

13 Years since Tokyo: Re-Visiting the “Superterrorism” Debate

By Adam Dolnik

Introduction [1]

On 20 March 1995, members of the Aum Shirikyo cult used sharpened umbrella tips to pierce plastic bags filled with sarin nerve agent onboard five trains converging at Tokyo’s Kasumigaseki station. Twelve people died and 1,039 were injured in what remains the largest nonconventional terrorist attack in history. Then, only a month later, an explosives laden truck detonated in front of the Alfred P. Murrah Federal Building in Oklahoma City, killing 168 people and injuring over 800 others in what at the time was the most lethal terrorist attack on United States soil. These two events, while unrelated, served as the catalyst for the overwhelming perception that it is no longer a question of “if” a mass casualty terrorist attack using chemical, biological, radiological, or nuclear (CBRN) weapons will occur, but rather the question of “when” it will happen. In 2008, 13 years since these two tragic events, we are still waiting for these gory predictions of CBRN “superterrorism” to materialize. This article will revisit some of the core questions in the “superterrorism” debate, particularly in relation to recent trends, such as the apparent decentralization and de-territorialisation of the phenomenon.

The Debate

Even in 1995, the concerns about the threat of “superterrorism” were not new. As far back as 1975, Brian Michael Jenkins had already asked the most important questions.[2] Many other contributions into this largely theoretical debate followed, especially in light of the heightened sense of uncertainty and vulnerability to non-state actors as the end of the Cold War neared. Originally, the discussion concentrated primarily on capabilities, where the alleged ease of acquisition of CBRN materials following the breakup of the Soviet Union, as well as the arguably more widespread availability of expertise needed for the production and weaponization of such agents. Through the acknowledgment of technical hurdles associated with the successful delivery of CBRN agents, as well as the possible motivational constraints involved in the decision of terrorist groups to use such weapons; the debate became less theoretical. Another shift in the debate was represented by the claim that the rise of a phenomenon known as the “new terrorism” had eroded these constraints. In other words, the experts now believe the “new terrorists” – typically defined primarily by the religious nature of their ideology -- were not constrained by the political considerations that had traditionally led secular terrorist organizations to place limits on their violent activities. [3] The events of 1995 seemed to confirm this dire prediction. Even more importantly, 9-11 seemed to have once and for all resolved the perpetual question of whether terrorist groups would or would not be interested in causing mass casualties. Nevertheless, one question remains: why have we not witnessed another Tokyo?

Lessons From the Past and Their Implications for the Future

To answer the above question, it is useful to draw lessons from the history of CBRN terrorism. One of the first incidents of chemical terrorism in the post World War II environment was the 1946 poisoning of bread designated for a U.S. POW camp near Nuremburg by a group of Jewish terrorists known as Avenging Israel’s Blood (DIN). The attacks, in which arsenic mixed with glue was smeared onto the bottom of 2,500-3,000 loafs of bread, succeeded in hospitalizing 207 former SS officers, but failed to kill a single person. Another noteworthy attempt was the unsuccessful 1986 plot by the apocalyptic white Christian supremacist -Covenant, Sword, and Arm of the Lord (CSA)- to poison the water supply of several large U.S. cities using a mere 30 gallons of cyanide. In June 1990, the Liberation Tigers of Tamil Eelam (LTTE) became the first group to use chemical agents in a guerilla campaign, when they attacked a Sri Lankan Army encampment in eastern Kiran with canisters filled with chlorine. [4] Then on 27 June 1994, the first modern act of chemical terrorism took place in Japan, when six members of Aum Shinrikyo released sarin out of a van parked in a residential neighborhood of Matsumoto, killing seven people and seriously injuring 144 others. [5]

The first notable biological incident was an unsuccessful 1972 plot by a tiny environmentalist cult calling itself R.I.S.E.. This group attempted to culture large quantities of *salmonella typhi* and then contaminate the water supply of several large cities.[6] The first successful bioterrorist attack occurred in 1984 when the Rajneeshee

