force of CWC.[\[62\]](#)
- **June 25, 1999 [LF]**- The U.S. implements the CWC.[\[63\]](#)
- **March 19, 2003 [LF]**- U.S. invades Iraq, arguing that Iraq is in non-compliance with U.N. Security Council resolutions. Further, the U.S. led coalition contends that Iraq is developing weapons of mass destruction. Some argue the preemptive attack set a new precedent for international law regarding justification of war and enforcement of treaties.[\[64\]](#)

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15. USAMRIID, "History of Biological Warfare."
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23. 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 278, no. 5 (August 6, 1997): 413; USAMRIID, "History of Biological Warfare."
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36. Encyclopedia of Bioethics, 2545; USAMRIID, "History of Biological Warfare."
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