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EDITOR'S NOTE

The first Review Conference of the Chemical Weapons Convention (CWC) offers an important opportunity for both reflection on the first five years of the convention's implementation and planning for the future. The world is not the same as it was at the entry into force of the CWC in 1997. We have seen radical changes in science and technology, which might lead to the development of new weapons or raise concerns about how well novel chemicals are incorporated by the CWC. Threat perceptions have also altered—to many people, a terrorist attack using chemical weapons seems much more likely today than it did only a few years ago. The Organisation for the Prohibition of Chemical Weapons (OPCW) has also undergone a period of change. Over these early years numerous organizational issues, concerning budgeting, decision-making, long-term planning, and the involvement of Member States in the OPCW's work, have arisen. How the CWC and the OPCW adapt or respond to these changes will determine how well the strategic intent of the convention is met in the longer term and the health of the chemical weapons disarmament and non-proliferation regime in general.

In this issue of *Disarmament Forum*, experts weigh in with proposals and recommendations for the Review Conference and the post-conference period, discussing specific concerns such as universality, verification, transparency, the general purpose criterion, developments in non-lethal weapons, and institutional issues. A short reference section includes a variety of additional reading on this topic.

Against the background of unresolved missile defence and missile non-proliferation issues, increasingly intensive use of space technologies, and lack of progress on PAROS in the Conference on Disarmament, the first issue of *Disarmament Forum* in 2003 will focus on the prevention of the weaponization of outer space. The Institute, in cooperation with Project Ploughshares and the Simons Centre for Peace and Disarmament Studies, recently hosted the seminar *Outer Space and Global Security*. Over 150 participants discussed the current and future uses of outer space, as well as measures to preserve space for peaceful purposes. A meeting report will be published by UNIDIR. With these activities and publications, UNIDIR hopes to encourage the renewed interest in outer space issues.

In cooperation with the Centre for Humanitarian Dialogue and the United Nations Department for Disarmament Affairs, UNIDIR hosted the meeting *Disarmament, Health and Humanitarian Action: Putting People First*, on 7 November. The meeting offered an opportunity for disarmament experts and the humanitarian action community to discuss where disarmament and health issues intersect and how they contribute to overall human security. This was the third meeting in the annual Disarmament as Humanitarian Action series.

In response to widespread concerns about how to respond to the threat of nuclear terrorism, radiological weapons and 'dirty bombs', UNIDIR hosted the conference *International Cooperation in the Combat against Nuclear Terrorism and the Role of Nuclear Arms Control* on 17–18 December 2002. Jointly organized by UNIDIR, Peace Research Institute Frankfurt, and Germany's Federal Foreign

Office in Berlin, the meeting analysed the potential threat and technical capacities of terrorists, and how arms control, verification and transparency can combat these threats. A forthcoming issue of *Disarmament Forum* will also address this topic.

UNIDIR has several new publications. *Project Coast: Apartheid's Chemical and Biological Warfare Programme* by Chandré Gould and Peter Folb, offers a meticulous account of South Africa's clandestine chemical and biological warfare programme under apartheid and serves as a reminder of the perennial dangers of proliferation in the absence of adequate international controls.

Also recently published are *Le Conseil de sécurité à l'aube du XXIème siècle : quelle volonté et quelle capacité a-t-il de maintenir la paix et la sécurité internationales* ? by Pascal Teixeira and *The Costs of Disarmament—Rethinking the Price Tag: A Methodological Inquiry into the Costs and Benefits of Arms Control* by Susan Willett. Book excerpts are available on our website (www.unidir.org).

You'll find a new feature in this issue of *Disarmament Forum*: UNIDIR Focus. In each issue, one activity will be highlighted, outlining the project's methodology, recent developments in the research or project outcomes. UNIDIR Focus will also present a detailed description of a new publication of the Institute. Of course, you can find descriptions and contact information for all of the Institute's present and past activities online, as well as sample chapters of publications and ordering information.

We would like to thank all of our readers who have taken the time to comment on our new web site. Your feedback and suggestions have been both helpful and encouraging. We invite you to explore our site, read or download articles from *Disarmament Forum*, search our publication and activities databases, comment on our 'roundtable' papers, and subscribe to UNIDIR Highlights so you will be notified by email when the latest issue of *Disarmament Forum* is online!

We share with you our hopes for a more peaceful and secure 2003.

Kerstin Vignard

The first CWC Review Conference: taking stock and paving the way ahead

Alexander KELLE

When the Chemical Weapons Convention (CWC) entered into force on 29 April 1997 it marked the beginning of a new era of multilateral arms control and disarmament: the CWC is the first multilateral agreement that prohibits a class of weapons of mass destruction, provides for the verification of the elimination of the weapons, and creates a new international body, the Organisation for the Prohibition of Chemical Weapons (OPCW), to oversee the implementation of all the CWC's provisions.[1]

Since the CWC's entry into force much has been achieved in regards to setting up the OPCW and implementing the core provisions of the convention. Almost 150 states have ratified or acceded to the CWC, four of these have declared actual stocks of chemical weapons (CW), and destruction of different types of CW has begun in all possessor states. Likewise, the non-proliferation dimension, i.e. the horizontal spread of CW to countries that did not previously possess them, has been put into effect through a large number of routine inspections—conducted by the Technical Secretariat of the OPCW. Furthermore, OPCW states parties have held seven Conferences of the States Parties (CSP), which according to Article VIII, paragraph 20 of the CWC are tasked with reviewing the operation of the convention.

As the CSP annually reviews the operation of the convention, one might ask what is the unique role of the Review Conference. The CWC contains two provisions that relate directly to the Review Conference scheduled to take place from 28 April to 9 May 2003. According to Article VIII, paragraph 22:

> The Conference shall no later than one year after the expiry of the fifth and the tenth year after the entry into force of this Convention, and at such other times within that time period as may be decided upon, convene in special sessions to undertake reviews of the operation of this Convention. Such reviews shall take into account any relevant scientific and technological developments. At intervals of five years thereafter, unless otherwise decided upon, further sessions of the Conference shall be convened with the same objective.

In addition, Part IX, paragraph 26 of the Verification Annex contains a requirement that:

> At the first special session of the Conference convened pursuant to Article VIII, Paragraph 22, the provisions of this Part of the Verification Annex shall be re-examined in the light of a

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> comprehensive review of the overall verification regime for the chemical industry (Article VI, Parts VII to IX of this Annex) on the basis of the experience gained. The Conference shall then make recommendations so as to improve the effectiveness of the verification regime.

It follows from these stipulations that the Review Conference cannot but be grounded in a thorough review and assessment of the first five years of the OPCW's operation. At the same time, it must not be allowed to stop at this point. Rather, participants in the Review Conference must venture to answer how the review process translates into action for the next five-year period.

A number of important issues for the first Review Conference have already been identified.[2] Four of these topics will be covered in depth by other authors in this issue of *Disarmament Forum*: the review of the CWC's verification system,[3] the question of universality in the CWC's membership,[4] the scientific and technological developments of relevance to the CWC,[5] and the development of the OPCW Technical Secretariat.[6]

The remainder of this article will give an overview of a few other issues which are of relevance for the effective implementation of the CWC and thus are likely to be subject to assessment during the Review Conference. These are: CW disarmament, international cooperation and assistance, export controls and controls on the transfers of scheduled chemicals to non-states parties, and transparency and accountability. It concludes with a brief outlook of the interim period between the first and second CWC Review Conferences.

Chemical weapons disarmament

The review of disarmament obligations undertaken by states parties will have to start with the CW declarations, CW-related facilities, and the submission of destruction plans. On the positive side one has to note that four states parties have declared the possession of CW stockpiles at thirty-three locations. Before these declarations were made, only the United States of America and the Former Soviet Union/Russia had officially acknowledged CW stocks, but not India or the Republic of Korea. Eleven states parties have declared a total of sixty-one current or past CW production facilities.[7] Nine states parties have declared possessing old chemical weapons, and three have declared to have abandoned CW on their territory.[8]

These declarations formed the basis for inspections of CW-related facilities and sites at which old or abandoned CW are stored. Although most of the CW-related inspections were conducted without major problems, there are three areas of concern which might still have an impact on the review process.

First, compliance with the destruction deadlines spelled out in the CWC is more than questionable. The delays in the Russian CW destruction efforts may well be just the tip of the iceberg. The timely completion of the American destruction programme can no longer be taken for granted and the Republic of Korea was given an extension of one of the intermediate destruction deadlines during the seventh session of the Conference of the States Parties in October 2002.[9]

The second area of concern relates to the budgeting and late reimbursement to the OPCW of verification costs by CW possessor states. Delays in reimbursement substantially contributed to the organization's financial crisis in the first half of 2001. The success of the measures taken to address the underlying problems remains to be seen.[10] There appear to be differing views among the CW possessors as to the best way to tackle the reimbursement problem: will a quicker reimbursement suffice, or should CW possessors make a payment to the OPCW before the actual invoicing is done? Thus, the Review Conference might not be able to just take note of the financial crisis as a 'historic' event, but instead will find substantial issues left to be addressed.

Lastly, the question of conversion requests for CW production facilities might come up at the Review Conference. Certainly, some states parties perceive the high number of such requests to run counter the letter and the spirit of the convention, which stipulates conversion requests as the exception, not the rule. It remains to be seen whether the adoption of positive decisions on Russian conversion requests during the last CSP actually settles the matter.

CW disarmament is one of the cornerstones of the CWC, yet intermediate deadlines are being moved back and even the deadline for the eventual elimination of all CW stocks is no longer sacrosanct. A renewed commitment by all parties involved is clearly required. A special responsibility, however, falls on the CW possessor states who will have to carry the largest part of the burden and cannot expect to externalize their responsibility onto the community of all CWC states parties.

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International cooperation and assistance

The OPCW Technical Secretariat has divided its implementation of CWC Articles X and XI into three categories. First, to provide and coordinate assistance and protection in the event that a state party falls victim to chemical weapons. Second, to promote economic and technological development in the peaceful uses of chemistry and cooperation with other international organizations with related mandates. Third, to support the National Authorities of states parties in their efforts to implement the convention at the national level—including through the provision of legal assistance in the drafting of implementing legislation.

The Technical Secretariat runs workshops, seminars, training sessions, conferences and convenes expert-level meetings on the various aspects of international cooperation and assistance. It also coordinates the offers made by states parties under Article X, which take the form of contributions to a voluntary fund for assistance or offers of equipment and/or personnel on a bilateral or unilateral basis. However, despite the fact that the convention requires states parties to make declarations to the Technical Secretariat of their national programmes related to protective purposes and to offer assistance in some form, a minority of states parties has done so to date. So far, no request has been made to the OPCW for assistance against the use or threat of use of CW.