cult used a causative agent, salmonella, to contaminate salad bars in a small Oregon town in an effort to influence a local election. The cult, which chose an incapacitating rather than lethal agent, succeeded in making 751 people ill, but no one died. Then in 1994 and 1995, four Minnesota men, all members of an extremist antigovernment group called the Minnesota Patriots Council (MPC), became the first people ever convicted of possession of a biological agent for use as a weapon under the 1989 US Biological Weapons Antiterrorism Act. The men acquired the protein toxin ricin, which is derived from castor beans, possibly to use against local law enforcement and federal officials. Although the MPC's never carried out its plan, the group was heavily influenced by rightwing extremist Christian Identity ideology, similar to the ideology that motivated the Oklahoma City bomber, Timothy McVeigh. During the early 1990s, the Aum Shinrikyo carried out over a dozen large scale attacks with biological agents in Japan. Between 1990 and 1995 the group had spread botulinum toxin, the world's most toxic substance, and *bacillus anthracis*, the causative agent for anthrax, out of street cleaning trucks, automatic suitcases, and from the roof of its own compound near Mt. Fuji. However, the attacks went completely unnoticed, failing to produce a single casualty because the cult used a nonvirulent strain of botulinum toxin and only a harmless veterinary vaccine strain of *bacillus anthracis*. The 1990s also witnessed two cases of loners with ties to American militia and Christian identity movements. Larry Wayne Harris, who in 1995 ordered plague bacteria from a Maryland culture collection was arrested three years later in possession of bacillus anthracis, while Thomas Lewis Lavy was detained in December 1995 for possession of 130 grams of ricin. Finally, the 2001 attacks that utilized letters filled with *Bacillus anthracis* spores which resulted in 5 deaths were also probably carried out by an individual that fit a similar profile.

Nuclear and radiological terrorism have a less extensive record. We have yet to see a single incident of nuclear terrorism, and the only example of a radiological dispersal devices (RDD) has been the November 1995 discovery of a 32 kg parcel containing 10-50 mCi of cesium-137 at the Ismailovsky Park in Moscow. [7] An NTV television crew found the package after following instructions provided by Chechen terrorist Shamil Basayev, who simultaneously threatened that many such containers were placed around Moscow and could be detonated at any time to cause several "mini-Chernobyls." The package did not actually contain an explosive device. [8]

All of these past plots carry several important lessons. First, it is interesting to note that historically chemical and biological terrorism cases have all been geographically confined to developed countries -- specifically the U.S. and Japan. This possibly suggests that the perpetrators' frequent exposure to modern technologies could be associated with a greater likelihood of their incorporation into terrorist operations. This, of course, has significant implications for the future given the increasing transnationalization of terrorist organizations and the rise of jihadi networks in Western countries. Due to their exposure to advanced technologies and the increasingly prevalent involvement of well-educated individuals, the home-grown cells may theoretically be in an increasingly suitable position to exploit CBRN for attack purposes. In addition, the rapid evolution of fields such as microbiology and their proliferation to developing countries may gradually spread this effect on a global scale.

The second lesson states that the vast majority of the historical incidents are crudely delivered, low-level attacks that have utilized primitive agents such as potassium cyanide, arsenic, salmonella, cesium 137, various pesticides, rat poisons and other dual use items. Such attacks have been comparatively ineffective in creating a large number of casualties, although they have succeeded in achieving a disproportional psychological impact. Nevertheless, more potent unconventional agents have been used by terrorists only scarcely, and only two groups -- Aum Shinrikyo and the unknown anthrax letter mailer(s) -- have ever killed anyone by using an actual warfare agent. Given the fact the perpetrators that in both of these instances had at their disposal a large and comparatively expensive weapons program --which in today's security environment would arguably be such chemical are much more difficult to access. Therefore, it seems reasonable to expect that future CBRN plots are likely to uphold the general trend of rudimentary delivery of low-end agents.

The third important lesson lies in the fact that despite our common tendency to use the term CBRN as synonymous with "weapons of mass destruction," in most cases it was *not* the desire to produce mass casualties that had led the respective perpetrators to adopting CBR agents as their weapon of choice. In most cases, the respective groups utilize unconventional agents because of their covert and difficult-to-detect nature (i.e. MPC, Rajneeshees), due to their capacity to trigger disproportionate fear (i.e. Chechens, anthrax letter mailer, Lavy) or simply as an inferior substitute for a temporarily degraded conventional capability (i.e. LTTE). [9] In some cases, of course, the perpetrators did seek to maximize their killing potential (i.e. Aum, RISE, CSA, DIN), but the lesson to emphasize here is that the commonly assumed link between CBRN and mass casualties remains an exception rather than a rule.

Finally, the historical record suggests that past perpetrators of CBRN terrorism seemed to share certain distinct characteristics that set them aside from other more “conventional” terrorist organizations. This suggests that while any discussion about the uncertainty of terrorist organizations’ interest (or lack thereof) in CBRN in the post 9-11 world is likely to be dismissed as obsolete, there is still some value in going through this exercise in order to narrow down the “profile” of most likely perpetrators for the future.

Beyond “motivation”

Many of today’s threat assessments of CBRN terrorism tend to focus simply on the general nature of the respective group’s ideology (specifically along the “religious” vs. “secular” divide), in combination with specific statements of interest in mass-casualties or “weapons of mass destruction.” For instance, most analyses of al-Qaeda’s potential to use CBRN quickly establish intent by simply citing the following statements made by important al-Qaeda figures:

“Acquiring weapons for the defense of Muslims is a religious duty. If I have indeed acquired these weapons [of mass destruction], then I thank God for enabling me to do so.”

