

CHAPTER TWO

The Fight against Chemical and Biological Weapons: The Role and Performance of Competent Institutions

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The diplomat of disarmament, a kind of emergency doctor to international society, might be tempted to argue *ad absurdum* against the pure moralist. To be sure, he shares with the philosopher the deep-seated belief that “in truth, peace is more than the absence of war; it is a virtue arising from the vigour of the soul.”² But he must also take into consideration something that is both a truism and a call for action, action on *his* part: if the first shot has yet to be fired, peace can be saved. Therefore, chemical disarmament and the fight against chemical and biological proliferation are clearly of paramount importance in *preventing* the use of such materials by belligerents and terrorists, for terrorism is another form of warfare, conducted by a nonstate actor.

The tools available to the disarmament practitioner vary according to the times, and especially according to the willingness of states to create more or less robust alliances through international treaties. States are fully aware that in their usual form, treaties will restrict their own room for manoeuvre just as much as that of their potential enemies. The Biological Weapons Convention (BWC) (1972) and the Chemical Weapons Convention (CWC) (1993) constituted major advances in the field of traditional arms control. In

terms of nonproliferation, export control regimes (the Australia Group created in 1985 is particularly relevant to the present chapter) adopt a more empirical approach that employs two lists: a public list of sensitive “dual-use” goods³ and a flexible list of “suspicious” countries.⁴

Export control, the preferred nonproliferation tool, attracts far more criticism than arms control. However, it is a norm by virtue of its status as an international preventive arrangement, even if it has not been enshrined in law. It therefore stands in stark contrast to a situation in which “a state is the sole judge of its own cause, i.e. of the conditions essential to its continued existence” or, to take the Hobbesian view, “a situation bordering on a state of war.”⁵ Along with disarmament in the proper sense of the term, export control is a component of a multilateral project and view of the world, despite the inadequacy of its legal basis.

This chapter examines the advances in and achievements of chemical and biological disarmament and nonproliferation, and also attempts to identify some of the obstacles encountered in each of these fields.

The Basis of Chemical and Biological Disarmament

In *Le Miroir des Limbes*, André Malraux wrote some striking lines before going on to describe the German gas attack at Bolgako on the Vistula in 1916. He found the immanence of life so powerful in that timeless central European landscape⁶ that absolute evil, that is gas, like the acid used for etching, could only partially break down the surrounding material: “With the first battle gases Satan reappeared in the world; but the Scourge could not prevail over the blind instinct to survive resurging in the only European forest that still harboured the bison of the Quaternary . . . perhaps invested by death, I take refuge in the story of one life’s most enigmatic survivals.”⁷

Life’s survival is indeed the appropriate term, not only in relation to nature but also to values and ethics. Gases first appeared on the western front on April 22, 1915, and were used abundantly thereafter, notably at Verdun. Their effects were so ghastly—causing huge

numbers of lingering deaths even after hostilities had ceased—and their advantages in military terms were so uncertain that they were banned after the war. The Treaty of Versailles contained a clause relating to their prohibition, as did other peace treaties drafted in 1919. But it is the *Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare* (signed June 17, 1925), a League of Nations initiative, which still symbolizes the moral reprobation induced by the use of gas as a weapon of war. The most striking aspect of this surprisingly brief protocol is not the technicality of its measures or its definitions, but the moral foundations of the prohibition: “...whereas the use in war of asphyxiating, poisonous or other gases...has been justly condemned by the general opinion of the civilised world...to the end that this prohibition shall be universally accepted as a part of international law, binding alike the conscience and the practice of Nations...”

