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A History of Biological Warfare (2) / CB Terrorism

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* The superpowers never made serious use of BW during the Cold War, and given the fact that they possessed nuclear weapons it is hard to see why they would have done so. However, during that period smaller states, particularly Iraq, had their own BW development programs. They were a major worry to the US during the Gulf War in 1991, but fortunately the Iraqis did not make use of them. Twelve years later, worries over Iraqi efforts to manufacture weapons of mass destruction would help convince the US to invade the country, with unexpected results.

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[4.1] IRAQI BW DEVELOPMENT & THE GULF WAR

* At about the same time US intelligence was beginning to get wind of the Soviet BW program, information was starting to come to light that Saddam Hussein was also working to develop a BW capability. His use of gas during the Iran-Iraq war made the idea very plausible.

The Iraqis had been obtaining deadly pathogens from the American Type Culture Collection, a nonprofit organization that supplied such items to medical researchers. The Iraqis had claimed they were obtaining the pathogens for medical research, but in 1988 the word went out to stop supplying the pathogens. The acknowledged fact that the Iraqis had acquired the pathogens from the US would later become part of the web of conspiracy theories about US involvement with Iraq, but in reality the controls were so slack at the time that almost anybody could have got their hands on the nastiest pathogens with few probing questions asked.

Iraq's invasion of Kuwait in 1990 made the US military painfully aware of how vulnerable US forces were to a BW attack. Troops needed to be vaccinated against anthrax and botulism toxin, but obtaining adequate supplies of vaccines was impossible.

One of the difficulties of dealing with BW agents is that they may be diseases, anthrax as the prime example, that are rare under normal circumstances. Since few people are threatened by them, there is no need to produce large quantities of vaccine against them and no sensible reason to build major manufacturing facilities to produce such vaccines. The military brass proposed a cost-is-no-object crash program to build up vaccines against anthrax and botulism toxin, only to be told by the experts that there was no way to ramp up vaccine production quickly no matter how much money

was thrown at the problem. One of the big obstacles was that a vaccine production facility would have to go through a lengthy approval process by the US Food & Drug Administration.

Some vaccinations were performed, but all the military could really do was stockpile antibiotics. The problem with that approach was detecting a BW attack quickly enough to begin administering the antibiotics. It is only really possible to treat anthrax in the initial "mild" phase of an infection; once the victim moves on to the second violent phase, death is certain. A clumsy detection system was improvised, but nobody had much faith in it. All everyone could do was hold their breath. When the Gulf War ended without Saddam Hussein making use of his CB weapons, everyone exhaled with a sigh of relief.

* That the fears had plenty of basis in fact was demonstrated by the discoveries of UN officials of the "United Nations Special Commission on Iraq (UNSCOM)", responsible for disarming Iraq after that country's 1991 defeat in the Gulf War. UNSCOM inspectors gradually discovered an Iraqi BW development and production effort of startling scale.

For four years after the end of the war, the Iraqis denied that they had developed and manufactured bioweapons. UNSCOM was skeptical, to put it mildly. The Iraqis had purchased a spray dryer, useful for drying out bacteria so it could be stored, and four filling machines that could be used to pack bioagents into shells, bombs, and warheads. These items had other uses, but the Iraqis never gave any convincing explanation of what they were purchased to do. Even more ominously, the Iraqis had purchased some 39 tonnes (43 tons) of biological growth medium, in containers ranging in size from 25 to 100 kilograms (55 to 220 pounds), when it normally is shipped in 1 kilogram (2.2 pound) packages. There was no conceivable reason for ordering biological growth medium in such quantities or in such large containers except for very-large-scale cultivation of microbial agents. UNSCOM found 22 tonnes (24 tons) of the medium in storage, but the rest was not accounted for.

Some of the inspectors were suspicious of a plant at Al Hakam, southwest of Baghdad, that included large fermentation facilities. The Iraqis claimed the plant was used to produce animal feed, but the site featured an unusual degree of security and isolation, and the equipment there seemed to be a bit on the high-budget side for producing animal feed. The plant lacked safety precautions that would have been regarded as absolutely necessary for producing dangerous pathogens in the West, but Saddam Hussein was not noted for fastidious concern over the welfare of those who worked for him.