Usama bin Laden interviewed in Time Magazine
(December 1998)

“We have the right to kill 4 million Americans, two million of them children.”

-Abu Ghaith

in “Why We Fight America”

(June 2002)

“If a bomb was dropped on them that would annihilate 10 million and burn their lands...this is permissible.”

-Sheikh Nasir bin Hamid al-Fahd in “A Treatise on the Legal Status of Using Weapons of Mass Destruction Against Infidels”
(May 2003)

While these statements are a serious cause for concern and should certainly not be taken lightly, it is important to emphasize that a comprehensive threat assessment of “intent” in the CBRN terrorism context needs to go further than the common focus on a group’s declaration of “interest.” A meaningful analysis needs to focus on the question of *how far is the given group willing to go in order to actually achieve a significant capability?* While it may be reasonable to assume that groups like al Qaida would use a chemical weapon if they stumbled across one, the question we must ask is: “how far is the respective group really willing to go to obtain it?” What level of material and human resources is the leadership willing to sacrifice, and how much is it willing to risk in terms of operational security in order to achieve a CBRN capability? If the organization is attracted to this option simply because of its desire to kill as many people as possible, why not just attack more often, at more locations, and on a greater scale with weapons that are already available and have already proven to be effective? Why invest a massive amount of precious resources into a new technology that only few if any know how to use and that could potentially end up killing the perpetrators themselves—all without any guarantee of success? Why risk a negative public reaction and a possibly devastating retaliation likely to be associated with the use of CBRN weapons?

As we can see from the complexity of these questions, there is clearly an additional element besides the desire to kill on a large scale that plays a decisive role in a terrorist group’s decision to launch a biological or nuclear weapons program, one so strong that it is able to offset the currently unfavorable cost-benefit calculation [10] in favor of chemical or biological weapons over other conventional options. Empirically speaking, organizations that have in the past gone beyond merely expressing interest in chemical and biological agents have been groups for whom these weapons have had a strong expressive or emotional value, such as the desire to kill without shedding blood or the interpretation of poisons and plagues as God’s tools. An example of this is the frequent reference to biblical plagues commonly used by various radical Christian groups, or the strange fascination of Aum Shinrikyo’s leader Shoko Asahara who wrote poems about sarin. Alternatively, environmentalist cults have interpreted diseases as “natural” tools used by Mother Nature to eliminate the human race that has through technological advances and an inconsiderate use of natural resources caused a natural imbalance, which according to the group could only be restored by an elimination of the world’s most destructive species. [11] Alternatively, more ideologically “conventional” groups that place great emphasis on the principle of unconditional reciprocity may under some conditions resort to CBRN violence, especially in the case of repeated

claims of having been subjected to the same treatment by the enemy - in this case the use of poisons against the population the group claims to represent. An example of this is the attraction to poisons by the aforementioned Avengers (DIN), who argued that because six million Jews were poisoned in concentration camps, six million German civilians also had to be killed in the same manner for justice to be served. [12] On a similar note, an attraction to chemical weapons can be expected from Chechen and Kurdish groups based on their claims that their constituencies have also been targeted with such weapons. We can also expect an attraction to radiological terrorism on behalf of groups in countries such as Iraq, Bosnia or Kosovo, where much resentment has been raised by the American use of depleted uranium (DU) munitions.

It is this specific expressive component that will play a key role in the matrix of useful intelligence indicators that can be used to identify potential perpetrators beforehand. Other such indicators include high level of paranoia, an apocalyptic vision, presence of an undisputed charismatic leader displaying signs of psychological idiosyncrasies and an attraction to truly extreme violence, high level of operational and physical risk taking, membership base including members with scientific backgrounds, the group's expressive emphasis to innovation and extremely high ambitions in the operational realm. [13] At the same time, while these predictive indicators can provide us with a useful tool, we must be aware of the fact that the vast majority of previous CBW plots have not involved prominent terrorist organizations, but rather previously *unknown* individuals and groups that emerged seemingly out of nowhere. This means that a meaningful threat assessment needs to expand past existing terrorist organizations to include unknown actors, and that new assessment tools need to be designed to provide timely and accurate intelligence on the activities of such actors.