It is only reasonable, given what occurred in the decades between the Protocol and the CWC (the CWC opened for signature in 1993 and entered into force in 1997), to regard the effectiveness of the Geneva Protocol with some skepticism:

- Spanish forces used chemical weapons in 1925 during the Rif War. Fascist Italy used them during its invasion of Ethiopia in 1935–1936. Japan used them against China during the Manchurian War until 1941. Japan was not a signatory to the Protocol, but had accepted its principles at the Washington Conference in 1922. It should be noted that Japanese operations against China and the Italian attack on Ethiopia were not preceded by a formal declaration of war.
- The Nazis used gas in their extermination camps, but during the Second World War the belligerents generally refrained from resorting to gas, chemical, or similar weapons in combat situations, even though they had developed substances more powerful than those employed in the previous World War.⁸ However, it is likely that the decision to forego their use was based on strictly military reasons rather than ethical considerations. The Second World War was a much more mobile affair, whereas gas had been a factor of trench warfare. In addition, some members

of the German high command, beginning with Hitler, had experienced such weapons in the earlier conflict and were convinced that their use would provoke an equivalent response from the Allies, whose arsenals also included recently developed toxic substances.

- By using herbicides and defoliants in the Vietnam War (1961–1971), the United States clearly contravened the spirit, if not the letter and basic measures, of the Geneva Protocol.⁹ However, the most blatant use of chemical weapons, in total violation of the 1925 Geneva Protocol, occurred during the war between Iraq and Iran (1980–1988), 60 years after Ypres.¹⁰

Over the course of six decades the 1925 Protocol, with its limited but practical measures (prohibition of use *in war*) and highly generic definition of prohibited substances (poisonous, bacteriological or others, or in other words potentially all chemical and biological substances), had some success in symbolizing the relevance of a ban on the use of chemical and biological weapons in conflicts, and still symbolizes the validity of that relevance. In many respects, the Geneva Protocol is a seminal text, the origin of the BWC and the CWC. To be sure, its universality, which has tended to stagnate in recent years,¹¹ does not compare well with that of the two major conventions; in particular, the many reservations expressed by the vast majority of states have not aided its effectiveness. However, it remains an indispensable founding text, and if proof were needed, one only has to look at the repeated calls from certain countries to abandon objections to it and enhance its power.

The Problems of Biological Disarmament

The unarguable relevance and urgency of biological disarmament, which is clearly a technically complex issue, has in recent years engendered a specific and often passionate body of literature.¹² But the technicalities should not be allowed to conceal a certain number of truths that can be approached in the form of two unsettling questions:

- What occurred between November 25, 1969, when the Republican administration under Richard Nixon announced America's unilateral decision to destroy its stocks of biological weapons, and December 7, 2001, when George W. Bush's Republican administration caused outrage in the international disarmament community by using the notorious "killer amendment" to withdraw from the Geneva disarmament conference,¹³ which the Ad Hoc Group working on a "verification protocol" to the 1972 BWC had long regarded as the only way of making the Convention verifiable, and therefore effective and legally binding?
- How do we explain the fact that despite extremely pessimistic statements from renowned experts,¹⁴ there was still no evidence of a deliberate and successful bacteriological attack in 2008, apart from the postal anthrax attack in the United States in the autumn of 2001, an incident that most conveniently exacerbated public fears of biological terrorism and, consequently, the belief that the war against Iraq was justified? Note that in 2008 the FBI attributed sole responsibility for the anthrax incident to Bruce Ivins, an American military biologist who had committed suicide.

It would be more appropriate to begin by rephrasing the second question: why aren't terrorists using death-dealing viruses and pathogens (there is no known remedy for some of them), which are surely ideal weapons of mass destruction? The answer lies in a concept known as "militarization." It is relatively easy to detonate a kilogram of TNT, but the manipulation of a pathogenic agent for terrorist purposes is far more difficult and requires complex planning. Numerous factors have to be mastered: the choice of pathogen, the stabilization of the agent, its resistance to the ambient environment, its interaction with other agents, and so on. Nature slowly develops fearsome "killers" that are not necessarily the most lethal agents per se, the flu virus being one example. But this requires a maturing process and prior natural selection that involves an incalculable amount of sorting and recombination. In other words, some bacteriological agents are indeed potential weapons of mass destruction¹⁵ with regard to their performance in vitro or effects on human beings. The concept of a "weapon," however, indicates a guaranteed result and a relative

facility of usage. In reality, the effects of pathogens are far from predictable when not subject to carefully controlled conditions and inoculation.