UNSCOM inspectors finally managed to push the Iraqis into a corner. In July 1995, the Iraqis admitted they had a BW program and that the Al Hakam plant had been used for producing bioagents, and provided what they called a "full, final, and complete" disclosure. UNSCOM found plenty of holes in the story, however, and a month later Hussein Kamel Hassan, who had been in charge of military production and was Saddam Hussein's son-in-law, defected to Jordan after a family dispute. Iraqi authorities immediately tipped off UNSCOM inspectors to a shed on a chicken farm that had been under Hussein Kamel Hassan's control, where they found a stash of documents that provided a detailed description of the Iraqi biowarfare program. Why the Iraqis seemed so quick to provide information was a puzzle at the time, though a decade later possible

motivations would become apparent. Hussein Kamel Hassan would return to Iraq in an unbelievable lapse of judgement, and die in a gun battle between his guards and Saddam Hussein's personal troops.

The Iraqis declared the previous "full, final, and complete" disclosure to be "incomplete and invalid" and released a new one. It revealed that the Iraqis had begun the program in 1985, obtained their first pathogens in 1986, and by the eve of the Gulf War had extensive stockpiles of bioweapons. The Iraqis admitted to working on a wide range of pathogens and biotoxins:

- Anthrax, of course. Iraqi documents show they produced 8,500 liters (2,245 US gallons) of anthrax and loaded 6,500 liters (1,715 US gallons) of it into weapons.
- Botulism toxin. The Iraqis said they produced 19,000 liters (5,015 US gallons) and put 10,000 liters (2,640 US gallons) of it into weapons.
- "Aflatoxin": This is another toxin related to food poisoning, and is produced by fungal contamination of peanuts and other crops. The Iraqis produced 2,200 liters (580 US gallons) of aflatoxin and put 1,580 liters (415 US gallons) of it into weapons. Aflatoxin is an odd candidate as a bioagent, since its major effect is to cause liver cancer in its victims a decade or so after exposure, and production of the toxin may have been done mostly as a pilot exercise.
- Other BW investigations that never reached the production stage included the gas gangrene bacteria; wheat rust; ricin; "hemorrhagic conjunctivitis" virus, which causes pain and temporary blindness; "rotavirus", which cause severe diarrhea; and "camel pox" virus, another odd choice even by the sometimes puzzling standards of bioagents, since the camel is no longer of major strategic importance in the Middle East.

The bioweapons were not used in the Gulf War since the Iraqi army did not have the proper supplies of vaccines needed to protect their own troops, and were not fired in Scud missiles at Israel and other remote targets because of the likelihood of massive retaliation.

After this revelation, UNSCOM continued to probe into Iraqi efforts to produce weapons of mass destruction. The Iraqis continued to stall the inspection effort and UNSCOM was finally told to leave the country in 1998. Few had any doubt that the Iraqis were continuing to develop weapons of mass destruction in secret, and the stage was set for another military confrontation.

[4.2] THE BW THREAT / THE CONQUEST OF IRAQ

* The experience with Iraq suggested that secret BW efforts were very likely going on in other countries. Suspects included states regarded by the US as suspicious at the very least, such as North Korea, Iran, Libya, and Syria, but inconveniently included American allies such as Egypt and possibly Israel. South Africa did have a BW effort during the last years of the apartheid order, but it was disbanded after the fall of the old regime. However, there were worries that South African BW experts hired out to other countries.

With the widespread introduction of "genetic modification" technologies, even relatively poor countries can develop bioagents undreamed of by Shirou Ishii and his contemporaries. For example, influenza might be genetically modified with components of the murderously virulent Marburg or Ebola "hemorrhagic fever" viruses to produce a new pathogen that combines great lethality and contagiousness. Another nightmare idea would be to modify a pathogen to produce, say, saxitoxins, which are structurally simple. Such "Satan bugs" would be too dangerous and indiscriminate to be actually used in combat as such, but would be useful as terror weapons.

Despite the clear and present danger the US military, in a degree of confusion due to defense cutbacks and the emergence of a dizzying range of new threats in the wake of the Cold War, found it difficult to coordinate an effective response. Efforts to ramp up vaccine production proved slow and frustrating. The US Army finally instituted a mandatory anthrax immunization program in 1997, but it proved controversial, with critics claiming that the anthrax vaccine was ineffective and possibly dangerous, and a number of soldiers refusing to be vaccinated. The Army replied that the vaccine had been thoroughly checked out and demonstrably effective, and that troops were at risk of anthrax attacks; the soldiers who refused the vaccinations were disciplined for disobeying orders. Another universal military vaccination campaign, this time against smallpox, was begun in late 2002.

The problem of detecting BW attacks had also been at least partly addressed by that time. Pocket devices had been developed that use antibodies matched to anthrax, or in principle other pathogens, to examine samples. A test took about 15 minutes, which was plenty of time to respond to an attack. The device was not very sensitive and had a high rate of false alarms, but it was vastly better than nothing. New technologies are being introduced, such as "DNA chips" that consist of a slide with patterns of DNA that match the DNA of particular pathogens, that may offer greater sensitivity and a lower rate of false alarms.