In addition to conducting training courses, the OPCW has held seminars and workshops worldwide for National Authority staff, medical personnel and inspectors. The Technical Secretariat has established a database of laboratory equipment, facilitated bilateral cooperation agreements, assisted in the drafting of implementing legislation, set up an expert-level protection network, and sought to conclude cooperation agreements with such organizations as the World Customs Organization and the United Nations Office for the Coordination of Humanitarian Affairs. In October 2001 the Technical Secretariat released a paper detailing the 'assistance response system', a strategic concept for the provision of emergency assistance in response to deliberate or accidental use of CW. In addition, it has published papers on its web site outlining the role and capabilities of the OPCW in preventing, responding to and combating CW use by terrorists.[11]

International cooperation and assistance activities of the OPCW have received a considerable boost with the recent budgetary increases. However, this was one of the areas which suffered considerably during the financial impasse and therefore lost ground has to be regained with respect to international cooperation and assistance efforts of the OPCW.[12]

Export controls and transfers of scheduled chemicals

Controls on the transboundary movement of scheduled chemicals to non-states parties come in the form of a layered transfer regime, as spelled out in different parts of the CWC's Verification Annex. Accordingly, trade in Schedule 1 chemicals with non-states parties is prohibited altogether.[13] For Schedule 2 chemicals there was a three year grace period starting at entry into force for trade in these items.[14] For Schedule 3 chemicals, the CSP had five years after entry into force to decide whether trade in these chemicals should continue with the reporting requirements foreseen in the CWC.[15]

One of the key elements established in Parts VII and VIII of the Verification Annex concerns the requirement for end-use certificates when trading with non-states parties. Yet, the type and issuing authorities of these certificates were hotly contested among states parties for quite some time. Although the matter was solved on paper during the third session of the CSP, the degree to which the agreement is actually implemented is still viewed as questionable by some states parties.

Similarly, although the procedures for trade in Schedule 3 chemicals have been hammered out in a number of steps, with the latest decisions adopted at the seventh session of the CSP, these decisions have yet to be implemented. The fact that states parties have allowed themselves until the beginning of 2004 to begin implementing the most recent decisions is not going to help create a 'level playing field' soon.[16]

Related to the CWC transfer regime is a debate on the appropriateness for OPCW states parties to maintain other export control regimes for trade among themselves. Criticism in this regard is directed against the existence of an informal group—the so-called Australia Group—of thirty-two industrialized states, all states parties to the CWC, who continue to coordinate their export control policies independently of the convention. Critics of the Australia Group contend that these actions contravene the spirit of the convention and its goal of promoting free trade and international development. At the third session of the CSP at the end of 1998, some countries of the Non-Aligned Movement brought up the issue of export control mechanisms outside the CWC. The Conference tasked the Executive Council with consideration of the matter; it has remained an item on its agenda ever since. It should not come as a surprise if this issue is brought up again during the first Review Conference.

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The unsatisfactory state of affairs from the point of view of some CWC states parties becomes clearer if one considers the position taken by the Australia Group during the endgame of the CWC negotiations: the then Australian ambassador to the Conference on Disarmament announced that the Australia Group would review its operation in light of CWC implementation. Implicit in this statement was the possibility that CWC states parties in good standing could receive preferential treatment in terms of the transfer of scheduled chemicals. After the terrorist attacks of late 2001 in the United States, the trend seems to point in the opposite direction. This is not to argue that the Australia Group should start dissolving; rather it is a call to revisit its promise to review its operation in light of CWC implementation. The first CWC Review Conference might present a good opportunity for the presentation of the results of such a reconsideration.

Transparency and accountability

One other important set of issues for the Review Conference that—predictably, one might say—has not featured prominently on the agenda of those preparing the Review Conference revolves around

questions of transparency and accountability of the OPCW vis-à-vis civil society. As someone who has followed the implementation of the CWC from its very beginning, the author clearly remembers the fight for every single conference document during the first three regular sessions of the CSP. It is understandable that it was a new international organization that needed time to get established and whose staff was not primarily employed to service NGOs, civil society groups or academics. Yet one would have hoped that states parties had realized by now—more than five years later—that those interested parties who continue to follow the activities of the OPCW are concerned with seeing the goals embodied in the CWC realized and try to make a meaningful contribution to this end. Indeed, the invitation issued by the chairman of the OPCW's Executive Council in 2002 for NGOs to submit written contributions to the organization seemed to signal just that. It was greeted by the NGO community as the beginning of a new phase in the OPCW's relationship with civil society. However, looking at the current practice of not making available the reports of the working group that is preparing for the Review Conference, one wonders whether such a new era is really imminent or whether—quite to the contrary—one is back in square one of OPCW public relations as it was prevalent during the organization's operation in 1997–1998.

Conclusion—the first Review Conference and the way ahead

Much has been achieved in implementing the CWC in its first five years, the financial crisis of 2001 seems to have been overcome and the leadership change in the Technical Secretariat in the first half of 2002 appears to have resulted in a more positive atmosphere within the OPCW. But states parties must not be complacent with the current state of affairs, as it still lags far behind an optimal performance of the OPCW and its states parties.

The tendency towards complacency manifests itself in two forms, which in all likelihood will also account for the fact that the Review Conference will not tackle the concerns identified in this issue of *Disarmament Forum* in their entirety. First, time constraints will seriously undermine the most effective outcome of the Review Conference. This constraining factor will affect both the preparation of the Review Conference and its actual conduct. As a report of a workshop held in mid-2002 involving both governmental representatives and NGOs noted, 'the states parties do not yet seem engaged or interested in the review process.'[17] As many national bureaucracies have to deal with both chemical and biological weapons issues, it is safe to assume that this attitude has changed only very recently, if at all, after the conclusion of the fifth Biological Weapons Convention Review Conference. This considerably limits the time available for agreeing on the outcomes of the CWC review. If however, as a number of observers have already urged, there is no 'pre-cooked' agreement on the issues and goals of the Review Conference, the likelihood is decreasing that a meaningful outcome will be achieved during the two-week conference, which commands a wide-ranging consensus among CWC member states.

In light of the past performance of both the CSP and the Executive Council and the 'culture of deferral' that one could notice with respect to decision-making by these two bodies, expectations should not be raised too high for what can realistically be achieved at the Review Conference.

Here, the second factor comes into play: the political will by states parties to take on the difficult issues and to compromise in order for consensus to be reached. In light of the past performance of both the CSP and the Executive Council and the 'culture of deferral' that one could notice with respect to decision-making by these two bodies, expectations should not be raised too high for what can realistically be achieved at the Review Conference.

As a result, the most likely outcome of the first CWC review is that in the five-year period leading to the second Review Conference, a two-track strategy will have to be pursued: the first track will

encompass CWC implementation as foreseen by the convention text, while on the second track the CWC control regime will have to be adapted to the evolving 'real world', which the CWC tries to govern.

Related to this second track, the biggest challenge to the CWC's continued relevance to CW controls is presented by technological developments that go well beyond the question of so-called non-lethal weapons, as discussed in the article by Malcolm Dando in this issue of *Disarmament Forum*. A report that was recently produced by the International Union of Pure and Applied Chemistry (IUPAC) identifies six technical challenges to the CWC, all of which are related to the non-proliferation dimension of the CWC, and none of which is likely to be addressed comprehensively by the first Review Conference.[18]

Thus, during the first inter-review period the OPCW and its states parties will have to accomplish nothing less than walking the tightrope between traditional CW controls on one hand and coming to terms with the challenges posed by the merger of modern biotechnology and chemical synthesis on the other.

This will be made even more difficult as this latter task falls into the 'grey area' between the chemical and the biological realm. Consequently, those who were critical of the BWC Protocol negotiations and instrumental in their failure can be expected to object anything that looks like compensating for the lack of control mechanisms in the biological weapons field through expansion of activities under the CWC. Yet, the case can be made convincingly that these new technologies already fall under the CWC's general purpose criterion (GPC). What is needed therefore is a mechanism to agree on the practical rules and procedures to implement the GPC in the evolving scientific and technological environment. Whether this can be achieved through the reorientation of the current system of routine inspections (as described by Daniel Feakes in his contribution to this issue) is uncertain and merits further analysis.

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Therefore the Review Conference could task the OPCW's Scientific Advisory Board (SAB)—through the Director-General of the Technical Secretariat—to analyse the adaptability of the routine inspection system to the technological challenges identified in the IUPAC report and make recommendations on specific measures to be submitted to the 2004 CSP. Alternatively, the Executive Council might be tasked to set up an open-ended working group on this issue for which states parties could nominate technical experts. However, as a usable structure in the form of the SAB already exists, and this second option therefore amounts to a duplication of available infrastructure, it is less desirable. In light of the fast pace of scientific and technological progress, deferring the issue to be reconsidered by the second Review Conference in 2008 cannot be considered an option.

Notes

1. See Michael Bothe, 1998, The Chemical Weapons Convention: a general overview, in M. Bothe, N. Ronzitti and A. Rosas (eds), *The New Chemical Weapons Convention—Implementation and Prospects*, The Hague, Kluwer Law International, pp. 1–15.
2. This process found its expression within the OPCW through the establishment of an open-ended working group on preparations for the Review Conference in late 2001. This working group has gone about creating a formal framework and guidelines for the review process. It has also identified nine substantive clusters of issues that could structure the Review Conference. On the details of this see Pamela Mills, 2002, *The First Review Process of the*

Chemical Weapons Convention, an Update, paper presented at the 17th Pugwash CBW Workshop 'The Impending First CWC Review', Oegstgeest, The Netherlands, 15–16 June.

3. See the contribution of Daniel Feakes, 'Evaluating the CWC verification system', on page 11.
4. See the contribution of Jean Pascal Zanders, 'The Chemical Weapons Convention and universality: a question of quality over quantity?', on page 23.
5. See the contribution of Malcolm Dando, 'Scientific and technological change and the future of the CWC: the problem of non-lethal weapons', on page 33.
6. See the contribution of Maurizio Barbeschi, 'Organizational culture of the OPCW Secretariat', on page 45.
7. These states parties are Bosnia and Herzegovina, China, France, India, Iran, Japan, Republic of Korea, Russia, United Kingdom, United States, and the Federal Republic of Yugoslavia.
8. The nine old CW possessors are Belgium, Canada, France, Germany, Italy, Japan, Slovenia, United Kingdom and United States, while China, Italy and Panama have declared abandoned CW on their territory.
9. See *Decision: Request by a State Party to Grant An Extension of its Obligation to Meet the Intermediate Phase 2 Deadline for the Destruction of Category 1 Chemical Weapons Stockpiles*, OPCW Document C-7/Dec.4 of 11 October 2002, available at <http://www.opcw.org/html/global/docs_frameset.html>.
10. For a more detailed account of the financial difficulties and the proposed remedies see A. Kelle and P. Mills, in press, The Chemical Weapons Convention—Its Scope and Application, in M. Chevrier et al. (eds), *Implementation of the Protocol to the Biological Weapons Convention*, Amsterdam, IOS Press.
11. See *Initial Considerations Regarding the OPCW's Contribution to the Global Struggle Against Terrorism*, OPCW Document S/277/2001 and *Possible Responses to Global Terrorist Threats*, OPCW Document S/292/2002. Both available at < http://www.opcw.org/html/global/docs_frameset.html>.
12. According to the press release issued after the conclusion of the seventh CSP, the international cooperation and assistance budget increase for 2003 amounts to 12.4% over the 2002 budget, compared to an overall increase of around 10%. See *Seventh Session of the Conference of the States Parties to the Chemical Weapons Convention Concludes*, OPCW Press Release Number 65, The Hague, 15 October 2002, available at < http://www.opcw.org/html/global/docs_frameset.html>.
13. See Verification Annex, Part VI, paragraph 3, available at <http://www.opcw.org/html/db/cwc/eng/cwc_frameset.html>.
14. See Verification Annex, Part VII, paragraph 31, available at <http://www.opcw.org/html/db/cwc/eng/cwc_frameset.html>.
15. See Verification Annex, Part VIII, paragraph 27, available at <http://www.opcw.org/html/db/cwc/eng/cwc_frameset.html>.
16. See *Decision: Guidelines Regarding Declarations of Aggregate National Data for Schedule 2 Chemical Production, Processing, Consumption, Import and Export and Schedule 3 Import and Export*, OPCW Document C-7/Dec.14 of 10 October 2002, available at <http://www.opcw.org/html/global/docs_frameset.html>.
17. See the report of Pugwash Meeting no. 270 on 'The Impending First CWC Review', written by Pamela Mills, June 2002, available at <http://www.pugwash.org/reports/cbw/cbw17.htm>.
18. See International Union of Pure and Applied Chemistry, 2002, *Impact of Scientific Developments on the Chemical Weapons Convention*, November, available at <http://www.iupac.org/reports/2002/Report-to-OPCW.pdf>.