This is especially the case given the increasing transformation of terrorist organizational structures from the hierarchical, political party-like formations into more loosely knit networks of cells operating without any real central command. [14] The characteristics of the worldwide network we know as al Qaida, or the concept of "leaderless resistance" embraced by the North American Christian Identity and animal rights movements, provide good examples of this phenomenon, which in many ways represents one of the downsides of globalization. Today's terrorists can easily communicate via e-mail, using commercial encryption programs and coded messages posted on various Web sites and chat rooms, a fact that has resulted in an unprecedented international reach of terrorist networks and the proliferation of operational know-how among groups through knowledge sharing. More importantly, the proliferation of the Internet has also contributed to the rise of the so-called "home-grown terrorism", or the emergence of active *jihadi* terrorist networks in the West. Members of these small networks identify themselves with al Qaida's global ideology, but essentially operate autonomously and frequently without any direct link to the central command. This dynamic significantly influences our capability to accurately assess the threat, given the fact that the potential intent of these homegrown-cells to acquire and use CBRN will rarely be identifiable beforehand. Today, one can theoretically become a "member" of a terrorist group simply by embracing its ideology, gaining operational knowledge through manuals accessed from the Internet, and carrying out attacks in the group's name via its signature *modus operandi* and general targeting guidelines.

The unpredictability of such independent actors is especially worrying because terrorist organizations may recruit volunteers that have never gone through structured training or formal organizational acceptance, has contributed to the erosion of motivational constraints to engage in acts of catastrophic terrorism. Because members of such ad hoc groups operate without any moderating influences from the more politically and strategically conscious central leadership, this decentralization of decision making has also contributed to the deterioration of restraint that traditionally played a role in the initiation and planning of spectacular attacks.

This might especially be the case with respect to CBRN. For instance, al Qaida's pre 9-11 doctrine called for the acquisition of CBRN mainly as a deterrent and counterbalance against Israeli and American non-conventional arsenals (as opposed to a first strike option) creating a setting in which any use of such technology would be carefully weighted by the leadership. [15] In this light, the continuing fragmentation of the group and the emergence of a global movement of independent and self-radicalized cells subscribing to al Qaida's global ideology has arguably created a situation, in which the decision to use CBRN would theoretically be in the hands of only several individuals acting in a one-time capacity with no real concern for the consequences. In such a setting, the motivational, strategic, and political obstacles to using CBRN have become even less relevant today. This is especially true given the increased aggressiveness of the new "al Qaida" doctrine with regards to CBRN, which now incorporates not only religious sanction, but even strategic preference for using such means. [16] For an independent cell seeking guidance on *jihadi* websites and forums about the permissibility of employing CBRN technology to attack the enemy, the answer would be an overwhelming "yes". That being said, in order for a CBRN attack to actually take place, this intent would also need to be matched by the

capability to acquire and effectively weaponization of a CBRN agent.

Acquisition and Weaponization of CBRN Agents

Admittedly, any analysis that seeks to address the threat of “CBRN terrorism” collectively as a monolithic phenomenon is inevitably too vague to be useful, given the fact that C vs. B vs. R vs. N are very disparate threats with regards to issues such as difficulty of acquisition, potential to cause significant damage, technological hurdles involved in mass production and weaponization, and challenges posed for states on the side of detection, prevention, and response. [17] In light of this limitation, it is not the ambition here to provide an exhaustive analysis, but only a general coverage of the core issues.

For most CBR (but not N) agents the acquisition step is not difficult because many weapons-usable substances have legitimate uses and are therefore relatively widely available. Further, the boom of information technologies and the Internet makes the necessary know-how for successful procurement of cultures more widely available than ever before. On the other hand, the production of large quantities of a biological agent, as well as its successful weaponization (the process of producing a mass casualty capable delivery system for the acquired agent), is a much more complex and difficult endeavor than generally believed. [18] The difficulty of weaponizing chemical and biological substances varies greatly based on the agent of choice. Inflicting mass casualties with chemical and non-contagious biological agents such as anthrax or tularemia requires a high-tech delivery because every victim has to come into direct contact with the agent in order to be affected.

One popular scenario for a bioterrorist attack has been the mass contamination of a city’s water supply. A major difficulty of successfully perpetrating such an attack is represented by the fact that most water-borne organisms die in the presence of sunlight, ozone, or chlorine. One possibility solution would be the contamination of water post-treatment/ Such an operation would involve pumping enormous quantities of agent into the water distribution system while avoiding detection – not an easy feat considering the huge quantities of agent needed and the fact that the water in the pipelines is under pressure. Assuming terrorists overcame all of the hurdles associated with contamination of a city’s water supply, the chances of inflicting mass casualties are minimal, unless the agent used is colorless, tasteless, and odorless, in order to facilitate mass consumption. Despite the fact that this seems common sense, past plots and a review of dozens of terrorist chemical and biological weapons manuals demonstrate the lack of realization of this simple fact on behalf of most terrorist groups. Consider, for instance, the February 2002 plot to poison the water supply of the U.S. Embassy in Rome, which has been widely cited as evidence of al Qaida’s “chemical weapons” capability. [19] In this case, the four Moroccan perpetrators arrested in Italy possessed 8.8 pounds of potassium ferrocyanide - enough to theoretically kill several individuals, but certainly not suitable for a water borne attack – but were unsuccessful because the agent changes color significantly when mixed with water. Thus, providing ample warning to the possible target. [20]