For a better understanding of the difficulties involved in shaping international legislation on the dual-use aspect of biology, we should return to the first question: what caused the United States to reverse its view on the feasibility of a strictly verifiable biological weapons convention between 1969 and 2001? The answer lies close to hand, in the form of some edifying figures: in the intervening 30 years, the biology and biotechnology sector experienced rapid growth, particularly with regard to the commercial potential of prospective developments. For example, America's biotechnology sector benefited from \$29 billion of investment in 2000 alone. In 2001, the sector employed no less than 191,000 high-level scientists, while American universities awarded 6,526 biology and agronomic sciences degrees.¹⁶ In such circumstances—and in the domain of biology, 95 percent of discoveries, patents, and innovations were potentially “dual-use,” a far higher percentage than in the chemical sector—how could the world's largest economy be persuaded to restrict the profits it hoped to reap from the biological sector,¹⁷ which the intrusive mechanisms of a verifiable international convention would force it to in one way or another?

Now that the background is somewhat clearer, we can turn to the issue of a convention that prohibited the development and stockpiling of biological *weapons* (the definition needs to be put in perspective given that 95 percent of biological research was “dual-use,” i.e., applicable to both military and civil purposes) but contained no proper verification measures. Three remarks seem appropriate in this context:

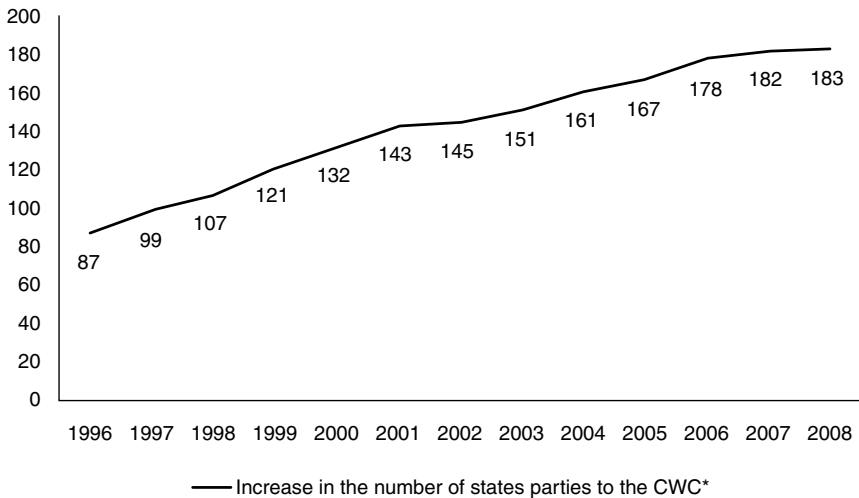
- Not all parties to the Convention¹⁸ have officially abandoned the project to strengthen the BWC with a verification protocol.¹⁹
- Although in their present form commitments under the BWC are strictly juridical and declarative, the states parties agreed, after the 2001 Review Conference, to enhance negotiations by implementing a multilateral monitoring process (confidence-building measures that rely on information submitted annually by the states parties).

- Some of the more serious states—those most heavily involved in study and research—have made great progress in recent years by introducing stricter laws on storage, monitoring, traceability, exchanges of information between laboratories,²⁰ stocks of pathogens, and so on.

Despite the public perception that progress has stalled, the BWC and the forums working to reinforce it are perhaps creating the basis for a genuine understanding of the realities. This could bear fruit—diplomatically in the form of a new convention or a revitalized process, and finally in the operational sphere, following the example of the chemical domain, where an effective convention has been in place since 1997.

Achievements in the Chemical Domain

With 184 states parties (June 2008 total), the CWC is currently the most universal international disarmament convention and has many other assets besides its wide membership.



Graph 2.1 Increase in the number of states parties to the CWC.*

*Annual increase in membership since the CWC's entry into force (April 29, 1997).

Source: OPCW, 2008.