Evaluating the CWC verification system

Daniel FEAKES

When the first Review Conference of the Chemical Weapons Convention (CWC) convenes in April-May 2003, the CWC verification system will be one of the primary items on its agenda. The convention requires this first Review Conference to undertake a 'comprehensive review of the overall verification regime for the chemical industry' and to 'make recommendations so as to improve the effectiveness of the verification regime', thereby ensuring both a retrospective analysis of CWC implementation since 1997 and consideration of future possibilities. In addition, the Executive Council's open-ended working group on preparations for the Review Conference has identified 'verification in general' as one of nine substantive areas for consideration by the Conference.

The *Oxford English Dictionary* defines verification as 'the action of demonstrating or proving to be true or legitimate by means of evidence or testimony'. This definition, although focused on the function of verification as a provider of *evidence*, already hints at the complexity inherent in verification. While it is most frequently associated with proving the compliance or non-compliance of a state, verification also provides an opportunity for a state to demonstrate its compliance when suspicions are raised, thus also serving a *reassurance* function. MacEachin identifies the 'defining objective' of on-site verification as denying 'a potential treaty violator the means for concealing proscribed programmes under the cover of legitimate activities' thus highlighting a third function of verification, namely *deterrence*.[1] A Group of Qualified Governmental Experts appointed by the United Nations Secretary-General added a further element in its 1995 report, stating that 'verification can be generically defined as a process in which data are collected, collated and analysed in order to make an informed judgement as to whether a party is complying with its obligations.'[2] This definition introduces the concept of verification as a *process*, ideally a cooperative one.[3]

The CWC verification system is based on the monitoring of compliance with CWC obligations on two levels—national and international—with each supported by a number of mutually reinforcing elements. At the international level, the system rests on three such elements—declarations, routine inspections and challenge inspections. The elements at the national level are much less clearly defined in the CWC but at least three can be identified—implementing legislation, data collection and the National Authority. Integral to both levels of the verification system, as it is to the CWC itself, is the general purpose criterion (GPC). The CWC verification system incorporates a process that begins with national and international monitoring and that could feasibly end with an 'informed judgement' by states parties that one of their number is in violation of its CWC obligations. In such a situation, it will be up to the states parties to decide how to respond and how to enforce compliance.

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A two-tiered verification system

At the international level, the CWC establishes the Organisation for the Prohibition of Chemical Weapons (OPCW) to 'ensure the implementation of its provisions, including those for *international* verification of compliance with it' [emphasis added]. The convention therefore details the requirements for states parties to collate and submit information to the Technical Secretariat on activities with certain toxic chemicals and precursors (primarily those listed in the three schedules annexed to the convention) and the procedures by which the Secretariat validates this information and reports any ambiguities. Besides submitting information on any activities involving toxic chemicals for prohibited purposes, states parties are also required to submit information on legitimate activities involving the production, processing, consumption and transfer of scheduled chemicals. As the most visible tier of the verification system, many states parties and commentators concentrate almost exclusively on this international level in their assessments.

However, considering the extremely broad objectives and detailed obligations in the CWC, the verification system extends much further than this limited conception. As Robinson writes: 'It would be an error to regard responsibility for CWC verification as lying solely with the Technical Secretariat'.[4] While the procedures contained in the convention are very elaborate, they do not and cannot cover monitoring of all the obligations with which states parties must comply. This is in part because some obligations are negative ones—it would be almost impossible for the Secretariat to monitor compliance with these obligations. But it is also due to the limitations placed on international monitoring by the CWC. The Secretariat is required to 'carry out the verification measures provided for' in the convention but as already noted these apply mainly to the families and species of chemicals listed in the three schedules and not to the millions of other toxic chemicals and precursors. In addition, as a recent report notes, 'some States Parties have sought to restrict the applicability of the CWC to scheduled chemicals only'.[5]

The negotiators of the convention never intended that its scope be limited only to scheduled chemicals, which is one reason why they incorporated a GPC that defines all toxic chemicals and precursors as chemical weapons unless 'intended for purposes not prohibited under this Convention, as long as the types and quantities are consistent with such purposes'. The definition of a chemical weapon also includes munitions, devices and specifically designed equipment. Using this extremely broad definition of a chemical weapon, it is clear that the procedures set out in the CWC are not sufficient to allow the Secretariat to monitor compliance with the Article I obligations not '(a) To develop, produce, otherwise acquire, stockpile or retain chemical weapons, or transfer, directly or indirectly, chemical weapons to anyone; (b) To use chemical weapons; (c) To engage in any military preparations to use chemical weapons; (d) To assist, encourage or induce, in any way, anyone to engage in any activity prohibited to a State Party under this Convention.' Considered as the convention's 'catch-all clause', these obligations can be interpreted as prohibiting, for example, the transfer of equipment or financial or technical assistance to a chemical weapons programme.[6]

This raises the question of how compliance with these obligations is to be monitored to the satisfaction of other states parties. Any answer to this question has at its core the GPC. One possible solution would be for states parties to give the Secretariat a greater role in the operationalization of the GPC. In some respects, this has already begun with states parties being required to declare 'other chemical production facilities' (OCPFs) using certain unscheduled chemicals, which the Secretariat can then inspect. A recent report recommends that 'States Parties should grant the [Technical Secretariat] the right in principle to collect information of relevance to the functioning of the CWC. … Information collection will also be a cornerstone of making the [general purpose criterion] operational.'[7] However, there are a number of obstacles to this approach, not the least of which is the states parties that seek

to limit the applicability of the CWC to scheduled chemicals. States parties, and the chemical industry, would also be reluctant to accept the degree of scrutiny necessary. For states parties, this is partly because much monitoring of the GPC is undertaken by intelligence agencies, making them reluctant to share information internationally.[8] In addition, states parties are not required to report transfers of unscheduled chemicals and the sampling equipment used by the Secretariat is currently limited to only detect the presence or absence of scheduled chemicals.

Instead, the CWC creates a division of labour between the Secretariat and the states parties under which much of the responsibility for monitoring compliance with CWC obligations actually lies with the states parties.[9] It has been noted that 'the routine verification system operated by the OPCW Technical Secretariat does not monitor compliance with all the obligations that states parties have assumed under the Chemical Weapons Convention. In fact the Secretariat monitors only a small fraction.'[10] Mention of this national level of the verification system is made in Article VI: 'Each State Party shall adopt the necessary measures to ensure that toxic chemicals and their precursors are only developed, produced, otherwise acquired, retained, transferred, or used within its territory or in any other place under its jurisdiction or control for purposes not prohibited under this Convention.' In order for national monitoring to adequately play its part in the verification system, it is necessary for states parties to have enacted comprehensive implementing legislation incorporating the GPC and to have a knowledgeable National Authority empowered to collate the data necessary to monitor national compliance with the Article I obligations. It is the role of the Secretariat to support these efforts and to validate the portions of the data that National Authorities are required to submit.

The regime of national monitoring

The national level of the verification system has been described as 'not widely acknowledged or even appreciated.'[11] However, considering the monitoring tasks that fall to the national rather than the international level, effective national monitoring is essential to the future well-being of the CWC. The Review Conference should acknowledge this fact and devote much of its time to reviewing the effectiveness of the elements that make up the regime of national monitoring and recommending ways to improve them.

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National implementing legislation

Integral to the regime of national monitoring is effective and comprehensive implementation of the CWC in each state party. Article VII requires each state party to 'adopt the necessary measures to implement its obligations under this Convention.' Among these obligations are those from Articles I and VI quoted above, which require that the GPC be incorporated into national law. A state party will neglect its obligation not 'to develop, produce, otherwise acquire, stockpile or retain chemical weapons, or transfer, directly or indirectly, chemical weapons to anyone' if it enacts legislation that only prohibits and punishes activities with scheduled chemicals. Current concern about international terrorism and weapons of mass destruction provides another incentive for states parties to enact comprehensive legislation since terrorists cannot be expected to use only scheduled chemicals. States parties with incomplete implementing legislation risk becoming 'safe havens' within which individuals may not be deterred from producing and using unscheduled chemicals as weapons. These concerns have also focused attention on measures to track the domestic transfers of toxic chemicals.[12] However, it remains

that many states parties have not enacted any implementing legislation, let alone legislation incorporating the GPC.[13] Others lack regulations governing the import and export of scheduled and unscheduled chemicals. This situation has wider repercussions as 'the individual quality of national implementation has an effect on the overall quality of international implementation.'[14] The Secretariat and some states parties have already devoted much time and effort to assisting other states parties in drafting implementing legislation. The Review Conference should assess the responses to the implementing legislation questionnaires issued by the Secretariat, particularly with a view to implications for the national monitoring of compliance.[15] It could perhaps also recommend minimum standards to which all states parties should aspire in their legislation.

National Authorities

In addition to enacting comprehensive implementing legislation, each state party is required to designate or establish a National Authority to which the CWC assigns two primary tasks: 'to fulfil [the state party's] obligations under this Convention' and to 'serve as the national focal point for effective liaison with the Organisation and other States Parties.' The National Authorities are therefore 'responsible for monitoring compliance with each of the obligations that their states have assumed, including those where the OPCW Secretariat has no treaty-assigned role.'[16] This might surprise those National Authorities that have not yet managed to collate and submit to the Secretariat the information required by Articles III and VI. By the end of 2001 only 111 of 145 states parties had provided information on their National Authorities to the Secretariat.[17] In many ways, the National Authorities are the guardians of the regime of national monitoring. If they are neglected, the resultant loopholes that will develop at the national level will undermine the overall verification system. The importance of the National Authorities has been recognized by the Secretariat, which offers a range of implementation support programmes and training courses. The Secretariat also hosts an annual meeting for all National Authorities and assists in regional meetings of National Authorities. The Review Conference should reiterate the importance of the National Authorities to the overall verification system and should identify implementation support as one of the priorities for the next five years.