The next commonly discussed scenario is the open-air dissemination of a non- contagious agent such as *bacillus anthracis* (a.k.a. anthrax). Anthrax is the prototypical biological weapons agent - it is relatively easy to produce, it is extremely virulent, and the infection is not contagious, so the outbreak will not spread beyond those affected directly. Most importantly, anthrax forms rugged spores when exposed to environmental stresses, and these spores facilitate processing and weaponization. However, significant hurdles to effective open-air dissemination of anthrax exist as well. While the liquid form is relatively easy to produce, it is much more difficult to deliver effectively because it is susceptible to clumping into heavy droplets that fall to the ground instantly, providing insufficient time for the victims to inhale the agent. Conversely, the powder form is significantly less challenging to disseminate, but is much more difficult to produce; its effective dissemination requires an aerosol composed of particles between one and five microns in diameter. Production of such fine aerosol requires a sprayer system that is equipped with specialized nozzles that are not widely available. Finally, an open-air dissemination of aerosol is also highly susceptible to meteorological conditions that make targeting much less controllable.

Contagious agents on the other hand, allow for a much less efficient delivery, as it is only necessary to infect a small group of people, who can then spread the disease by secondary transmission. In this regard, the popular scenario of a suicide “bomber” infected with smallpox and cruising along crowded city areas comes to mind. This scenario is, of course, not nearly as technologically sophisticated as the scenarios mentioned above. However, obtaining the virus today is almost impossible, and even then there are very few organizations in the world that would be inclined to use such an unpredictable method; contrary to a classical suicide bombing one of the key advantages of which is a high level of control of the circumstances under which the detonation oc-

curs, in the “biosuicide” attack the organizers lose any control whatsoever following the first secondary transmission of the disease. Few of today’s known groups seem willing to launch a terror campaign that would have the capacity to indiscriminately eliminate not only the intended victims, but also the group’s constituencies, membership and leadership, as well as their friends and families. [21] It is thus not surprising that none of the many existing biological weapons manuals inspected by the author has ever covered the category of contagious agents.

While the technological difficulty of obtaining a mass casualty capable chemical, biological, or nuclear weapon is clearly the dominant reason for why the use of such weapons by terrorist organizations has been extremely rare, the comparative ease with which a radiological dispersal device (RDD) could be assembled raises the question of why there has not yet been a single incident involving the “dirty bomb” scenario. RDDs can be very crude and can take the form of simple placement of radioactive material in a location with the intent of causing damage, destruction, or injury by the means of radiation produced by the decay of the material used, or by the dispersal of radioactive material over a larger area by the means of attaching it to a conventional explosive. [22] The damage and injury inflicted by such a device would depend greatly on the amount and type of the radioactive material used. The effects of a “dirty bomb” would be threefold: the blast and fragmentation effects of the explosive device, radiation effects, and psychological effects. [23] Of these, the psychological implications would be the most devastating, mainly because of the automatic association of the word “radioactive” with “nuclear” in the minds of the majority of world population. In reality, however, more people would probably die in stampedes and car accidents resulting from the panicking population’s desire to leave the affected area immediately, than from direct effects of radiation. Second, in the hierarchy of destructive impact would be the damage inflicted by the blast and the fragmentation effects of the explosive device to which the radioactive material was attached. The physical damage caused by the actual radiation effects would in most instances be minimal, comprising mainly of area denial rather than mass casualties resulting from radiation poisoning. And while the possibility of a significantly lethal RDD design cannot be ruled out completely, even states with access to virtually unlimited amounts of highly radioactive materials have found this difficult. The main obstacle in this case was the handling of gamma-emitting radioactive substances, which requires the use of extremely heavy and bulky protective lead shielding. [24] Other obstacles included the problems associated with grinding the material into the five-micron size and mixing it with an inactive solid substance to enhance dispersion and increase inhalation hazard, the variability of whether conditions, and the ability of buildings to absorb large amounts of radiation. [25] Nevertheless, the relative ease with which an RDD can be assembled combined with the immense psychological effects such a weapon has to offer, make the “dirty bomb” scenario a threat that is very real.

