The challenge of biological and chemical weapons

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How has the challenge of biological and chemical weapons changed over the more than 40 years since Martin Kaplan began his very effective and continuing efforts to educate scientists and diplomats to the need for imagination and action to contain and eliminate the threat (see page 149)?

From a purely technological perspective of what the weapons are, there has been rather little change. By 1960, the lethal organophosphorus nerve agents, developed but not used by Germany in the Second World War, had been stockpiled in munitions in the United States and the Soviet Union. Binary nerve gas munitions, much debated in the 1970s, represented only a logistic refinement, not an increase in effectiveness, and were never produced in quantity. Testifying to the maturity, even stagnation, of chemical weapons technology, munitions filled with the vesicant agent mustard, massively used by both sides in the First World War, were still considered by the superpowers to be worth stockpiling half a century afterwards. Psychochemicals were developed as weapons, but then abandoned as unwanted by the military. And lethal toxins, including botulinum, troublesome to use as weapons and in several ways militarily inferior to nerve agents, were studied but never embraced by the military. Indications that trichothecene mycotoxins had been used in South-East Asia proved to be illusory.

The point is not that chemical weapons posed no threat. On the contrary, if the gigantic stockpiles of nerve agent munitions accumulated on both sides of the bipolar world had actually been used, especially in densely populated Europe, the casualties, particularly among unprotected civilians, would have been enormous (see WHO's *Health aspects of biological and chemical weapons*, 1970).

Rather the suggestion is that despite the maturity of the technology and ready access to the weapons and despite the outbreak of hundreds of wars during the 80 years since the First World War, chemical weapons were almost never used. Ethiopia, China, Yemen and Viet Nam, if we include riot control agents and herbicides, and the use of mustard and nerve agents against the Islamic Republic of Iran and against Kurdish towns, are among the very few exceptions.

What are we to make of this? Whatever the reasons, and several may be put forward, something has inhibited the use of poison as a weapon even though powerful poison weapons had been developed and stockpiled and even in the numerous wars in which one side had far greater capability to employ chemical weapons than did its adversary.

We see a similar situation, of availability but not use, for biological weapons. Despite media hyperbole about genetic engineering of ever more fearsome biological weapons, the fact is that by 1960, following intensive development during and after the Second World War, infectious agents and the aerosol-producing bombs and spray tanks for disseminating them had already been developed, tested and produced in quantity in the United States, only to be categorically renounced by President Nixon in 1969 and destroyed soon after. As with chemical weapons but far more devastating in terms of the areas that could be attacked, dreadful biological weapons had already been developed, tested and stockpiled in quantity – but have never been used.

This is not to advocate complacency but rather to emphasize that there are obviously powerful factors at work to minimize the use of biological and chemical weapons as compared with conventional high explosive and flame weapons. Among these factors must be the widespread, although not completely universal, disinclination, revulsion, inhibition or whatever one may call it, that people, including most military people, have towards the use of poison and disease as weapons.

Indeed, among all the general categories of weapons developed in modern times, the only ones that are categorically prohibited by international law are chemical and biological weapons, outlawed by the 1925 Geneva Protocol, the 1972 Biological Weapons Convention and the 1993 Chemical Weapons Convention. The Chemical Weapons Convention has on-site compliance measures and an international organization that applies them. After two-and-a-half years in force, the Organization for the Prohibition of Chemical Weapons had already conducted some 350 on-site inspections, including inspections of 34 chemical weapons storage sites holding some 8 000 000 chemical munitions, all of which were slated for destruction.

Spurred on by the discovery of Iraq's attempt to develop and produce biological weapons, by the discovery of the intensive biological weapons development pursued in the Soviet Union after it had ratified the Biological Weapons Convention, and by evidence that the Aum Shinrikyo cult sought to use biological terror weapons, the effort is on to strengthen the Biological Weapons Convention with measures to encourage compliance and detect noncompliance. Now under negotiation in Geneva by the Ad Hoc Group of States Parties to the Biological Weapons Convention, with completion expected within another year or two, the effort will need stronger political support if its declaration and on-site compliance procedures are to be anywhere near as rigorous as those of the Chemical Weapons Convention.

It would be encouraging to believe that what we see here – in the general non-use of devastating chemical and biological weapons developed decades ago and in the gradual development of an international chemical and biological weapons disarmament regime including compliance measures – is a growing sense in the collective consciousness of humanity that as we enter the period in our technological evolution in which profound advances in biology will enable us to manipulate all of the life processes,

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including metabolism, reproduction, embryonic development, and even cognition, we must not let ourselves use this knowledge against ourselves. Perhaps there is a growing recognition that while we have managed to survive the hostile exploitation of all previous major technologies, biotechnology – the technology that would allow us even to change what we are – is fundamentally different and must be protected from hostile exploitation.

This may be one of the more momentous challenges to our species in what will be an extremely challenging next century. ■