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Data collection

The implementing legislation adopted by each state party must also make provision for the collection of data by the National Authority, if necessary providing it with new powers whereby the data can be acquired in order to ensure there are no activities in violation of CWC obligations on its territory and so it can provide the required declarations to the Secretariat. Here again it is absolutely vital that the GPC be fully incorporated. By collecting data only on activities with scheduled chemicals a state party might fulfil its reporting requirements to the Secretariat but how would it be able to ensure that unscheduled toxic chemicals and precursors are 'only developed, produced, otherwise acquired, retained, transferred, or used within its territory or in any other place under its jurisdiction or control for purposes not prohibited under this Convention'? And how would such a state party deal with newly discovered toxic chemicals that were not listed in the CWC schedules? Another function of the GPC is to protect the CWC from obsolescence caused by scientific and technological advances. Current advances in chemistry and biology could lead to the discovery of new toxic chemicals and more efficient methods of production.[18] States parties therefore need to be aware of such developments

and National Authorities need to be equipped and authorized to monitor them.[19] The Review Conference should encourage states parties to be proactive in the collection of CWC-relevant data and should recommend that the Secretariat devotes more resources to providing them with technical assistance and evaluation, including 'evaluation of scheduled and unscheduled chemicals', as required by Article VIII. It will be essential that the Review Conference reaffirms the scope and applicability of the GPC as the CWC explicitly states that the Review Conference should 'take into account any relevant scientific and technological developments.'

The regime of international monitoring

While the regime of national monitoring covers a large number of CWC obligations but is barely mentioned in the convention, the regime of international monitoring covers a much smaller set of obligations but features heavily in the convention. This is not surprising; the negotiators of the convention would have been reluctant to dictate the actions states were required to take at the national level but were less hesitant in drafting international mechanisms to oversee national monitoring.

Declarations

The 'baseline' of international monitoring is the subset of the data collected by each National Authority, which is then submitted to the Secretariat in the form of initial and annual declarations. Under Article III, states parties are required to declare any possession of chemical weapons or related facilities since 1946. Under Article VI, they are required to submit information on industrial activities with scheduled chemicals, including aggregate data on transfers, and on activities with unscheduled 'discrete organic chemicals' (DOCs). The Secretariat uses the declarations to plan the inspections with which it will validate the information and, at the same time, to build up a picture of activities with scheduled chemicals and DOCs in, and between, states parties and non-states parties.

However, experience with Article VI declarations has demonstrated that some declarations contain ambiguities and some states parties accidentally omit information. The Secretariat has requested clarification of some of the declarations submitted. During 2000, the Secretariat sent 241 clarification requests to eighty-eight states parties but by April 2001 only 46% had been answered and the Secretariat later sent out another 103 such requests.[20] Recently, the Secretariat has used open-source information to identify potentially declarable industrial activities. As of March 2002, the Secretariat had identified such activities in at least forty-four states parties that had not previously declared them.[21] The results of the Secretariat's work have been described as 'modest': three states parties asserted that none of the facilities identified were declarable; three provided incomplete declarations requiring further clarification; five provided new declarations; and three indicated that they would submit declarations in the future.[22] The Review Conference should urge states parties to develop the means to be able to identify declarable activities on their territory and should endorse the use of open-source information by the Secretariat to identify omitted activities.

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As part of the reassurance function of verification, information from national declarations is available, on request, to all other states parties. As of December 2000, only thirty states parties had requested information from the Secretariat on other states parties, although some were in regions of tension such as South Asia and the Balkans—perhaps demonstrating a contribution to confidence-

building in these regions.[23] The states parties requesting this information are typically larger, well-resourced states with the facilities to handle classified data and to analyse it independently alongside publicly available information and data from their own intelligence agencies. This internal transparency mechanism provides an opportunity for states parties to also raise declaration-related ambiguities with their counterparts and to request clarifications. In contrast to clarification requests from the Secretariat, Article IX stipulates that requests from states parties should be answered within ten days. The United States has publicly stated that it has used this procedure on a number of occasions, with success in several cases.[24] If unsatisfied with the response it receives, a state party can take its concerns to the Executive Council although the opacity of the Council's deliberations means that it is not clear whether any state party has availed itself of this opportunity. If still unsatisfied, a state party can request a challenge inspection although none has yet done so.

The aggregate data submitted by states parties on transfers of scheduled chemicals should in theory be an integral part of the regime of international monitoring, allowing the Secretariat to monitor the global movement of scheduled chemicals and to identify suspicious transfers or trends. However, in practice the system has failed to live up to expectations. Individually, many states parties simply do not have regulations in place to allow them to collate the required data, while collectively there is little harmonization of reporting criteria between states parties. As a result of these and other factors, the Secretariat has noted that the vast majority of transfers are irreconcilable, negating the use of this information as a non-proliferation tool.[25] Apart from some information collected during Schedule 2 inspections, the Secretariat has no way of verifying the accuracy of the data submitted. States parties are additionally prohibited from importing or exporting Schedule 1 or 2 chemicals to states not party to the convention and exports of Schedule 3 chemicals to non-states parties need an end-use certificate confirming that the chemicals will not be used for prohibited purposes or re-transferred. However, the CWC fails to provide for any international monitoring of compliance with these prohibitions or of end-use certificates. The Review Conference should encourage the current efforts between the Secretariat and states parties to improve the accuracy of the aggregate data and should consider ways to increase harmonization of criteria between states parties. The Conference could also consider ways for the Secretariat to validate aggregate national data as it validates initial and annual declarations and for it to have a role in monitoring compliance with the provisions on transfers of scheduled chemicals.

The Review Conference should encourage the current efforts between the Secretariat and states parties to improve the accuracy of the aggregate data and should consider ways to increase harmonization of criteria between states parties.

Routine inspections

The Secretariat uses routine inspections to validate the information submitted by states parties in their initial and annual declarations. Routine inspections are also intended to act as a deterrent to any state party considering operating a covert chemical weapons programme within its civilian industry.[26] Inspections of chemical weapons facilities are intended to verify declarations of weapons stockpiles and the non-production of chemical weapons and to monitor destruction. Inspections of industrial plants are designed to confirm the non-production of Schedule 1 chemicals and the non-diversion of other scheduled chemicals to weapons programmes.

To date, 'verification has concentrated on monitoring the destruction of existing chemical weapons stockpiles, rather than on detecting illegal new production.'[27] For example, inspections of chemical weapons facilities accounted for approximately 85% of the OPCW's total verification spending in 2001. This imbalance is due mainly to an interpretation of the CWC that emphasizes the physical presence of inspectors at destruction facilities rather than the use of remotely operated on-site

instruments. Also contributing to the imbalance is the artificial capping of the number of industry inspections per year at 132 since 2000 despite the fact that, since 1999, twenty-six new states parties have joined the CWC and almost 4,000 new facilities became inspectable for the first time in 2000. In addition, financial problems have resulted in the Secretariat being unable to even conduct 132 industry inspections annually; during 2001 it only carried out 57% and is expecting to carry out 60% in 2002.[28] Some states parties and commentators are therefore now asking whether the current resource allocation is the best way to achieve the CWC's objectives.[29] With declared chemical weapon stockpiles under strict monitoring and gradually being destroyed, threats in the medium to long term are more likely to emerge from the misuse of scientific and technological developments by either states or non-state actors. In addition 'there is no implication in the CWC that at any stage industry verification should be a secondary activity to CW destruction verification.'[30] The Review Conference should therefore adopt a two-pronged approach. On the one hand, it should urge much more use of monitoring equipment and smaller inspection teams at destruction facilities. On the other hand, it should also recommend increasing the number of industry inspections per year. As suggested elsewhere, the Review Conference could propose setting annual targets with the aim of reaching a 75:25 ratio between chemical weapon-related and industry inspections by 2006 and making further improvements thereafter.[31]

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Once a decision has been made to allocate additional resources to industry inspections, the Review Conference will need to recommend upon which industrial facilities inspections should be focused. Some states parties argue that the hierarchy elaborated in the CWC means that most attention should be devoted to facilities handling Schedule 1 and 2 chemicals.[32] However, others argue that the modern, flexible plants declared under the CWC as OCPFs that produce unscheduled DOCs pose more of a risk to the convention as they can switch production quickly between chemicals.[33] In the course of the inspections conducted since entry into force, the Secretariat has found that almost all Schedule 1 facilities have no break-out production capability or diversion potential, that most Schedule 2 facilities have little potential to produce Schedule 1 chemicals or to divert Schedule 2 chemicals and that none of the Schedule 3 facilities inspected so far appears able to produce Schedule 1 chemicals. However, of the tiny fraction of declared OCPFs inspected to date, some could produce Schedule 1 chemicals and up to 500 others could have similar potential. The inspection of OCPFs is also important for it reaffirms that the scope of the CWC is not limited to scheduled chemicals and thereby upholds the applicability of the GPC. This debate took place most recently during the drafting of the 2003 budget. A draft prepared by the Secretariat in May 2002 divided the 132 industry inspections 39:93 between plants handling scheduled chemicals and OCPFs. In the end, the budget adopted for 2003 uses a 72:60 ratio reflecting a degree of compromise—but also signalling a significant shift when compared with the 2002 budget, which contained a 100:32 ratio. The Review Conference should endorse the trend expressed in the 2003 budget and should recommend further increases, within an overall increase in the number of industry inspections, to provide a credible deterrent against the misuse of these OCPFs and to afford a degree of international monitoring of the GPC.

Although states parties are entitled to request the information submitted in the declarations of their peers, access to information on the results of the Secretariat's inspection activities is more limited. The final inspection reports drawn up by the Secretariat are confidential communications between it and the inspected state party and can only be transmitted more widely if processed into 'less sensitive forms'. Therefore, much of the regime of international monitoring is conducted bilaterally between the Secretariat and individual states parties without the involvement of other states parties. Most of the time, it is better for issues to be discussed at this technical level rather than being referred to the Executive Council. However, when the Secretariat feels that uncertainties have not been resolved it must inform the Council 'without delay'. In March 2002 for example, the Director-General informed

the Council of remaining uncertainties relating to six inspections.[34] What the Secretariat can provide routinely to other states parties are 'general reports on the results and effectiveness of verification activities', namely the biannual *Verification Implementation Report* issued as a document classified as Highly Protected. A debate on the content and format of these general reports in 1999 saw some states parties arguing for the provision of more information to the Council and others insisting that the information already provided was adequate.[35] The Review Conference should endorse recent moves towards the provision of more inspection-related information to states parties but should discourage states parties from interfering in the bilateral clarifications conducted by the Secretariat. States parties need a degree of access to inspection-related information so as to be able to verify compliance with CWC obligations. While it is the job of the Secretariat to monitor compliance and 'carry out the verification measures' of the CWC, it is the role of the OPCW as a whole, primarily the states parties, 'to ensure the implementation of its provisions, including those for international verification of compliance'.

The Review Conference should endorse recent moves towards the provision of more inspection-related information to states parties but should discourage states parties from interfering in the bilateral clarifications conducted by the Secretariat.