* After the expulsion of the UNSCOM team from Iraq in 1998, intelligence reports indicated that the Iraqis were trying very hard to build up their stocks of CB agents. Some of the reports described mobile BW production facilities based on fleets of tractor-trailer rigs that could be moved if they were detected.

During 2002, the US presidential administration of George W. Bush ("Bush II") began to press for military intervention against Iraq to depose Saddam Hussein, arguing that he had violated the terms of the Gulf War cease-fire agreement and was building up stockpiles of WMDs. The British government under Tony Blair backed up the argument. The case against Iraq was heavy-handed, going so far as to make claims that Saddam Hussein had links to Islamic terrorists, a claim that few took seriously. However, Iraq allowed the inspectors to return, but the US government insisted that the result was nothing more than the same old pattern of stalling tactics, not a good-faith attempt to abide by the terms of the cease-fire. Even the head of the inspection team, Hans Blix, admitted to reporters that the Iraqis had no credibility.

US forces began a major buildup in the Persian Gulf region in late 2002 and early 2003, and in the spring of 2003 the US invaded Iraq. Although the expectation was that Saddam Hussein would "pull the lanyard" on his CB weapons arsenal this time around, nothing of the sort happened, and in

fact the US quickly conquered the country, encountering very little effective resistance and suffering fewer casualties than had been inflicted in the first Gulf War.

This triumphant march was quickly deflated by the emergence of a wasting insurgency against the occupation force that would gradually evolve into a civil war between Iraqi Sunni Muslims, who had long run the country, and more numerous Iraqi Shiite Muslims, who had been oppressed under Saddam Hussein. To compound frustration, an "Iraq Survey Group" organized under the occupation authorities to search for stockpiles of WMDs failed to find them. Although the US and British governments kept insisting that such weapons would be found, nothing was, while the tide of criticism rose. The roving CB weapons labs turned out to be mobile hydrogen generators used to inflate balloons.

In late 2004, the US and British governments finally conceded the obvious if embarrassing fact that WMD stockpiles couldn't be found. Given the lack of results and the dangerous security situation in Iraq at the time, it made no sense for the Iraq Survey Group to continue the search, and it was shut down in early 2005. The Bush II Administration argued that the invasion had still been justified, that in light of Saddam Hussein's past conduct, it wasn't prudent to give him the benefit of the doubt.

* Given the documented history of Iraqi involvement in and enthusiasm for CB weapons production, and the evasive behavior of Saddam Hussein's regime, in fact many who had been following the issue were sincerely astonished when the facts became known and illuminated how shoddy the intelligence on Iraq had actually been. There had been little doubt in the previous Clinton Administration that Iraq was hiding stockpiles of WMDs. Even Hans Blix, who was sharply critical of the way the US and British governments had promoted the war to the public, calling Bush and Blair "salesmen", publicly admitted he was surprised that the Iraqis had been telling the truth.

Before disbanding, the Iraq Survey Group issued a final report that stated Saddam Hussein had shut down his CB weapons program shortly after the Gulf War. The report claimed that he had decided CB weapons were more trouble than they were worth in his effort to "break containment" by the US and its allies, and that he felt he could easily restart the program once he had. After all, many of the facilities were "dual use" and could be shifted from one purpose to another easily. Everything that UNSCOM found was essentially "old news".

According to the report, the Iraqi evasiveness and games played with UNSCOM team had been a bluff, an intimidation tactic designed to convince outsiders that Iraq really did still have CB weapons -- which could explain the occasional puzzling acts of cooperation of the Iraqis with UNSCOM inspectors. The report indicated that even senior Iraqi government ministers were surprised to find out that Iraq hadn't had active CB program. If a bluff it was, no doubt it came as a hideous shock to Saddam Hussein when his bluff was called. He went on the run but was captured, to be hanged by the successor Iraqi government at the end of 2006.

[4.3] CB TERRORISM IN THE 21ST CENTURY

* With the fall of Saddam Hussein, worries about the CBW programs of "rogue states" went on the back burner. However, there remained a current of concern over the use of CB weapons by terrorists.

Although terrorism was not unknown in the United States through the 20th century, it wasn't really until the 1980s that the issue began to acquire a higher profile. There had been some domestic terrorism from the Left during the late 1960s and into the 1970s, most notably in the form of the "Weather Underground" group, but by the end of that decade the focus had turned towards the Right, first in the form of the "Survivalist" movement and then the Rightist / white supremacist "militias" that followed.