Assessment of Contemporary Terrorist Capabilities

Due to significant obstacles faced by terrorist organizations in the process of weaponizing chemical, biological, and nuclear agents; most of the doomsday scenarios often cited by security agencies and sensationalist media accounts are unlikely to be fulfilled any time soon. In fact, judging by past incidents and dozens of CBRN terrorism manuals, contemporary terrorist organizations still demonstrate a relatively naïve approach to this issue. Even al Qaida and its associate groups such as Jemaah Islamiya (JI) have demonstrated a very limited ability to acquire a significant chemical or biological capability. [26]

For instance, al-Qaida had initiated its plan to develop chemical and biological weapons -- the so-called “Project Yogurt” – as far back as 1999. [27] In the initial stages, the alleged plan was to conduct a survey of literature while the organization looked to recruit a scientist to run the program. In 2001, al-Qaida’s third in command, Mohammed Atef, approached JI’s top operational leader of Hambali with a request to find a scientist that would take over the program. Hambali introduced Yazid Sufaat, a U.S. trained bio-chemist and former Malaysia military officer, who subsequently spent several months attempting to cultivate anthrax in a laboratory near the Kandahar airport. [28] Plans were also established to set up another laboratory in Malaysia and a third lab in Bandung, Indonesia, through Sufaat’s company called Green Laboratories Medicine. [29] But while this intent may sound scary on paper, it is interesting to compare the logistics and expertise of al-Qaida’s biological weapons program with that of the Aum Shinrikyo, the undisputed leader in this field. Prior to deciding on the production of chemical agents, Aum Shinrikyo had conducted no less than 10 attacks with biological agents (particularly *bacillus anthracis* and botulinum toxin), under the direction of Dr. Seichi Endo, a molecular biologist who had obtained graduate degrees in genetic engineering, genetics, and medicine from the prestigious Kyoto University. [30] Even though the group had at its disposal an unrivaled amount of resources equaling nearly \$1 billion, a team of no less than 20 graduate level scientists, and state of the art laboratories

and equipment, it failed to kill a *single* person with a *biological* weapon. Compare that with al-Qa'ida's "Project Yogurt," which had the startup budget of only \$2-\$4,000, was based on an initial survey of literature from the 1920s to 1960s, [31] and its chief "scientist" only had a bachelors degree in biological sciences and a minor in chemistry from Cal State University in Sacramento. In this perspective, al-Qa'ida's ability to kill thousands of people with biological agents seems rather questionable.

Could this reality suddenly change? The rapid scientific advances in the fields microbiology and genetic engineering seem to suggest so, but in order to get the full picture we must also consider the issue of willingness and ability of terrorist organizations to adopt new technologies. History tells us that terrorist organizations rarely alter their established *modus operandi*, and when they do, these changes are driven by very specific reasons. [32]

The first such reason comes in the event of an introduction of government countermeasures, such as target hardening efforts that serve as a direct obstruction to the tactics used by terrorists in the past. While most groups can be expected to respond by selecting substitute targets, an innovative organization will refuse to go down this path of least resistance in order to increase its probability of success. Instead, such a group will work to overcome these countermeasures by means that have not been accounted for by the enemy, often placing an emphasis on projecting an image of invincibility as well as mocking the state for failing to stop the attack despite all of its resources. In this light certain chemical and biological agents pose a direct threat for the future, as they could be used to overcome security measures already in place at key targets such as airports. And while CBW employment in this scenario is unlikely to involve a mass casualty capable delivery system, even crudely delivered agents deployed onboard a commercial airliner in midcourse flight could result in very significant damage and casualties.

Another scenario in which a group can be expected to alter its operational methods in a novel direction comes in the presence of an inherent ideological pre-determination toward using certain technologies or the need to innovate in order to obtain the capability to match the level of violence associated with the respective ideological and strategic preferences. [33] An example of this in the CBRN realm is the incorporation of certain chemical or radiological agents into explosive devices, along the lines of the HAMAS inclusion of pesticides in suicide belts for anticoagulant effect, [34] or the detonation of chlorine canisters recently introduced by the insurgents in Iraq. What is important to emphasize here, is that mass casualties remain an unlikely outcome even in this scenario, as most of the added agent tends to be consumed by the initial explosion. Nevertheless, the psychological effect of such operations cannot be underestimated.

The third relevant scenario of a trigger to terrorist adoption of new operational methods is an incidental or unintended acquisition of a particular human or material resource. In the CBR context this is a real threat, especially in light of the growing decentralization of the global *jihadi* movement and the associated phenomenon of "self-starter groups" emerging in Western countries. If, for instance, a highly skilled microbiologist decided to launch an attack in the name of "al Qaida," it is likely that such a person would use the skills and technologies that he or she is most familiar with, as opposed to resorting to traditional terrorist weaponry. Given the growing prevalence of highly educated individuals actively participating in terrorist violence, the scenario of a "homegrown" terrorist cell attacking with a CBR capability in a western city is becoming increasingly more imaginable. That being said, even in this scenario, there would be significant technological obstacles standing in the way of producing mass casualties.