Challenge inspections

The third element of the regime of international monitoring brings together both the national and international levels. Challenge inspections are conducted by the Secretariat, and unlike routine inspections they can only be initiated at the request of a state party. Challenge inspections have been described as a 'safety net' underneath the regime of international monitoring,[36] filling three potential gaps: deterring prohibited activities at undeclared facilities; deterring the abuse of declared facilities; and enabling states parties to demonstrate they have not abused particular facilities.[37] However, the lack of a challenge inspection since the convention's entry into force means that 'it is no longer possible to argue that challenge inspections are a "normal" component of the CWC verification regime.'[38]

Challenge inspections are an essential link between the international and national levels of the CWC verification system. While the regime of international monitoring deals principally with the obligations relating to scheduled chemicals, challenge inspections apply to the full scope of CWC obligations in that 'any facility or location' under the jurisdiction or control of a state party can be inspected to clarify and resolve 'any questions concerning possible non-compliance with the provisions of this Convention'. While the hope is that all states parties will take the necessary measures to monitor compliance at the national level, in practice this is probably not feasible. Instead, it is likely there will always be some states parties without effective and comprehensive legislation or a well-informed National Authority equipped to monitor and enforce national compliance. In this situation, a challenge inspection could be the ultimate form of support from the Secretariat. For example, a challenge inspection, either requested or offered, might be the only way to resolve concerns about a particular facility in a state party that had become a 'safe haven' in which to conduct prohibited activities due to a lack of implementing legislation or a breakdown in the authority of the state. Of course, there could also be states parties that have both effective legislation and a well-informed National Authority but which have decided to operate a covert programme. Particularly if the prohibited activities were being carried out at an undeclared location or using unscheduled chemicals, a challenge inspection might be the only way to ascertain compliance. It is with regard to cases involving unscheduled chemicals that it will be necessary for the Secretariat to be fully aware of the GPC and equipped to detect unscheduled chemicals. Whether a challenge inspection, particularly one in a non-cooperative environment, will detect a 'smoking gun' is debatable but it might 'reveal a pattern of anomalies or discrepancies strongly

indicative of a treaty violation.'[39] When reiterating the importance of challenge inspections, the Review Conference should also highlight their value in demonstrating compliance. It should also emphasize the relevance of the GPC to challenge inspections.

The Secretariat has not yet been called upon to perform a challenge inspection so the Review Conference will not be able to base its assessment on prior experience. Indeed, some states parties and observers have expressed concern at this situation, given the role of challenge inspections in filling gaps in the CWC verification system. As one report states, 'the framers of the CWC anticipated that the routine and challenge inspection mechanisms would interact synergistically, creating a verification system that was stronger than the sum of its parts.'[40] However, the longer challenge inspections remain unused, the weaker this interaction becomes. In addition, as more time goes by without a challenge inspection, the political threshold for requesting one will increase.

Also undermining challenge inspections are public accusations of non-compliance without any subsequent use of one of the three mechanisms provided in the CWC: bilateral consultations, the involvement of the Executive Council or a challenge inspection request. For example, the United States has frequently, outside of CWC structures, accused Iran of operating a clandestine chemical weapons programme.[41] However, despite certain hints of future action, the United States has not requested a challenge inspection in Iran.[42] If the concerns are serious enough to be revealed publicly, surely all possible measures should be taken to resolve them, particularly in the light of the current state of heightened awareness about weapons of mass destruction. Perhaps the biggest concern is the effect that the weakening of the challenge inspection mechanism will have on the other elements of the CWC verification system, since 'the utility of one type of regime is severely reduced—arguably marginalized—if it is not complemented by the other.'[43] To avoid this outcome, the Review Conference should encourage states parties to utilize all the CWC provisions for consultations, cooperation and fact-finding, including challenge inspections, and should recommend that the OPCW conducts at least one realistic practice challenge inspection in a different region every year.

Conclusion

The CWC verification system is the most ambitious of any multilateral disarmament treaty in force today and in many respects its first six years have been a success story. At the international level, the Secretariat has carried out over 1,000 routine inspections accepted by militaries and chemical industries around the world. It has also processed a huge amount of national security and confidential business information, apparently with no significant breaches of its strict classification procedures. At the national level, many states parties have enacted legislation to implement the CWC and enforce its prohibitions. Many National Authorities have a much clearer picture, not just of activities involving scheduled chemicals on their territory, but of activities involving all toxic chemicals and precursors.

The significance of these achievements cannot be understated. Yet there is still more to do and the forthcoming Review Conference provides an opportunity to assess progress and to plan for the future. States parties need to become much more proactive in their monitoring of national compliance with the CWC, in particular with regard to the GPC but also in terms of identifying all activities that need to be declared to the Secretariat. For its part, the Secretariat should strive to find economies in its monitoring of destruction so that it can focus more resources on industry inspections, especially to OCPFs. It is the regime of national monitoring however that could prove to be the verification system's weakest link, so it should be upon issues of national implementation, implementation support, advances in science and technology and the application of the GPC that the Review Conference focuses.

Notes

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2. United Nations document A/50/377 dated 22 September 1995.
3. Allan Krass, 1985, *Verification—How Much Is Enough?*, London, Taylor and Francis; Julian Perry Robinson, 1985, *Chemical Warfare Arms Control: A Framework for Considering Policy Alternatives*, London, Taylor and Francis (SIPRI Chemical and Biological Warfare Studies No. 2).
4. Julian Perry Robinson, 1995, The verification system for the Chemical Weapons Convention, in Hague Academy of International Law, *The Convention on the Prohibition and Elimination of Chemical Weapons: A Breakthrough in Multilateral Disarmament*, Dordrecht, Martinus Nijhoff, p. 490.
5. Stockholm International Peace Research Institute, 2002, *Maintaining the Effectiveness of the Chemical Weapons Convention*, Stockholm, SIPRI.
6. Urs Cipolat, 2000, The new Chemical Weapons Convention and export controls: towards greater multilateralism?, *Michigan Journal of International Law*, vol. 21, no. 3 (Spring), pp. 393–444.
7. SIPRI, *ibid*.
8. Julian Perry Robinson, *Should the First CWC Review address state-party non-compliance with the national implementation provisions?*, paper presented at the 17th workshop of the Pugwash Study Group on the Implementation of the CBW Conventions, The Impending First CWC Review, Oegstgeest, the Netherlands, 15–16 June 2002.
9. Julian Perry Robinson, 1996, Implementing the Chemical Weapons Convention, *International Affairs*, vol. 72, no. 1, p. 80.
10. Daniel Feakes and Julian Perry Robinson, *National implementation measures: role of the OPCW Secretariat*, paper presented at the 15th workshop of the Pugwash Study Group on the Implementation of the CBW Conventions, Approaching the First CWC Review Conference, Oegstgeest, the Netherlands, 23–24 June 2001.
11. *Ibid*.
12. For example, provisions in new British legislation controlling access to dangerous pathogens (the *2001 Anti-Terrorism, Crime and Security Act*) may soon be extended to cover toxic chemicals.
13. More than half of the OPCW member states have not informed the Secretariat of their implementing legislation. Fiona Tregonning, 2002, Progress in The Hague: 39th quarterly review, *The CBW Conventions Bulletin*, no. 57 (September), p. 19, available at <http://www.fas.harvard.edu/~hsp/bulletin/cbwcb57.pdf>.
14. SIPRI, *op. cit.*, p. 10.
15. OPCW document S/194/2000 dated 8 June 2000 and S/308/2002 dated 6 June 2002.
16. Feakes and Robinson, *op. cit.*, p. 2.
17. OPCW document C-VII/3 dated 10 October 2002, p. 8.
18. Mark Wheelis, 2002, Biotechnology and biochemical weapons, *The Nonproliferation Review*, vol. 9, no. 1 (Spring), pp. 48–53; George W. Parshall, 2001, Scientific and technical developments and the CWC, in Jonathan Tucker (ed.), *The Chemical Weapons Convention: Implementation Challenges and Solutions*, Monterey Institute of International Studies (April), pp. 53–58.
19. For example, the European Commission proposes that by 2012 all new and existing chemicals will undergo a comprehensive risk assessment. Such information would prove invaluable to National Authorities monitoring compliance with CWC obligations. European Commission, *White Paper: Strategy for a Future Chemicals Policy*, COM(2001) 88 final, dated 27 February 2001.
20. OPCW documents EC-XXIV/DG.10 dated 3 April 2001 and EC-XXVII/DG.10 dated 4 December 2001.
21. OPCW document EC-XXVIII/DG.10 dated 19 March 2002.
22. Tregonning, 2002, *op. cit.*, p. 18.
23. OPCW document C-VI/5 dated 17 May 2001.
24. OPCW document C-V/NAT.2 dated 18 May 2000.
25. Daniel Feakes, 2002, Challenges in the implementation of export controls under the Chemical Weapons Convention, in Rodrigo Yepes-Enríquez and Lisa Tabassi (eds.), *Treaty Enforcement and International Cooperation in Criminal Matters*, The Hague, TMC Asser Press, p. 338.
26. MacEachin, *op. cit.*, p. 1.
27. OPCW Director-General Rogelio Pfirter in OPCW document C-VII/DG.4 dated 7 October 2002.
28. OPCW document C-VII/3 dated 10 October 2002.
29. Ian Kenyon, 2002, The Chemical Weapons Convention and OPCW: The challenges of the 21st century, *The CBW Conventions Bulletin*, no. 56 (June), pp. 1–2, available at <http://www.fas.harvard.edu/~hsp/bulletin/cbwcb56.pdf>.

30. VERTIC, 2002, *Getting Verification Right: Proposals for Enhancing Implementation of the Chemical Weapons Convention*, London, VERTIC (October), p. 5.
31. *Ibid*, p. 10.
32. At the recent seventh session of the Conference of the States Parties, the Indian representative said that shifting resources to OCPF inspections would be 'not merely a major policy shift but a reinterpretation of the Convention.'
33. Also at the seventh session, the European Union stated its preference for 'an approach to Article VI inspections based upon the capabilities of facilities'. The European Union representative said the current situation did not 'represent a credible means to achieve this aspect of the object and purpose of the Convention.'
34. OPCW document EC-XXVIII/DG.10 dated 19 March 2002.
35. Daniel Feakes, 1999, Progress in The Hague: 25th quarterly review, *The CBW Conventions Bulletin*, no. 43 (March), p. 4, available at <http://www.fas.harvard.edu/~hsp/bulletin/cbwcb43.pdf>.
36. Jonathan Tucker (ed.), 2002, *The Conduct of Challenge Inspections Under the Chemical Weapons Convention: Proceedings of an Expert Workshop Held on May 29–31, 2002, in Washington, DC*, Monterey, Monterey Institute of International Studies (August), p. 1.
37. Robinson, 1995, *op. cit.*, p. 499.
38. Tucker, 2002, *op. cit.*, p. 21.
39. *Ibid*, p. 1.
40. *Ibid*, p. 1.
41. For example, the United States Central Intelligence Agency, 'Unclassified report to Congress on the acquisition of technology relating to weapons of mass destruction and advanced conventional munitions, 1 January through 30 June 2001', 30 January 2002, Carl Ford [US Assistant Secretary of State for Intelligence and Research], testimony before Senate Foreign Relations Committee, 19 March 2002.
42. John Bolton [US Under Secretary for Arms Control and International Security], *Statement to the Conference on Disarmament*, CD/PV.890 of 24 January 2002.
43. MacEachin, *op. cit.*, p. 3.