International terrorism also came of age in the 1980s. There had been a "dirty little war" between Palestinian terrorists and the Israeli Mossad intelligence organization in the cities of Europe during the 1970s, which was followed in the next decade by the rise of international Islamist terrorism, with the Palestinian issue becoming only a part of the agenda. The story of the rise of modern domestic and international terrorist groups is elaborate and of course not the focus of this document; it is important here because of the possibility that such groups could use CB weapons in their acts of terror.

During the 1980s, domestic and international terrorism focused on "traditional" actions, such as kidnappings, assassinations, bombings, and hijackings. Although use of CB weapons by such groups was a possibility, it was not one that was taken very seriously. The Gulf War was not only a big wakeup call for the US on the possibility that CB weapons might be used on the battlefield, it also raised the possibility that such weapons might be used on American cities as well.

Joshua Lederberg, a Nobel-prize-winning biologist from Stanford University, had been warning for decades that new biological technologies made the prospect of bioweapon attacks much more fearsome. During the Gulf War, Lederberg spoke with government officials, saying that Saddam Hussein's best option for using CB agents was to give them to terrorist groups for attacks on domestic targets. Lederberg was taken seriously, though serious action was out of the question given the short notice. An emergency response team was organized at the US Department of Health & Human Services (HHS), and antibiotics were stockpiled in Washington DC.

Lederberg's nightmare scenario didn't happen, but that didn't mean the issue could be forgotten. Rightist domestic terrorists were increasingly active at the time, and Islamists, encouraged by their successful war against the Soviets in Afghanistan during the 1980s, were becoming more ambitious, eager to take on the United States.

On 23 February 1993, Islamic terrorists set off a truck bomb in the underground parking garage of the World Trade Center. The attack was a fizzle, though six people were killed, and the terrorists were arrested with impressive speed and efficiency. The bungled attack bred a degree of public complacency, with the terrorists mocked in op-ed cartoons, but a line had been crossed: Islamic terrorists had conducted their first major operation against a target on American soil. They had

failed miserably, but it could be assumed that they would learn from their mistakes and would be back. The terrorists had actually included a container of hydrogen cyanide with the truck bomb in hopes that the blast would drive the gas up the ventilation system of the building, but the gas was incinerated in the explosion. The threat remained mostly a possibility, and possibilities always end up being lower on the priority queue than active threats.

* The threat became much more active on 20 March 1995, when containers of a liquefied form of sarin were placed on five different subway cars on three different lines in the Tokyo subway system and opened by members of a Japanese religious sect named the "Aum Shinrikyo (Supreme Truth)". Twelve people were killed and 5,000 required medical attention.

The Aum Shinrikyo sect preached a doctrine that combined elements of Hinduism and Buddhism with apocalyptic prophecies. Japanese authorities quickly arrested its leader, Shoko Asahara, born as Chizuo Matsumoto, and forty other members of the sect. Asahara confessed to the subway attack and other terrorist acts. The Aum Shinrikyo was linked to a 1994 sarin gassing in a residential neighborhood in Matsumoto, Japan, that killed seven people. The attack had been originally shrugged off by the authorities as an accident, caused by a chemical hobbyist who had been tinkering with pesticides. That rationalization was implausible, but the idea that somebody wanted to kill large numbers of Japanese citizens at random with nerve gases was even harder to believe. Other acts of terror using chemical weapons that took place in Japan, including the release of phosgene at a train station in Yokohama, remained unresolved.

Investigators found that the Aum Shinrikyo had also attempted to develop bioweapons. Sect members had traveled to Africa in 1992 to obtain samples of the virulent Ebola virus, but returned to Japan empty-handed. In 1993, the cult had attempted to spray anthrax spores off the roof of a building they owned in downtown Tokyo, but they did it in bright daylight, which killed most of the spores, and they didn't have enough for lethal dosages anyway.

* The Tokyo subway attack was an alert to authorities around the world, and particularly in the United States. The Aum Shinrikyo sect had planned to carry out other attacks in New York and Washington DC.

In fact, the Aum Shinrikyo's attack wasn't the first time extremists had developed or used CB agents in the US. In September 1984, in the US state of Oregon, members of a cult community founded by guru Bhagwan Shree Rajneesh responded to a confrontation with the neighboring town of The Dalles by spreading salmonella bacteria over salad bars and coffee creamers in ten restaurants, as well as supermarket produce. The idea was to keep voters home in bed sick during local elections so the guru's people could vote their own candidates into office. Over 750 people were affected.