The strengths and attractions of the Convention may be summarized as follows:

- The Convention deals not only with weapons and the items necessary for their production (“precursors”), but also with the vast domain of the chemical industry.²¹
- In both domains, relations between the Organization for the Prohibition of Chemical Weapons (OPCW) and states party are organized around a reliable, comprehensive declaration and verification system. Any civil or military site that has declared that it is producing or handling substances on one of the Convention’s three lists can be inspected at any time.
- The Convention sets out a binding calendar for the destruction of chemical weapons arsenals.²² All such arsenals should have been eliminated by 2007. The current deadline is 2012.

The figures may seem impressive (3,373 inspections in ten years; an average of 40 percent of declared category 1 arms stocks already destroyed), but the Convention, like any text, has its weak points.²³ However, while the pace at which the chemical weapons disarmament it organizes and monitors is admittedly slow, the following facts should be taken into consideration:

- The OPCW uses the initial declarations made by states to construct a database. Consequently, and despite its apparent effectiveness, the Convention relies primarily on the information that states have agreed to provide; on their good faith, in other words;
- The Convention contains measures (in particular surprise inspections) to verify or at least to try to ascertain whether certain states are lying or have lied in the past. However, the use of such tools presupposes a strong *political will*, given the difficulties that will inevitably arise.²⁴

Good faith is a manifestation of a strong *political will*. These are powerful moral demands; they demonstrate that a binding, comprehensive international mechanism (such as the one established by the CWC) is and will remain above all a permanent invitation to states to play by the “rules of the game.”²⁵

**Export Control: A Matter of Self-Regulation or
Discrimination?**

For a member of the European Union such as France, export controls on chemical and biological substances are organized around positive measures set out in European regulation 1334/2000 and modified by regular updates. It also has the ability to enact national measures that exceed the scope of European law, and annually adjusts its control lists in accordance with those produced by the Australia Group. In 2008, the Australia Group encompassed 41 states including all 27 EU members, but the United States and its ideological allies, particularly Britain and Australia itself, were not prepared to admit Russia and China.

In reality, there is a knock-on effect between the lists drawn up by the Australia Group and the European regulation, for the latter's Article 11 provides for regular updates of lists of "dual-use" goods in the light of new measures agreed by member states in the export control forums to which they belong. The Australia Group's discussions and consensual decisions are, therefore, contributing to the emergence of concrete laws, even though the group's existence is based on an informal arrangement of the Anglo-Saxon type instead of a treaty.

It is important to understand that the Australia Group—whose philosophy of preventing biological and chemical proliferation is by and large admirable—perpetuates an arrangement that its founders regarded as a provisional measure. In April 1984, when UN secretary general Javier Perez de Cuéllar examined the conclusions of the commission tasked with investigating Iraq's use of chemical weapons, it emerged that most of the materials used in the manufacture of those weapons had been supplied by Western states.²⁶ In the summer of 1985, 16 countries acted on Australia's initiative and agreed to set up an informal group of nations to ensure that their biological and chemical exports were not used for military purposes. We are, therefore, confronted with unilateral trade restrictions in the light of conflict situations or regional tensions. However, these measures most certainly run counter to the free exchange of scientific and technological expertise advocated in the CWC (Article X1) and the BWC (Articles X.1 and X.2). The Australia Group's original provisional conception emerges clearly from the terms of the O'Sullivan Declaration adopted in 1992,²⁷ when members agreed to reconsider

their restrictions on international trade in the medium term. The Declaration, or at least its political aim, is no longer foregrounded by the Group's Australian presidency.

In June 2003, the Group published some interesting statistics on its members' refusals of export licenses. It emerged that very few licenses had been refused, and represented a drop in the ocean considering the total volume of exports of listed products. Nevertheless, the target countries were always the same: the United Arab Emirates—given Dubai's position as a hub—India, Iran, and Israel, with Syria and Serbia added in 2002.