The Chemical Weapons Convention and universality: A question of quality over quantity?

Jean Pascal Zanders

The Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (Chemical Weapons Convention, CWC) was opened for signature in January 1993 and entered into force on 29 April 1997. It establishes a comprehensive prohibitory norm regarding the acquisition, possession and the use of chemical weapons (CW), which remains applicable under all circumstances, including that of armed conflict. As of 15 October 2002, 147 states have ratified or acceded to the CWC and another twenty-seven have signed, but not ratified it. Twenty-one states are non-signatories.[1]

Between 28 April and 9 May 2003, the Organisation for the Prohibition of Chemical Weapons (OPCW) will hold the first Review Conference of the CWC.[2] The principal purpose of the conference is to evaluate the operation of the CWC in its political, legal and technical aspects. Part of this exercise is backward-looking, namely to evaluate the operation of the convention during the preceding five years. The other part is forward-looking, namely to identify the most urgent issues the CWC may face over the next five years and to set up mechanisms, if necessary, to deal with them. Consideration of questions relating to the universality of the CWC will be a key element in the review process as they bear on the future relevance of the prohibitory norm and the preservation of the interest of the states parties in the functioning of the treaty regime. During the first five years it has become clear that universality comprises more than just numbers of states parties.

The Chemical Weapons Convention and universality

The CWC makes no direct reference to the concept of universality. Nevertheless, the desire for universal adherence follows from the wish in the preamble to exclude completely the possibility of CW use through the implementation of the treaty provisions 'for the sake of all mankind'.[3] Universality was the clear aim of the negotiators. The CWC is open to all states without exception.[4] Some measures, such as the limitation of the trade in scheduled chemicals to states parties only,[5] were proposed with the aim of encouraging universal adherence.[6] Furthermore, the negotiators constructed the CWC in such a way that a state can only claim legal rights under the convention (such as the right to import and export scheduled chemicals from or to a state party, to request and receive emergency assistance, or to benefit from international cooperation or technological exchanges under the convention) unless it engages in the treaty obligations.[7] The reservation of these rights to states parties serves simultaneously as a penalty to states staying outside the CWC and as an encouragement for them to join. Especially with respect to the transfer of scheduled chemicals, the cost of staying outside the treaty rises with the growing number of parties to the convention as the possible alternative sources for such compounds decrease.

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From its second session in the later part of 1997 onwards, the Conference of the States Parties (CSP)—the highest decision-making body of the OPCW—has systematically emphasized the importance of universality and has called upon states that have not yet done so to ratify or accede to the CWC. The Technical Secretariat of the OPCW has developed several types of outreach programmes to increase the awareness of the importance of the CWC among non-member states. These activities have contributed greatly to the large membership of the convention.

However, attracting new ratifications or accessions is becoming increasingly costly. Most of the states currently outside the convention feel that they cannot join the CWC as a consequence of their threat perceptions or because they discern few tangible benefits that can offset the costs of being a member of the OPCW. In addition, the poor quality of the national implementation of the treaty obligations by many states parties has raised questions about their compliance and long-term commitment to the convention. The experience acquired during first five years of operation of the CWC has contributed to the growing awareness that there is a quantitative and a qualitative dimension to universality.

The experience acquired during first five years of operation of the CWC has contributed to the growing awareness that there is a quantitative and a qualitative dimension to universality.

Quantitative universality

Quantitative universality bears on the number of independent states that adhere to a particular global treaty and thus directly relates to the strength of the norm. For a global agreement like the CWC, which has clear security implications for each participant, universal membership is ideal. However, no global treaty has ever attracted universal adherence. (Not every independent state is even member of the United Nations.) While absolute universality appears unattainable in practice, a high number of ratifications and the speed with which this number is achieved has important consequences for the states that stay outside the treaty. In particular, the consistent practice of the large group of states parties could make the relevant provisions of the CWC declaratory of international customary law, and thus binding on all states irrespective of whether they have joined the treaty.[8]

Nonetheless, some states currently outside the CWC are of CW proliferation concern. Most of them are located in regions of deep-rooted conflicts (Central and Southern Africa; Northeast, Southeast and Central Asia; and the Middle East) so that they feel they cannot afford to abandon the CW option in spite of the sanctions and benefits offered by the CWC. Whether their unwillingness to join the treaty diminishes the strength of the CWC is a matter of debate. Their membership in the convention could also cause difficulties if they continue to be suspected to behave in violation of the core prohibitions of the CWC and the verification instruments of the convention are unable to resolve the concerns unambiguously. Furthermore, their membership in the OPCW may also deprive the international community from alternative means (e.g., the range of coercive options available to the United Nations Security Council) to deal with a proliferation threat. It requires fundamental study into the reasons why the CWC cannot offer these states sufficient security guarantees in order to allow them to join.

Finally, quantitative universality or near-universality may also give rise to the so-called ‘universality paradox’, whereby a state may decide to remain outside the CWC because it believes it can acquire a major relative advantage over the parties to the convention by retaining or expanding its CW arsenal, or whereby a state party decides to defect from the treaty in order to obtain a similar gain. These possibilities underscore the critical importance of the provisions in the CWC that offer states parties security guarantees in the case of a threat with or actual use of CW (Article X), because they greatly reduce the relative advantages a country might hope to gain from staying outside or defecting from the treaty.

Qualitative universality

Qualitative universality refers to the necessity of the global treaty to remain relevant to all parties during its lifespan in order to ensure universal compliance. The CWC is of unlimited duration.[9] This implies that the questions regarding universality pertain not only to the present, but also to the mid- and long-term future. This future perspective adds an important qualitative dimension to the concept of universality. In particular, the political, security and technological context in which the CWC must operate changes constantly. The greater relative importance of regional over global security after the end of the Cold War; the materialization of terrorism with chemical agents, the changed nature of terrorism in general and their impact on threat perceptions and responses of countries; the acceleration of product and process innovation in chemistry and its industrial applications; and the new demands and expectations for development from a globalizing economy are but a few of the significant developments that have marked the international context since the conclusion of the negotiation of the CWC in 1992. The nature of the CWC will also change considerably once all of the declared CW stockpiles have been destroyed.[10] The verification of the chemical industry, the monitoring of the transfer of toxic chemicals and the organization of international cooperation will then be among the central activities of the OPCW. Irrespective of the motivations countries had at the time of becoming a state party, the transformations in the international context and the progress in the implementation of the CWC will generate different expectations from the convention.

The future relevance of the CWC to all states parties will depend greatly on the extent to which the OPCW can reaffirm the core prohibitions in light of technological changes and adapt the instruments and procedures envisaged by the negotiators to the emerging challenges and expectations.

General purpose criterion

The OPCW has rightfully been concerned mainly by past CW programmes. Nonetheless, it also has an important task of preventing future weapon programmes involving the exploitation of toxic properties of chemicals. Future CW armament programmes may be based on so-called traditional toxic compounds and their precursors, most of which are listed in the three schedules of the CWC. However, new CW could also be based on toxic chemicals that are not listed in the schedules and therefore may fall outside the standard reporting and inspection routines. These could be currently existing toxic chemicals or novel ones. Besides product innovation there is also process innovation whereby traditional or novel chemical warfare agents and their precursors may be produced in ways that current inspection procedures were not designed to detect. The growing overlap between chemistry and biotechnology as well as design and production processes based on nanotechnology may be of particular concern.

Most of the technologies and processes required for the manufacture of CW have so-called ‘dual-use’ characteristics, because they also have legitimate civilian applications. As the CWC does not seek to interfere with legitimate scientific and economic activities in the field of chemistry, it uses the ‘general purpose criterion’ (GPC) to distinguish between legitimate and prohibited applications of technology. To this end not the technologies themselves but the purposes to which they may be applied are prohibited under the convention. The GPC is formulated in Article II of the CWC, which considers any toxic chemical and its precursors as a CW unless it is ‘intended for purposes not prohibited’ under the CWC and ‘as long as the types and quantities are consistent with such purposes.’[11] Article II also identifies certain technologies—such as a chemical shell—that have no other purpose than for

chemical or biological warfare. They are therefore banned under all circumstances (which implies that they are single rather than dual use). The article further identifies the purposes under which toxic chemicals and their precursors are not considered CW. The GPC is reiterated in Article VI, which stipulates, among other things, that toxic chemicals and their precursors can only be transferred for non-prohibited activities.[12]

During the first five years of its implementation the focus of the CWC has been generally on the past and the present: creating inventories of past CW programmes, remaining CW stockpiles and CW-relevant installations, and of private and government facilities with activities that are reportable under the CWC. The reporting and verification requirements for the chemical industry are based on the three schedules of toxic chemicals. This practice has tended to narrow the range of the applicability of the convention to the listed chemicals only in spite of the all-encompassing scope embedded in the GPC. A similar trend is noticeable with regard to the reporting of the transfer of toxic chemicals under Article VI: while the GPC applies to all transfers of toxic chemicals, the reporting requirements and application of specific export control measures pertain only to the chemicals listed in the three schedules.[13] In addition, some states parties seek to narrow the applicability of the CWC to the scheduled chemicals only (especially in the context of the debate whether export control arrangements that maintain longer lists of controlled items than the schedules, such as the Australia Group, can continue to exist outside the CWC regime), thereby disregarding the GPC.

A reduction in the scope of the GPC—whether by default through practice or by political design—could irrevocably undermine the CWC's ability to cope with future developments. At present, some production routes for particular chemical warfare agents are not covered by the schedules and the salts of some listed chemicals are not included in them either. Furthermore, there are reports of novel chemical warfare agents that were developed to a point just before weaponization. Because of the secrecy of these programmes, the chemicals were not considered during the negotiation of the CWC. Consequently, they are not reflected in any of the three schedules. (The composition of some of these chemicals has only recently been declassified.) Other chemical compounds are being investigated for their use as so-called non-lethal weapons. Under the current reporting obligations the state party in question need not inform the OPCW of such agents and consequently there are no inspections. Incomplete or uneven implementation of the GPC with respect to such agents could effectively limit the options of a challenge inspection or investigation of alleged use in the case a second state party should feel particularly threatened by them or becomes the victim of their use. In addition, rapid scientific and technological developments in chemistry and the chemical industry contribute to the high-speed screening of new toxic compounds, some of which might hold considerable attraction for warfare purposes. Present and future toxic chemicals are covered by the GPC, which, in the case of research and development, can also serve as the foundation of an ethical code against chemical warfare for scientists and other professionals.

Since the conclusion of the negotiation of the CWC the terrorist threat with chemical agents has become a reality. Terrorist may resort to the traditional chemical warfare agents; however, there are many other widely available toxic compounds—industrial, agricultural or other—that could serve their purposes. By ignoring or denying the GPC, states deprive themselves of an important foundation for legislation criminalizing the preparation, possession and (intent of) use of toxic chemicals for terrorist or criminal activities. This tool against terrorism ought to be included in the national implementation legislation of each state party as the lack of such legislation in one or more state party could create safe havens where activities violating the CWC might be undertaken. This underscores the importance of having effective national implementation in place in all states parties.[14]

By ignoring or denying the GPC, states deprive themselves of an important foundation for legislation criminalizing the preparation, possession and (intent of) use of toxic chemicals for terrorist or criminal activities.