The incident didn't attract that much attention, since nasty salmonella outbreaks happen every now and then in the normal course of events, and public-health officials concluded that the outbreak was due to accidental contamination. The full details didn't come to light until September 1985, when law-enforcement officials descended on the Rajneesh community, arresting the leaders and interrogating them. They started singing and outlined the whole mad plot. A number of Rajneesh

officials received prison sentences of several years, while the Bhagwan himself was heavily fined, given a suspended sentence, then told to leave the country and not come back.

The salmonella attack hadn't been recognized for what it was because it was so unprecedented, though citizens of The Dalles were very suspicious of the cult and believed from the start that the Rajneeshis had caused the epidemic of food poisoning. Even after the facts came to light, there was a certain reluctance to discuss in the incident in the scientific press for giving other extremist groups ideas.

Rightist extremists were obviously getting the same ideas anyway, with numbers of them arrested for possession of biotoxins such as ricin, as well as for working on poison gases and toxins. In 1995, Disneyland received a videotape showing two hands mixing chemicals, along with a note threatening the theme park. No suspect was ever arrested. That same year, a one-time white supremacist named Larry Wayne Harris was convicted of wire fraud when he obtained under false pretenses three vials of the plague bacterium *Yersinia pestis*, which causes bubonic plague. He received probation, though he told reporters he had managed to culture anthrax, and said that bioweapons might be a proper response to Federal attacks on anti-government groups: "How many cities are you willing to lose before you back off?"

Following the Tokyo attacks and presented with evidence of home-grown interest in CB weapons, US law enforcement agencies became increasingly worried about a CB attack on a US population center by domestic or foreign extremists. Even the idea that individuals were trying to synthesize CB agents in their garages or basements was enough to cause alarm. The history of the development and manufacture of CB agents is littered with reports of accidents, some of them disastrous. The likelihood of an accident in a basement laboratory would clearly be high, and anyone who would take such a risk was unlikely to be rigorously cautious or prudent.

* On 11 September 2001, the issue of a major terrorist attack on a US population center abruptly ceased to be theoretical. Islamic terrorists of the "al-Qaeda" network, directed by Saudi master terrorist Osama bin Laden, hijacked four airliners on domestic US flights, then flew two of them into the World Trade Center skyscraper towers in New York City and one into the Pentagon. The fourth crashed in the Pennsylvania countryside after a scuffle between the terrorists and the passengers. The Trade Center towers were leveled and a wing of the Pentagon badly damaged. Total casualties from the operation, which was as meticulously planned and executed as it was ruthless, were over 3,000 people.

The attack did not involve CB agents but in early October 2001, while the dust was still settling from the 11 September attacks, somebody sent off a set of letters to number of strangers. Within a month five people had died of anthrax, contracted from spores contained in the envelopes that had contained the letters. The five included two postal workers in Washington DC, a New York hospital worker, a Florida photo editor, and an elderly woman in Connecticut. Several others received the envelopes, but were saved by prompt medical attention.

The letters used the rhetoric of Islamic militancy, but their intended targets were generally liberals, suggesting a Rightist was using the 911 attacks as a cover. The US Federal Bureau of Investigation

(FBI) originally zeroed in on Dr. Steven Hatfill, who worked at Fort Detrick, where the strain of anthrax had originated. Hatfill was finally exonerated after being thoroughly raked over the coals; he sued the Justice Department and won a multimillion-dollar award in 2008. Although the Hatfill investigation turned out to be a dead end, the FBI persisted, and in 2007 began to focus on a colleague of Hatfill at Fort Detrick, Dr. Bruce Ivins. The evidence against Ivins began to pile up, and on 29 July 2008, he committed suicide by overdosing on non-prescription drugs.

Ivins' suicide left the Justice Department with the uncomfortable appearance of having hounded a man to death, and in the aftermath a Justice Department spokesman claimed that the evidence against Ivins was conclusive. Ivins had been responsible for the flask, labeled "RMR1029", that contained the specific anthrax strain used in the attacks; all others who might have had access to RMR1029 were cleared; Ivins had the non-trivial technical knowledge required to make use of the spores as a weapon; and during the timeframe of the attacks, Ivins spent much more extra time in the labs than he had before or did since. However, nobody could identify any strong motive Ivins might have had to perform the attacks, and statements by some who knew him that he was prone to write threatening letters were contradicted by others familiar with him. Who actually performed the attacks may never be identified with certainty.