This restrictive policy should be modulated by two observations. On the one hand, a refusal can be seen as a penalty imposed by the exporter. It is, therefore, important to focus on the "right target": the policy should be based on serious doubts as to the eventual application of the "dual-use" item. However, the ability of Third World countries to process chemical and biological substances is steadily *increasing*. To be sure, some highly exogenous chemical reactions and highly corrosive products require equipment so sophisticated that only Western countries know how to make. However, the comparative advantage that Western countries enjoy in this field will diminish as time goes on. Conversely, "dual-use" lists also include pathogens that are found only in certain Western laboratories. In this domain, and in an age of genetic engineering, the export of a pathogen or genetic sequence is little different from the export of technological expertise, or perhaps an irreplaceable cell culture for scientific experiments. In the biological domain, the refusal to grant an export license is double-edged. To deny an Iranian or Chinese laboratory the opportunity to develop vaccines or conduct virological research is a delicate matter, for it would equate to a kind of quarantine and could even hinder a country's ability to establish a properly functioning public health sector: the SARS epidemic that originated in Asia and appeared to present a global threat in the summer of 2003 comes to mind here.

In summary, and to answer the question posed earlier (is the Australia Group model of export control a matter of self-regulation or discrimination?), three elements require emphasis:

- Export control regimes are based on an idea dear to the Anglo-Saxon world, and particularly to the United States, that

technology plays a determinant role in conflicts and in a nation's desire for dominance. Indeed, the United States takes the view that access to its level of technology requires some form of ideological allegiance or major concessions on strategic issues. The extent to which technology is a power factor does not concern us here, but we should bear in mind that for all its phosphorous bombs, defoliants, and attacks on highly sophisticated cultures, the world's greatest power did not win its war in Vietnam. In addition, there are other factors to consider, some objective, like demographics, and some subjective, like the influence of national identity, or the belief that one is fighting for a just cause.

- The leading power in a technology market often uses its position to dictate norms. Thus, the impact of the Australia Group's export control regime is similar to that of a norm: if a company wants to export materials, it has to notify the state and await authorization. Consequently, a country with a vast internal market, the United States, for example, fares better under this system than Europe, which has its own internal market, although this is not recognized by the United States.²⁸
- If it is true that strategic issues are primarily issues of common sense, then it is surely common sense to reject controls that are manifestly abusive and would also harm Western members of the club who occupy a less-favored position in the domain of technology under consideration. The high-performance computers subject to controls by the Coordinating Committee for Multilateral Export Controls (COCOM), and later by the Wassenaar Arrangement, provide a perfect example. The United States subtly circumvented the controls as soon as they were implemented and continued to do so for many years, using its annual Export Administration Regulation review to target measures that benefited its own computer industry and trading ability.

While some states argue that export control regimes reflect the need for restrictive policies to prevent conflicts or moderate their intensity—and in the process contradict the measures set out in conventions such as the CWC and BWC—their effects, like embargo policies, are in

reality highly complex. Indeed, it is significant that among the countries that devised them and attempt to exploit them, we find trading nations and former maritime powers experts at controlling the flow of goods and guaranteeing supplies of something or other in return for a specific allegiance or a commitment to non-retransfer provisions, neutrality, and so on. Continental powers, however, seem to participate in these regimes more or less passively; they prefer the intellectual mechanism of the written treaty, with its more precisely defined contours, as long as it is acknowledged that it reflects a more academic view of the world and cannot cover every situation.

Some Unresolved Problems

As we have seen, arms control mechanisms and those designed to control sensitive materials operate according to different types of diplomatic logic. At certain times they can be seen as complementary, but when taken separately and guided by their own logic they tend to invest as much space as possible in their life spans because of the diverse effects they claim to produce. Given this claim to self-sufficiency, it seems appropriate to highlight some of the shortcomings, or more precisely the *limits*, of the exercises in question. A few examples may tell us something about the logic of the institutions examined in this book.