Two pillars for preserving long-term universality

The GPC preserves the intrinsic strength of the CWC as it enables the extension of the scope of the prohibitory norm to future technological developments of relevance to the convention. In terms of maintaining or further expanding the quantitative universality of the CWC, two articles are of critical importance—namely Article X on emergency assistance in the case of a threat with or use of CW, and Article XI on international cooperation and technology transfers among states parties. Their concrete implementation make up the two pillars of qualitative universality.

Emergency assistance

As a consequence of Article X, the OPCW has a specific mandate to provide assistance in the case of CW use or the threat of such use. However, after five years the implementation of the provision and the preparations for actual deployment of assistance are still in their infancy. Should the OPCW receive a request for assistance today, it would be unable to honour its obligations. The fulfilment of this eventuality could strike a fatal blow to the CWC, as it would signify the incapacity of the OPCW to offset the security consequences of the voluntary renunciation of a weapon category by a state party.

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In the light of the potentially critical importance of Article X, the undertaking to implement its different aspects is underfunded within the OPCW budget. Unfortunately, the project suffers from the standard problems associated with the priority allocation of scarce resources in the protection against threats: the wisdom of the investment can only be demonstrated in the case that the threat actually materializes, but meanwhile the expenditures produce no return on investment.[15] In the wake of the terrorist attacks of 11 September 2001 the Technical Secretariat received an increased number of requests for help and advice, but the organization was unable to meet many of them for lack of resources. This has led to several complaints, which were taken up in the Executive Council of the OPCW.

The problems related to the organization of emergency assistance have been further compounded by the evolution of threat perceptions with regard to CW proliferation and terrorism. The terrorist attacks of 11 September 2001 appear to have provoked a tendency in some countries to place national security over collective security. In parallel to these developments the view has gained currency that sharing information about national CW defence programmes (as mandated by the CWC) or providing the OPCW with equipment to detect chemical warfare agents or protect against them (as one of the means open to a state party to meet its obligations under Article X) will reveal the weaknesses in the CW defence posture and consequently enable potentially hostile countries to exploit them.

Despite the considerable shifts in circumstances and threat perceptions that may be required to achieve a meaningful implementation of Article X, the OPCW cannot afford failure. Failure would seriously damage the prospects of universality in terms of attracting new ratifications or accessions from states in regions of conflict or of the long-term interest of states parties to be actively engaged in the CWC regime. Should some states parties decide that their security interests are better served through unilateral measures, such as CW armament for deterrence purposes, the whole prohibitory regime on chemical warfare may collapse.

International cooperation and technology transfers

Article XI deals with the right of states parties to economic and technological development and access to technologies for purposes not prohibited under the CWC. These prospects have proved to be the most important incentive for some developing countries that do not possess CW or face a threat with CW to join the convention and, in some cases, it has assisted in overcoming reluctance to join the CWC for regional geopolitical reasons. In this sense, the article has been an important promoter of universality.

However, the article is also extremely controversial for political reasons. Some vocal developing countries have come to view it as a development assistance obligation for the industrialized countries (rather than as a right to receive such assistance). Meanwhile many industrialized countries, as a consequence of CW use in the 1980–88 Iran–Iraq war, the prominence of regional security concerns in the post-Cold War era, and the changing nature of terrorism, have come to view CW proliferation as a major threat to their security interests. They have responded with export controls in an effort to prevent the diffusion of technology that could contribute to the acquisition of CW and have started to coordinate them within the framework of an informal arrangement known as the Australia Group. Certain developing countries have increasingly come to view the Australia Group as a suppliers cartel that denies them their right to economic and technological development promised by the CWC. As a consequence, implementation of Article XI has become extremely politicized and the issue has unnecessarily complicated policy development or practical decision-making in some other issue areas. The Preparatory Commission of the OPCW (1993–97) and the OPCW have been unable to draw a roadmap for implementation, and the Technical Secretariat, in the light of budget limitations and political constraints, has only been able to launch some modest initiatives.

In order to bridge the divide, some important questions need to be considered. Although the 2003 Review Conference need not resolve these questions, it can provide important guidance as to the direction the resolution of the controversy may take. In particular, regard should be given to the questions as to which tasks should be executed by the OPCW and in which areas the OPCW should operate as a facilitator between states parties or between scientific institutions and industry organizations of different states parties.

The foundation for a solution lies with the acceptance by all states parties of the basic obligation in Article I to never, under any circumstances, assist anybody with the acquisition of CW.[16] This non-proliferation obligation extends much further than the scheduled chemicals or all toxic chemicals and their precursors as captured by the GPC: it covers all types of equipment, information, knowledge and expertise that might contribute to a CW armament programme. As a consequence, responsibilities with regard to technology transfers lie equally with the exporting and the importing state.

Export controls have received most of the attention in this debate. Import controls (and controls on technology transfers within a country), in contrast, have remained underdeveloped in both concept and practice. While there is a clear need to harmonize relevant export controls within the CWC framework—and to a certain extent this is already happening spontaneously among states parties through the coordination of customs regulations in regional settings—states parties should also study ways to increase the transparency of the movement of relevant technologies inside the country following their importation. Such mechanisms can contribute actively to the generation of confidence that the imported technologies are applied only for permitted purposes. In the short term, they may answer the question why the verification regime of the CWC is still unable to provide sufficient guarantees of compliance by states parties to the participants in the Australia Group.[17] Conceivably, they can also contribute to the conceptualization of a long-term verification and monitoring regime that is more tailored to preventing the illegal acquisition of future technological capabilities for purposes prohibited

under the CWC than to the elimination of past CW programmes. Such measures can be developed by the OPCW as a whole as a way to implement the GPC as well as by states parties as part of their individual responsibilities to the CWC.

A second approach for resolving the political controversy involves the formulation of concrete expectations under Article XI by states parties based on their individual needs instead of maintaining a broad principled argument. This would open up opportunities for bilateral activities between states parties and the Technical Secretariat could act as facilitator between National Authorities (which states parties must set up as a national contact point under the CWC) or scientists and industry representatives of the respective countries. Such a role for the Technical Secretariat would have significant benefits for the preservation of the long-term interest of all states parties in the CWC. At present the Technical Secretariat is developing and promoting modest but much appreciated initiatives (e.g., capacity-building initiatives, such as the Associate Programme, information exchanges and so on). Such initiatives should be expanded in the short term as they help the developing countries to articulate their specific needs and allow mutually beneficial cooperation between the developed and developing world in a less polarized environment.

Article XI is critical to the long-term implementation of the CWC and the maintenance of qualitative universality. To a lesser extent, but no less important, the demonstration of tangible benefits for states parties under this article may still convince countries outside the treaty regime to join the convention. At present, only a tiny amount of the OPCW budget is allocated for Article XI initiatives. It is nevertheless clear that its relative importance will grow as the destruction of CW nears completion, freeing up a larger percentage of resources for international cooperation.

Conclusions

Five years after entry into force the CWC faces the first comprehensive evaluation of its functioning and its contribution to international peace and security. Within this short timeframe the convention established itself as a central tool to ban chemical warfare. The large number of ratifications and accessions testifies to the importance the international community attaches to the prohibition. In practice, the negotiators have laid the foundation for a security regime, which has turned out to be much more cooperative than the many detailed provisions to detect non-compliance and restore compliance might have initially suggested.

Despite the obvious successes, the CWC is at a crossroads. The convention faces many challenges, ranging from fundamental changes in the international security environment to accelerating advancements in science and technology. The future relevance of the CWC to all states parties will depend greatly on the extent to which the OPCW can reaffirm the core prohibitions in the light of technological changes and adapt the currently available instruments and procedures to the emerging challenges and expectations.

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The OPCW must therefore confirm the centrality of the GPC to the future of the CWC. The GPC is of critical importance with regard to the expansion of the scope of the CWC to scientific and technological innovation, the criminalization of acts by criminals and terrorists involving toxic substances, the development of codes of conduct for scientists and professionals, and the creation of an effective regime to verify the export and import of chemicals and other technologies to prevent present and future CW proliferation.

Of particular concern is the fact that the OPCW is at present incapable of honouring its obligations to provide emergency assistance to a requesting state party in the case of CW use or threat of such use. Failure of Article X when assistance should be required could signify the collapse of the prohibitory regime on chemical warfare. The implementation of Article X needs to be adequately funded as a matter of urgency.

Concrete implementation of Article XI on international cooperation is critical to the maintenance of universality of the CWC. States parties should explore equitable mechanisms of technology transfers that equally satisfy concerns about potential CW proliferation, on the one hand, and the aspirations of technological and economic development on the other. The Technical Secretariat should receive sufficient resources to expand its current efforts in helping developing countries to articulate their specific needs and facilitate interactions between scientists and industry representatives of different states parties.

On the whole, there is little reason to suppose that the CWC cannot continue to play a useful and necessary role in the current and future international security environment. Nevertheless, the concrete implementation of the elements in the convention that contribute to the qualitative dimension of universality will be part of the foundation of the CWC's long-term relevance. The forthcoming Review Conference offers an excellent opportunity to evaluate the current functioning of the convention and to consider future challenges to the treaty regime.

Notes

1. Full listings are available from the SIPRI CBW Project web site at <http://projects.sipri.se/cbw/docs/cw-cwc-mainpage.html>. Included in the number of non-signatory states are East Timor, Niue and Taiwan.
2. CWC, Article VIII, para. 22. Review conferences must be held in the year following the fifth and tenth anniversary of the entry into force of the CWC (2003 and 2008, respectively), and thereafter at five-year intervals. The complete text of the CWC is available at <http://www.opcw.org/html/db/cwc/eng/cwc_frameset.html>.
3. CWC, Preamble, 6th preambular paragraph.
4. CWC, Articles XVIII, XIX and XX.
5. The convention categorizes chemical compounds of particular concern in schedules depending on their relative importance for the production of CW agents or for legitimate civilian manufacturing processes. Apart from their significance for verification and reporting routines, the three schedules also form the basis of an export control regime among states parties and between states parties and non-states parties. An evaluation of the mechanism for monitoring the transfer of scheduled chemicals is included in J.P. Zanders et al., 2002, *Maintaining the Effectiveness of the Chemical Weapons Convention*, Stockholm, SIPRI Policy Paper, October, available at <http://projects.sipri.se/cbw/research/cwc_policypaper2.pdf>.
6. See, for example, United States of America, 1991, *Measures to Ensure Universality*, Conference on Disarmament document CD/CW/WP.357 of 8 August.
7. The intention is made clear by the reference to 'The States Parties to this Convention' in the opening clause of the Preamble and the recurrent explicit references to the 'states parties' in the articles that lay down the obligations and extend rights.
8. Y. Dinstein, 1995, Ratification and universality, in D. Bardonnet, *The Convention on the Prohibition and Elimination of Chemical Weapons: A Breakthrough in Multilateral Disarmament*, Dordrecht, Hague Academy of International Law and Martinus Nijhoff Publishers, pp. 164–65.
9. CWC, Article XVI, para. 1.
10. This should be accomplished by 2007, although the CWC allows for an extension period of up to five years. Current projections suggest that as a consequence of economic, political and technological complications, Russia and the United States might exceed the maximum fifteen-year period for CW destruction specified in the CWC.
11. CWC, Article II, para. 1(a).
12. CWC, Article VI, para. 1.
13. The regimes governing the transfer of chemicals are detailed in the Verification Annex, notably Part VI, B for Schedule 1 chemicals, Part VII, C regarding the transfer of Schedule 2 chemicals to non-state parties, and Part VIII, C regarding the transfer of Schedule 3 chemicals to non-state parties. The import and export of Schedule 2 and 3

chemicals to other states parties are the subject of the initial and annual declarations to be submitted by each state party (Part VII, A and Part VIII, A respectively).