Conclusion

Today's terrorist organizations demonstrate only a limited potential to use CBRN agents for the purposes of launching an attack capable of causing mass casualties or significant physical damage. Nevertheless, the threat of small scale operations involving certain chemical, biological and radiological agents is certainly real, and is most likely on the rise. Of great concern in this light is the gradually growing understanding of the difficulty of causing mass destruction with CBRN among the terrorists themselves. Whereas a decade ago the known terrorist plots and CBRN manuals demonstrated a very high level of technological naivety and ridiculous ambitions, today's organizations seem to have a greater appreciation of the technological hurdles they are facing – and seem to be reflecting on this reality by shelving unrealistic projects in favor of focusing their energy on the more feasible scenarios. Even more importantly, today's terrorists seem to have a much greater appreciation of the psychological impact that even small-scale CBRN operations will have on us, [35] leading to an increasing likelihood of the occurrence of such attacks in the future. Given the importance of the primarily psychological

dimension of this threat, it will be even more vital for us in the future to take these plots for what they are, and to avoid misleading interpretations of such events as “weapons of mass destruction terrorism.”

With a longer-term outlook, the issue of specific concern is the continual process of transnationalization of terrorism and the associated rise of global decentralized networks of small cells operating independently of any central command. Given their lack of a longer term strategic outlook and the overwhelmingly supportive views of the online jihadi community on the issue of using CBRN, these cells are arguably going to be even less constrained in their motivation to deploy such technologies for attack purposes. While this increasing motivation in combination with our limited ability to accurately assess it beforehand is certainly a cause of concern, it must be emphasized that this growing intent is by no means matched by capability - in fact, there seems to be an inverse relationship between the two. Small groups of individuals operating in a hostile environment under pressure of the security services are likely to be in very difficult position to breach the technological hurdles associated with a mass-casualty CBRN weapons program. Actually, the homegrown cells typically experience very limited success in launching even small to medium-scale conventional attacks without obviation and disruption, which has led some members of the online jihadi community to call for *less sophisticated* and operationally *less challenging* attacks and plots, as a substitute to the current preference for synchronized suicide bombings. The further arrests of cells in Germany, U.S., Norway, Canada, Denmark, Belgium, U.K., Australia, and the Netherlands, as well as the failure of even rudimentary attacks launched in June 2007 by a comparatively well-educated group of jihadis in London and the Glasgow airport, seem to confirm that the upcoming trend of terrorist operations will be one of *decreasing*, rather than increasing, technological sophistication. And while the continuing process of “democratization of destructive power” will arguably make it easier for even small groups of individuals to wreak havoc and destruction, the prospects for significant acts of “superterrorism” appear bleaker than 13 years ago.

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NOTES:

- [] An extended version of this article will appear in Jaideep Saikia and Ekaterina Stepanova (Eds.) *Terrorism: Patterns of Internationalisation* forthcoming
- [2] Brian Michael Jenkins, “Will Terrorists Go Nuclear?” RAND Paper P-5541 (1975) p. 4
- [3] Bruce Hoffman, *Inside Terrorism* (New York: Orion Publishing Co. 1998) p. 201
- [4] “Sri Lankan Tamil Tigers Use Poison Gas Against Government Troops, Says Senior Officer,” *The Xinhua General Overseas News Service* (06/18/90)
- [5] David E. Kaplan, “Aum Shinrikyo,” in Jonathan Tucker ed. *Toxic Terror* (London: MIT Press, 2000) p. 207
- [6] This incident is sometimes incorrectly attributed to a neo Nazi group “Order of the Rising Sun.”
- [7] W. Lee Rensselaer III, *Smuggling Armageddon: The Nuclear Black Market in the Former Soviet Union and Europe* (New York: St. Martin's Press, 1998) p. 135-6
- [8] The container, which weighed approximately 15 kilograms and measured 400 by 300 by 250 centimeters, was wrapped in yellow paper and plastic, and contained an ordinary piece of equipment found in the oil industry.
- [9] is LTTE's employment of chlorine gas during the siege of a Sri Lankan Army camp in Kiran in 1990, which also came as a direct result of the group's decreasing access to ammunition following the seizure of several of the group's arms shipments. (Hoffman, Bruce, “The Debate Over Future Terrorist Use of Chemical Biological, Nuclear and Radiological Weapons” (RAND 2000) p.13
- [10] Consider the experience of Aum Shinrikyo, who after investing \$30 million into sarin alone, succeeded in killing only 12 people in its most lethal attack - a number that pails in comparison to the 192 persons who died in the 2003 suicide attempt on the Seoul subway, which was executed by a mentally disturbed individual who used technology requiring only about a \$3 investment: a paper milk container filled with gasoline and a cigarette lighter. The lesson is that even for a group that tries to maximize casualties, the cost benefit analysis is not necessarily in favor of “weapons of mass destruction.”
- [1] Adam Dolnik, *Understanding Terrorist Innovation: Technology, Tactics and Global Trends* (Routledge, 2007) p. 178
- [12] Ehud Sprinzak and Idith Zertal: *Avenging Israel's Blood*. In Tucker, Jonathan B., *Toxic Terror: Assessing Terrorist Use of Chemical and Biological Weapons*, (Cambridge, Mass: MIT Press, 2000) p. 26
- [13] Adam Dolnik, *Understanding Terrorist Innovation: Technology, Tactics and Global Trends* (Routledge, 2007) p. 177
- [14] Andrew Tan and Kumar Ramakrishna, *The New Terrorism* (Singapore: Eastern University Press, 2002) p. 7
- [15] Sammy Salama and Lydia Hansell, “Does Intent Equal Capability? Al-Qaeda and Weapons of Mass Destruction,” *Nonproliferation Review*, Vol. 12, No. 3 (November 2005), <http://cns.miis.edu/pubs/npr/vol12/123/123salama.pdf>
- [16] *Ibid.*
- [17] For instance, only N and B but not R and C have the capacity to achieve “mass destruction”.
- [18] The term “weaponization” refers to the process of producing an effective delivery system for the acquired agent. Generally, two basic scenarios for a chemical or biological terrorist attack exist. One is a relatively crude, small-scale delivery along the lines of the 2001 anthrax letters, which can succeed in causing massive panic and disruption, but lacks the potential of inflicting significant damage in terms of loss of human life. The other scenario is a mass-casualty attack, which is much less likely, but which could potentially be catastrophic. It is the latter type of attack that is the primary focus in this study.
- [19] Melinda Henneberger, “4 Arrested in Plot Against U.S. Embassy in Rome,” *New York Times*, February 21, 2002, p. A15.
- [20] For an excellent analysis of this incident see: Croddy, Eric, Osborne, Matthew, and McCloud, Kimberly, “Chemical Terrorist Plot in