Silent cheating: the first example is taken from a presentation given by an American conference speaker from Sanda National Laboratory (a U.S. government research institute) in the spring of 2002, a year before the coalition invaded Iraq. In effect, the presentation posited two characteristics, or two possible approaches to the requirements of a multilateral disarmament treaty such as the CWC. A “cooperative” state should be understood as a state that maintains relaxed relations with the Hague-based OPCW and its technical secretariat (a team of inspectors and experts tasked with the concrete implementation of the Convention’s mechanisms). A “compliant” state should be understood as a state that is a member of the Convention and complies with its basic measures.²⁹

In reality, these suggestions reflected the thinking of certain experts in the Bush administration and the “Boltonian”³⁰ approach

to treaties: treaties could not guarantee the security of the United States, for it was possible to be a party to one and still avoid compliance with its measure. Moreover, the threat to arms control came not from states that had not signed up to the process, but from participants who merely feigned compliance (a grey area). While the examples given here are simply elements of a broader view, the conceptual framework is rather banal: it has always been known that one can cheat with treaties. Its novelty stems from the readiness of a country as respectable as the United States—and whose influence on the international stage is so decisive—to systemize defiance of multilateral disarmament. Another response to the Boltonian argument would be to say: various mechanisms have been devised to verify compliance—surprise inspections of chemical facilities, for example³¹—let's use them, and tell us why you have never used them.

The inertia of states: another critical observation vis-à-vis multilateral treaties and their institutional mechanisms concerns the inclination of state parties to focus on routine procedures and the bureaucratic microrequirements of the organization (meeting deadlines for paperwork, etc.), and thus neglect the importance of the purpose that justified the organization's creation. Leaving aside the more well-known examples of such inertia, it appears that some institutions prefer to function in a purely bureaucratic manner. At the OPCW, an organization with a substantial technical secretariat (more than 350 staff), this attitude is induced largely by the standard mode of discussion. States routinely deal with the secretariat, while Executive Council discussions are chaired by the Council's president. In accordance with the Convention, states can ultimately bypass the technical secretariat and hold bilateral consultations (Article IX.1), but very few of them take advantage of this

Table 2.1 OPCW “cooperation” and “compliance”

	<i>Compliant</i>	<i>Noncompliant</i>
Cooperative	Possible example: France	Iran
Noncooperative	United States	All states not party to the Convention

procedure, which is often reserved for contentious issues. Discussion of the more sensitive issues is, therefore, subject to the influence of the lowest common denominator, or is postponed until the next meeting of the Executive Council. Besides its internal bureaucracy, the OPCW has done little to develop relations with other bodies.³² Although formally attached to the UN system, it is seldom called upon to provide expertise on the UN's behalf. Its ability to react to events as they unfold, or more precisely to become technically and diplomatically involved, is therefore weakened. The voice of Mohamed ElBaradei, director general of the International Atomic Energy Agency (IAEA), commands attention, but the voice of his counterpart at the OPCW is unknown. When taken together, these elements account for the OPCW's unusually low profile.

Table 2.2 shows OPCW involvement in some recent political or diplomatic events. In the first case, it did the bare minimum to maintain its credibility. In the second and third cases, it could not take action because the target states were not parties to the Convention. Finally, the G8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction is a diplomatic process that the OPCW ignores with as much aplomb as the G8 ignored the CWC and its measures before launching its ten-year project.

We could extend the analysis and attempt to pinpoint the causes of the inertia that afflicts institutions such as the OPCW. But for the purposes of this brief study, it is enough to suggest that in the

Table 2.2 The ability of the OPCW to add real value or initiate intervention in crises, conflicts, or specific multilateral processes

	<i>Moscow theatre hostage crisis (October 2002)</i>	<i>Verification of the presence of WMDs in Iraq before and after March 2003</i>	<i>US-UK initiative converts Libya from "rogue state" to CWC state party (February 2004)</i>	<i>Launch of "global partnership" for chemical, biological, and nuclear disarmament at the G8 summit in Kananaskis, Russia (2002)</i>
OPCW involvement	Purely formal and post-crisis (request for information from director general)	None. Situation covered by UNMOVIC/ISG*	Involvement after the event	None/on the margins of the donors conference