* The anthrax letters were clearly not part of a well-planned terrorist campaign, but the 11 September attacks gave them very high visibility at the time and an awareness that things could have been much worse. Intelligence obtained from the US military intervention in Afghanistan, the main enclave of al-Qaeda, that followed the terror attacks revealed that the al-Qaeda network was seeking to develop CB agents, and they had already demonstrated that they had the will to use them without restraint. Investigators unraveling the trail of the al-Qaeda terrorists who participated in the 11 September attacks found they had also investigated obtaining use of a crop spraying aircraft, clearly to disperse CB agents over a population center.

Ironically, except for the anthrax letters, the abrupt rise of the Islamic terrorist threat coincided with the near-disappearance of the domestic US Rightist terrorist threat. After Rightist terrorists truck-bombed the Oklahoma City Federal Building in 1995, killing 168 people, the FBI and other US law-enforcement agencies zeroed in on the ultra-violent militias, and militia leadership mostly ended up behind bars. More significantly, although their rank-and-file membership remained generally in circulation, the Rightists had predicted that the year 2000 would bring an apocalypse, and when no apocalypse occurred there was widespread disillusionment with the cause. However, although domestic extremists are now keeping a low profile, they haven't disappeared, and the authorities believe the threat could revive at any time.

* At the present time, use of CB weapons by terrorist groups remains a possibility, but so far CB terrorism hasn't proven an active threat. As with conventional military forces, terrorists have generally found that bombs are much more suitable for their purposes than CB weapons. Worries over terrorists poisoning reservoirs or dusting down cities with anthrax or nerve gas are not all that credible. A reservoir is very big and it would take a truckload of toxin to achieve useful concentrations; water quality is monitored, and chlorinated water tends to break down toxins. Crop dusters are designed to distribute pesticides, which are heavy and not supposed to act as aerosols, and so such aircraft would not be effective in distributing finely-powdered bioagents. They could

distribute nerve gas, but loading up a crop duster with such fast-acting toxins without killing the pilot before he could get into the air would be tricky.

Islamic terrorists who were captured and interrogated did say that their training in Osama bin Laden's camps in Afghanistan involved exercises in dispersing hydrogen cyanide into the ventilation systems of buildings, which potentially could be a highly effective tactic. There is also the threat that terrorists could target a plant that manufactures dangerous chemicals and sabotage it to spread a huge toxic cloud, much like the 1984 accident at the Union Carbide plant in Bhopal, India, that killed over 2,500 people and permanently injured many more. The authorities still have not ruled out CB attacks, and their plans feature contingencies for dealing with them. Public concern over CBW seems to have dropped off the radar for now; unfortunately, it's an issue that never really goes away.

[4.4] FOOTNOTE: CB WEAPONS AND ARMS LIMITATION

* The issue of terrorist attacks using CB weapons is linked to the issue of states attempting to develop stockpiles of such weapons. Developing really effective CB weapons is beyond the means of most terrorist organizations, but nations with active CBW programs could supply such weapons to terrorists out of sympathy with their aims, or simple expedience. This reality raises the importance of arms control efforts to restrict the spread of weapons of mass destruction.

Arms-control efforts seek to limit the spread of WMDs by controlling the sale of critical technologies, and by obtaining intelligence on sites that may be used to develop them. The greatest efforts have been made in attempting to limit the spread of nuclear weapons, primarily through the "Nuclear Non-Proliferation Treaty (NPT)", and such efforts have proven successful to a degree.

Limiting the development of chemical weapons is more difficult, since it is harder to uncover their production. The "Chemical Weapons Convention (CWC)" came into effect in 1997 and, on paper, is extremely strict. The Geneva Protocol of 1925 had long established an international ban on the use of chemical weapons, though as previous chapters show, it has often been violated. The CWC took the Geneva Protocol one step further, banning the manufacture and storage of chemical weapons as well. It even bans the use of nonlethal agents, at least for combat operations, though it says nothing about their use for crowd control.

The CWC also places restrictions on trade in certain chemicals that can be used as "precursors" for synthesizing CW agents, and allows intrusive inspections on short notice, implemented by workers of the "Organization for the Prohibition of Chemical Weapons (OPCW)". Although the NPT allows a small handful of countries to possess nuclear weapons, at least on the basis that they'll eventually get rid of them, the CWC is even-handed: the same rules apply to everyone.

The CWC has had some significant successes. As of 2010, 190 countries had signed up and 188 had ratified the agreement. India and South Korea joined and admitted to having CW stockpiles, which had to be destroyed under OPCW supervision. France and China claim to have destroyed their chemical weapons. As mentioned in chapter 2, America and Russia, with the world's biggest CW stockpiles, are committed to destroying them all.