- Rome?" Center for Nonproliferation Studies. Available at: <http://cns.miis.edu/pubs/week/020311.htm> (accessed on 6/15/07)
- [21] It is interesting to note that in the jihadi manuals surveyed by the author, the category of contagious agents tends to be avoided completely. The AQ manual "Military Studies in the Jihad against the Tyrants" when discussing assassination with biological agents even specifically limits the discussion "only to poisons that the mujahed can prepare without endangering his health"
- [22] James L. Ford, "Radiological Dispersal Devices: Assessing the Transnational Threat" Internet. Available at <http://www.ndu.edu/inss/strforum/forum136.html> (accessed on 1/23/02)
- [23] Ibid.
- [24] James L. Ford, "Radiological Dispersal Devices: Assessing the Transnational Threat" Internet. Available at <http://www.ndu.edu/inss/strforum/forum136.html> (accessed on 1/23/02)
- [25] Ibid.
- [26] For excellent analyses of al Qaeda's potential to acquire and use CBRN see Sammy Salama and Lydia Hansell, "Does Intent Equal Capability? Al-Qaeda and Weapons of Mass Destruction," *Nonproliferation Review*, Vol. 12, No. 3 (November 2005), <http://cns.miis.edu/pubs/npr/vol12/123/123salama.pdf>. and René Pita, "Assessing al-Qaeda's Chemical Threat," *International Journal of Intelligence and Counter Intelligence*, Volume 20, Issue 3 (September 2007), pp. 480 – 511. For an analysis of Jemaah Islamiyah see Dolnik, Adam and Gunaratna Rohan: "Jemaah Islamiyah and the Threat of Chemical and Biological Weapons Terrorism." in Howard, Russell D. and Forest, James J.F. (eds.) *Terrorism and Weapons of Mass Destruction* (McGraw-Hill, 2007)
- [27] Cullison, Alan, *Inside al Qaeda's Hard Drive*. Atlantic Monthly. September 2004
- [28] 9-11 Commission Report, p. 151
- [29] Australian Broadcasting Corporation: Al Qaeda analyst on cricket terrorist plot claims. (10/10/2006) Full transcript of the interview with Zachary Abuza is available at: <http://www.abc.net.au/lateline/content/2006/s1759229.htm> (accessed on 12/10/06)
- [30] Miller, Judith, *Germs: Biological Weapons and America's Secret War*, (New York: Touchstone, 2002) p. 160
- [31] Cullison, Alan, *Inside al Qaeda's Hard Drive*. Atlantic Monthly. September 2004
- [32] Dolnik, Adam, *Understanding Terrorist Innovation: Technology, Tactics and Global Trends* (London: Routledge, 2007) p. 173
- [33] Ibid.
- [34] Weizman, Steve, "HAMAS Pleased with Addition of Poison to Bombs," Associated Press (December 12, 2001)
- [35] For the more details about this argument demonstrated on the Kemal Bourgass, (January 2003) and Dhiren Barot, (November 2006) plots, see: Hoffman, Bruce, "CBRN Terrorism Post-9/11." In in Howard, Russell D. and Forest, James J.F. (eds.) *Terrorism and Weapons of Mass Destruction* (McGraw-Hill, 2007) p. 273-274