*United Nations Monitoring, Verification and Inspection/Iraq Survey Group

absence of a UN-type veto, the *reluctance to become involved* is much stronger than we have been led to believe. For example, Russian security forces used an unidentified and certainly new chemical substance during the 2002 Moscow theatre hostage crisis, but the fact that more than 100 people died instantly prompted no demands for “clarification” from states parties, even though the CWC contains such a mechanism and “encourages” its use.³³

Is export control a useful tool in the fight against terrorism? We have seen how export control has been used to prevent the spread of terrorism. Now the events of 9/11 expanded the range of internal threats that a state faces. In this new political context, states are tempted to respond to such acts by imposing export controls. In addition, it is politically difficult for supply regimes to adopt a disinterested attitude to threats that have affected the central measures of their most important ally. However, the claim that such measures are effective in combating terrorism requires close scrutiny. On the one hand, most terrorist acts (and their preparation) take place inside the target state. Therefore, the most appropriate countermeasures are surely border checks, preventive intelligence, and infiltration and surveillance of terrorist cells. However, export controls are concerned with the movement of important goods³⁴ rather than the traffic in minor items, which can easily slip through the net. Finally, it seems absurd to include every product that could be used to violent ends in a list of sensitive “dual-use” goods.

The immediate lesson of the three shortcomings we have just examined is that institutional mechanisms—international conventions, supply regimes—designed to promote disarmament and prevent the spread of chemical and biological weapons originated in specific historical circumstances that defined their operational sphere and restricted their capacity for action. Like the biological organisms responsible for the host body’s immunity, they are characterized by both strengths and weaknesses. Thus they can be duped from within, clog up, react disproportionately, or fail to adapt to the current threat. By virtue of this rather Darwinian analysis, their ability to adapt to new threats while addressing core issues such as disarmament is therefore crucial. At the same time, states should not demand action from every institution whenever a crisis arises, given the risk of provoking reactions that defy interpretation.

Like those operating in other domains, *institutions* concerned with disarmament and preventing the spread of chemical and biological weapons are firmly attached to the international landscape. States created them, periodically demand their accountability, direct them, and sometimes manipulate them, but even so, they constitute *agorae* in which the performers—states—cannot predict with any accuracy the effects of the measures that they have agreed upon.

Notes

1. The opinions and views in this chapter are the author's own.
2. Baruch de Spinoza, *A Theological-Political Treatise* (Charleston: Forgotten Books, 2008).
3. "Dual-use" goods and equipment can be used for both military and civil purposes.
4. The United States once referred to "rogue states" or "pariah states" but has now formalized the concept of "states of concern." France has traditionally balked at publishing lists of "problem countries."
5. See Stéphane Rials and Philippe Raynaud, *Dictionnaire de philosophie politique* (Paris: PUF, 1996), p. 256.
6. Between Poland and Ukraine today.
7. André Malraux, *Oeuvres complètes*, vol. 3 (Paris: Gallimard, 'La Bibliothèque de la Pléiade', 1989–1996), p. 859.
8. Sarin, for example, was synthesized in German laboratories in 1936 and was a basic component of allies' arsenals until the CWC entered into force.
9. Laborious negotiations between the two superpowers resulted in a specific international text, the ENMOD Convention—Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques. This somewhat obscure agreement entered into force on October 5, 1978, after Laos, the twentieth state party, had deposited its instrument of ratification. The Convention currently prohibits a range of activities such as deforestation, use of herbicides, destruction of crops, manipulation of ozone levels, provocation of floods, El Niño, and La Niña. On the origins of ENMOD, see Monique Chemillier-Gendreau, "Le statut international des armes chimiques. Progrès et limites," in *Droit du pouvoir, pouvoir du droit. Mélanges offerts à Jean Salmon* (Brussels: Bruylant, 2007), pp. 875–887.
10. Resolution 687 of April 3, 1991, calls on Iraq to "reaffirm unconditionally its obligations under the Geneva Protocol," which Iraq signed in 1931. See Serge Sur, "Le Protocole de Genève à l'épreuve des deux guerres du Golfe," *Cahiers du GRIP*, 164, December 1991, pp. 16–33.
11. One hundred and thirty-six states are party to the Geneva Protocol, the last to join being Slovenia in 2008.
12. See the select bibliography at the end of this chapter.