OPCW inspectors have conducted hundreds of inspections, though critics wonder if the inspectors are not simply reviewing lies fed to them by member nations. While the convention does provide the right to snap inspections, so far none have been performed, partly due to the slow speed at which the bureaucracies of member nations have moved towards declarations of compliance. The snap inspections make many member nations uneasy. Members of the US Senate have opposed snap inspections, but the lack of such a provision would greatly weaken the CWC.

Biological weapons are a nastier problem. Biological weapons have been against international law since the Geneva Protocol of 1925. The fundamental treaty for the control of biological weapons is the 1972 BTWC, which bans development, manufacture, and use of BW agents. However, the BTWC is weak, lacking much in the way of enforcement measures, and, as the Soviet Biopreparat organization proved, it has been widely violated in practice. There has been a push towards adding such measures, in the form of "challenge" inspections of suspect sites where an inspection team can arrive without prior notice at any time, with no right of refusal. So far, there has been no major enhancement of the BTWC.

* While CB warfare is publicly regarded as an extraordinary evil, arguing that it is more vicious to kill someone with gas or pathogens than with bullets or cluster bombs is unpersuasive. There are still substantial arguments for CBW control.

One argument against chemical weapons is that they are inferior to conventional steel and explosives. Any reasonably trained and equipped military force can endure a gas attack with few casualties, though chemical defensive measures are a great nuisance, particularly for an army on the move. Furthermore, gas weapons tend to require more care in handling than other weapons, and in the confusion of battle gas can backfire against an attacker due to changes in wind direction and other confounding events. They are much more difficult to handle than more conventional weapons.

The most significant drawback of chemical weapons is environmental. Their manufacture tends to be a nasty process, and once produced and stockpiled, they require substantial security and maintenance that is hard to assure over a period of decades. Disposal of decrepit chemical weapons is a dangerous and extremely expensive task.

The arguments against biological warfare are even stronger. Bioagents are at least, or even more, hazardous to develop, manufacture, store, and transport than chemical agents. If actually used, they could lead to a pandemic that afflicts all sides equally. Even if "nonlethal" bioagents are used, there is no saying that their widespread production and dispersion might lead to a new and nastier strain for which no defenses are available. Genetic modification to design highly specific bioagents could have unpredictable and extremely dangerous consequences. Poor countries often look to bioweapons as a cheap equivalent to the atomic bomb. On the other hand, poor countries do not have the same level of public health resources available to meet attacks by CB weapons, making them even more vulnerable to attacks by bioweapons.

Given CB weapons control treaties with tough provisions to reveal cheating, countries do have strong incentives to renounce the development, manufacture, stockpiling, and use of CB weapons. Whether such incentives will balance the pressure to acquire such weapons remains to be seen.

[4.5] COMMENTS, SOURCES, & REVISION HISTORY

* My sole involvement with chemical weapons was the gas training I was provided during my US Army Basic Combat Training session at Ford Ord, California, in the fall of 1972. All trainees were required to go into a room full of CS aerosol powder and inhale it to give them an appreciation of what gas can do, a training technique that goes back to gas training in WWI. I compare being tear-gassed to having my head shoved into a bucket full of hot pepper sauce and chili powder and being forced to inhale and swallow. It was very effective training, as I haven't forgotten it in forty years.

We were also given familiarization with the use of gas masks, though the only full-body protection we had available was to put on a rain poncho, and were given a short training session with atropine auto-injectors and, I vaguely recall, decontamination powders.

I read a book on CB warfare while I was in the Army and was amused at the experiments with "Agent Buzz". Recreational drug use was widespread and blatant in the US Army in the early 1970s, though there was a crackdown later in the decade. I joked with a pal that if our guys were attacked with hallucinogenic gases, they'd tear off their gas masks and inhale as much as they could, and the enemy wouldn't be able to tell the difference.

* Concerning the use of CS powder in Vietnam: I once met a fellow who said they used it to render VC bunkers uninhabitable. If US soldiers simply blew up the bunkers, the hole and position were still basically intact and could easily be rebuilt. According to my acquaintance, however, the VC hated CS, and instead of demolishing the bunkers he and his team built charges with a combination of explosive and CS that thoroughly dispersed the powder through the bunker. The VC wouldn't use the bunker again.

* Experiences with natural biotoxins gives me a great respect for what they could do if used as a weapon. In the early 1980s, I suffered through a period of a few months where everything seemed to go wrong at once, with troubles including food poisoning and contact with poison oak.

The food poisoning involved an all-night session in agony that I tried to cope with by imagining I was being tortured. It was the sickest I had ever been in my grown life, and I should have been hospitalized. After a few hours of it, I would have given away any secret to make it stop. In the morning, I was purged, drained, white, and feeble. I suspect I would have been killed if I had been old or in bad health.

Poison oak exposure itself resulted in no more than a severe red, itching, swollen rash that took about a week to subside, though I had a friend who took a dose of it and had an allergic reaction, with his face hideously puffed up. However, after the worst of my exposure was over I kept having minor relapses on my forearms and facial areas. Some of the oily toxins had rubbed off on doorknobs and the like, and I had to give my apartment a thorough cleaning to put a stop to the

relapses. When I finally found out what mustard gas was and what it could do while writing this document, I remembered I'd been through an experience that gave me a mild taste of what it was like.

* This document evolved out of some notes taken from a six-part historical television documentary titled SCIENCE AT WAR, broadcast on the US History Channel in 1999, which included individual installments on chemical and biological warfare. The installment on chemical warfare focused strongly on the tragedy of Fritz and Clara Haber, which is such a neatly Shakespearian melodrama that I found it a bit hard to believe. However, the facts do bear it out. More formal sources for this document include:

- A HIGHER FORM OF KILLING by Robert Harris and Jeremy Paxman, Hill & Wang, 1982. This is one of the best-known books on CB warfare, and this document owes a great deal to it.
- BIOHAZARD by Ken Alibek with Stephen Handelman, Random House, 1999. This is a largely autobiographical book that has some interesting bits of information. For example, Alibek says that the extensive immunizations and repeated decontaminations he endured while working for Biopreparat gave him the widest range of allergies of anyone he'd ever met, and destroyed his sense of smell and the ability to produce skin oils. He lives on a troublesome regimen of medications and skin lotions.
- CHEMICAL & BIOLOGICAL WARFARE: A COMPREHENSIVE SURVEY FOR THE CONCERNED CITIZEN by Eric Croddy, Springer-Verlag, 2002.
- "The Whore Of Babylon And The Horseman Of Plague", THE ECONOMIST, 12 April 1997, 79:82.
- "Terrorism's Next Wave" by David E. Kaplan, US NEWS & WORLD REPORT, 17 November 1997, 28:31.
- "Bombs, Gas, And Microbes: The Desperate Efforts To Block The Road To Doomsday", THE ECONOMIST, 6 June 1998, 23:25.
- "Biological Warfare Against Crops" by Paul Rogers, Simon Whitby, and Malcolm Dando, SCIENTIFIC AMERICAN, June 1999, 70:75.
- "Germ Warfare Takes On Strategic Dimensions" by Paul Mann, AVIATION WEEK, 4 September 2000, 91:92.
- "Down To The Wire On Bioweapons Talks" by Richard Stone, AAAS SCIENCE, 20 July 2001, 414:416.
- "Weapons Of Mass Dislocation", THE ECONOMIST, 15 June 2002, 28.

The revisions of this document following the highly controversial US invasion of Iraq in the spring of 2003 were mostly made to address the various conspiracy theories that went into wide circulation around that time. On examination, these theories could be generally described as grasping at straws, so much so that they hardly seem worth worrying about, but as long as such misinformation is floating around I end up being forced to deal with it.

I have had to modify several of my documents in other fields in response to the "conspiracy theory of the day", and I am beginning to regard a conspiracy theory as something like a computer virus: an absolutely obnoxious nuisance and a gross waste of time and effort. I will concede that a very small percentage of conspiracy theories may actually have some basis in fact, but my only reaction to them now is annoyance.

* Revision history:

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v1.0    / 01 nov 99
v1.1    / 01 apr 00 / Minor polishing.
v1.2    / 01 jul 01 / Polishing, corrections, Ken Alibek material.
v1.0.3  / 01 may 02 / Cleanup, added 9-11 anthrax attacks.
v1.1.0  / 01 mar 03 / Added new chapter, many more details.
v1.1.1  / 01 jun 03 / Minor corrections.
v1.1.2  / 01 nov 04 / Various minor updates, mostly about Iraq.
v1.1.3  / 01 feb 05 / Further clarifications about Iraq, terrorism.
v1.1.4  / 01 feb 07 / Minor cosmetic update.
v1.1.5  / 01 feb 09 / Bruce Ivins case, cleanups.
v1.2.0  / 01 jul 10 / Cut from five to four chapters.
v1.2.1  / 01 jun 12 / Review & polish.
v1.2.2  / 01 apr 14 / Syrian gas stockpile destruction.
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