13. On this episode, see Milton Leitenberg, "Biological Weapons and Bioterrorism in the First Years of the Twenty-First Century," *Politics and the Life Sciences* 21, no. 2, September 2002, pp. 3–27.
14. See, for example, Henri H. Mollaret, *L'Arme biologique* (Paris: Plon, 2002), p. 10: "... the resort to microbiology, to the use of pathogenic bacteria or viruses, indisputably constitutes the *major* innovation in the history of early twenty-first century terrorism... paradoxically, leading politicians are still not giving this threat [of a biological attack] the attention it deserves..." [author's emphasis].
15. As emphasized by UN secretary general Kofi Annan at the AIDS summit in London on November 23, 2003, the AIDS virus combines many of the characteristics of a "weapon of mass destruction," although its diffusion is silent and particularly insidious.
16. Gerald R. Fink, Ronald Atlas, and David Franz, *National Research Council of the National Academies, Research in an Age of Terrorism: Confronting the Dual Use Dilemma* (Washington, D.C.: The National Academies Press, 2003), p. 17.
17. "Biopharmaceutical drugs, which barely existed 15 years ago, are estimated to have had sales of more than \$30bn last year, with gross margins of 80% and annual growth of about 15%—double that for conventional drugs," in "Genesis of a Copycat Generation," *Financial Times*, May 19, 2004.
18. On August 31, 2008, there were 162 state parties.
19. Britain's House of Commons has repeatedly called for progress on this issue.
20. The archetype of this restrictive legislation is the French decree on tracing stocks of pathogens and toxins (*l'arrêté Kouchner*, September 22, 2001).
21. In the chemical domain, the civil-military crossover is 65 percent, as opposed to 95 percent in the biological domain.
22. Six states—Russia, the United States, India, Korea, Albania, and Libya—declared that they possessed chemical weapons when they signed the CWC, and were therefore consigned to a specific regime covering "possessor" states.
23. On the tenth anniversary of the Convention's entry into force, Richard Guthrie wrote an article on the celebrated Article 1.5 (which sets out the prohibition on the use of antiriot agents in war). See Guthrie, Richard, "Tackling Ambiguities: Lessons for the Review Conference from the Chemical Weapons Convention Negotiations," *Chemical Disarmament Quarterly*, March 2008, p. 10 (also available at www.opcw.org).
24. No surprise inspection has been requested in the CCW's ten-year existence. If we accept that the mechanism is applicable to all state parties, which remains to be seen given the measures in Article IX, clauses 9 and 17, then the reluctance of the Convention's leading members to call for surprise inspections can only be due to their fear of being inspected themselves.
25. See the Introduction by Guillaume Devin.
26. See www.australiagroup.net/en/origins.html, "Origins of the Australia Group."
27. The 22 signatories to Australian ambassador Paul O'Sullivan's declaration at the 629th plenary session of the Disarmament Conference undertook to "review in the light of the implementation of the Convention, the measures that they take to prevent the spread of chemical substances and equipment for purposes contrary to the objectives of the Convention, with the aim of removing such measures for the

- benefit of States Parties to the Convention acting in full compliance with their obligations under the Convention.”
28. U.S. law recognizes individual European Union markets, but not the single European market.
 29. A state demonstrates its compliance by abiding by its initial, precise declarations and refraining from clandestine research for the purpose of refining chemical weapons, and so on.
 30. From John Bolton, then undersecretary of State for Arms Control.
 31. See note 23.
 32. Typically, NGOs have little access to these discussions.
 33. CWC, Article 9, paragraph 2.
 34. Raphael Prenat (one of the few French arms control specialists) discusses this aspect in “Conflits et contrôles des transferts de technologies sensibles,” in Pascal Lorot (ed.), *Guerre et Économie* (Paris: Ellipses, 2003), pp. 201–211.

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