14. The relationship between national implementation measures and qualitative universality is discussed in J.P. Zanders et al., 2002, *op. cit.*
15. During the Cold War this was one of the rationales not to construct large collective shelters in the event of nuclear war, whereas the production of nuclear missiles and other offensive weapon systems—supported by political and bureaucratic interests—generated immediate and continuous employment or trade profits.
16. CWC, Article I, para. 1(a) and (d).
17. S. Batsanov, 2001, 'The CWC: Issues for the First Review Conference', briefing to the Center for Nonproliferation Studies, Washington, DC, 20 March, <http://cns.miis.edu/dc/032001.htm>.

Scientific and technological change and the future of the CWC: the problem of non-lethal weapons

Malcolm DANDO

Article VIII, paragraph 22 of the Chemical Weapons Convention (CWC) requires that when the first Review Conference takes place in April-May 2003, it, amongst other things, takes '... into account any relevant scientific and technological developments'. Given the political difficulties that the convention has recently encountered, and the failure of the negotiations to strengthen the Biological and Toxin Weapons Convention (BTWC), it is possible that relevant scientific and technological developments may receive relatively little attention at the Review Conference. Yet the relevant science and technology are in a period of extremely rapid development that could have a severe impact on the future scope of the prohibition embodied in the convention.[1] For that reason, scientific and technological developments should be subject to very careful analysis at the Review Conference. This paper is intended to illustrate that point by particular reference to recent changes in the capabilities for developing non-lethal incapacitant chemicals that affect the central nervous system, and to what those changes might portend.

Reasons for concern

In the current post-Cold War period, it has become obvious that the military forces of technologically advanced countries are likely to be increasingly involved in complex operations other than war in the developing world and often in difficult urban areas. The equipment and basic training of such military forces are manifestly not necessarily well suited to dealing with such situations, and this has led to a renewed interest in many forms of non-lethal weapons.[2]

Discussions of non-lethal weaponry are made more difficult by the enormous range of different technologies that are under consideration. Furthermore, some advocates of non-lethal weapons clearly envisage their use at the strategic level rather than just at the tactical level, for example for crowd control.[3] So, within this one concept, there might be discussion of improved bean-bag rounds to replace plastic bullets and the strategic paralysis of a country by fouling of its electrical supply system with carbon fibres dropped from the air (thus shorting out the power lines). Nevertheless, most current developments remain at the tactical level, but even here weapon systems based on acoustics, biological or chemical agents, electromagnetics, and kinetic energy have all been under various forms of development. Non-lethal chemicals, for example, could include adhesives, corrosives, embrittlement

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agents, foams, slippery lubricants and engine modifiers. Similarly, electromagnetic-based non-lethal weapons could include not only carbon fibre conductive material but also lasers, optical munitions, microwaves and electrical stun systems.

What is undoubtedly true is that non-lethal chemical incapacitants figure large in many discussions of this new form of warfare. As the report of a recent series of British-American meetings noted: 'During the wargame scenarios, numerous participants expressed the desire to have a NLW [non-lethal weapon] that could quickly incapacitate individuals ... '.[4] The capability was particularly desired for 'a variety of scenarios ranging from crowd control to incapacitation of enemy combatants' and generally '*a chemical based calmative agent was viewed as the technology that could provide this capability*' [emphasis added].

At first sight it might appear that the CWC absolutely prohibits any such use of chemical agents. Article I of the convention reads:

> 1. Each State Party to this Convention undertakes never under any circumstances:
>
> (a) To develop, produce, otherwise acquire, stockpile or retain chemical weapons, or transfer, directly or indirectly, chemical weapons to anyone;
>
> (b) To use chemical weapons;
>
> (c) To engage in any military preparations to use chemical weapons ... .

The convention then states that chemical weapons are 'Toxic chemicals and their precursors, *except where intended for purposes not prohibited under this Convention, as long as the types and quantities are consistent with such purposes ... '* [emphasis added] and a toxic chemical is defined as 'Any chemical which through its chemical action on life processes can cause death, temporary incapacitation or permanent harm to humans or animals ... '.

The problem arises, in large part, because one of the purposes not prohibited under the convention is 'law enforcement including domestic riot control purposes'. Whilst Article I (5) of the convention also states that 'Each State Party undertakes not to use riot control agents as a method of warfare' there is clearly a grey area where different interpretations of what is permitted are possible—when, in short, does law enforcement end and a method of warfare begin?

When, in short, does law enforcement end and a method of warfare begin?

Writing in the *Naval Law Review*, and drawing on many original sources, Major Ernest Harper of the United States Marine Corps has recently tried to elucidate in detail how this ambiguity arose in the negotiations of the CWC.[5] In his view, Article I (5), whilst seemingly simple and straightforward, is in fact an 'intentionally undefined and ambiguous text that represents a compromise designed to find middle ground between polarized parties'. The parties in the polarized dispute did not want to change their positions, but they wanted to complete the agreement, so 'Everyone remained silent as to the meaning of the language, so as to avoid upsetting the delicate balance that had been created'.

Harper explains that when the United States entered the CWC negotiations in 1984, its official view was that riot control agents 'did not constitute chemical weapons, due to their nonlethal nature'. Indeed, when the United States moved to ratify the 1925 Geneva Protocol in 1975, President Ford had, in Executive Order 11850, allowed for some specific exemptions that permitted the use of riot control agents—for example for the control of rioting prisoners of war and for the rescue of downed aircrew. The United States wished to preserve such options and therefore wanted to define chemical

weapons in a way that did not include riot control agents. Other countries, including many American allies, wanted riot control agents included in the definition of chemical weapons so as to exclude their use in warfare. As Harper notes:

> They believed that any use of a RCA [riot control agent] could all too easily escalate to the use of lethal chemical weapons, and viewed RCAs as a large loophole in the effort to eradicate chemical warfare, a loophole they were determined to close.

In the end, opponents of the American position had to accept a compromise, as did the United States. When the United States ratified the convention, President Clinton accepted that all the options embodied in Executive Order 11850 were still allowed for American forces. Harper, however, correctly views this as a unilateral American interpretation and is concerned that American forces might, if they actually employed such options, be viewed by others as violating an international agreement. His paper is an attempt to clarify the meaning of 'method of warfare' in such a way that the United States could legitimately use the options it wishes to retain.

What is of interest here is that the major states which wanted the toughest possible barrier to the future use of chemical weapons were forced to accept a vague compromise, the United States still believes it has the option to use riot control agents under certain non-domestic circumstances and, of course, other states may later choose to take the same position. In short, the option to try to develop new forms of non-lethal chemical incapacitants that we know were attractive to the superpower militaries during the Cold War remains open.[6] Before considering the reasons why scientific and technological advances make the successful development of such incapacitants much more likely today, it is essential to note the extreme seriousness *for international law* of the potential development of non-lethal weapons.

The option to try to develop new forms of non-lethal chemical incapacitants that we know were attractive to the superpower militaries during the Cold War remains open.

As David Fidler has argued, the moral principles underlying the rules of war have been remarkably consistent over the centuries, and international lawyers are resistant to the idea that non-lethal weapons require some form of special treatment: ' ... under current international law, there is no good reason to think in terms of lethal versus "non-lethal" weapons because international legal principles must be applied to all weapons ... '.[7]

Fidler contrasts this 'compliance perspective' with the 'selective change perspective' put forward by non-lethal weapons advocates like John Alexander.[8] In the selective change perspective, the chance to do less harm by using non-lethal rather than lethal weapons in very difficult operational circumstances should not be given up; if international law has to be modified ('modernized') that is a price well worth paying. So in this perspective, it would clearly be sensible to modify the CWC so that riot control agents were understood to be permitted, for example to protect civilians who were being used to mask or screen an attack.

What is interesting about Fidler's analysis is that he raises the prospect of a third perspective: 'radical change'. In Fidler's view:

> The selective change perspective uses changes in military operations and technologies as a basis for advocating selective, case-by-case reforms in international law to allow more NLW development and use but it does not embrace the more radical implications of 'future war'. Giving these implications more weight produces the radical change perspective.

He argues, for example, that non-lethal weapons may expand rather than limit the acceptable 'just causes' for using force:

> Anticipatory self-defence might be viewed more favourably if undertaken with NLWs rather than merely with lethal force. Attacks on terrorist groups harboured inside states might be less controversial if the attacks were conducted with NLWs … .

More particularly, he notes the importance, in the arguments of proponents of non-lethal weapons, of a dynamic rather than static view of military technology:

> Arguments in favour of developing and deploying NLWs often rely on the new capabilities such weapons give military forces and *suggest that such capabilities affect how we evaluate the ethics of weapons' use* ... [emphasis added].

What is at stake here, therefore, is no small issue. The discussion involves all the ideas about ethics and war that international society has developed.

What is at stake here, therefore, is no small issue. The discussion involves all the ideas about ethics and war that international society has developed; non-targeting of civilians, proportionality, unnecessary suffering and superfluous injury are all concepts that may have to be overthrown in this perspective as operational needs and military technology evolve. These look like dark and dangerous waters that should not be entered lightly, yet the scope and pace of change in science and technology are such that these issues cannot be avoided for long.

Chemistry, biology and future war

There is an obvious linkage between growth of the sciences of chemistry and biology and the development of chemical and biological weaponry. Only with the systematization of chemistry and the growth of the chemical industry at the end of the nineteenth century was the production of chemical agents on a large scale possible during the First World War. Growing understanding of the role of the neurotransmitter acetylcholine underpinned elaboration of the new nerve agents around the time of the Second World War, and then, during the early stages of the Cold War, a fortuitous discovery of drugs which helped those suffering from mental illness led to renewed interest in chemical incapacitants and weaponization, for example of BZ by the United States.[9] Similarly, the revolution in bacteriology at the end of the nineteenth century, with the clarification of the nature of many infectious bacterial diseases, facilitated the anti-animal biological warfare of the First World War. Increased knowledge of aerobiology and of industrial-scale production lay behind the Second World War programmes of, for example, the United Kingdom and the United States, which produced the range of 'classical' agents such as anthrax and botulinal toxins. Elucidation of the nature of viruses in the 1950s, and then the capabilities for genetic engineering, were undoubtedly deployed in the late Cold War Soviet offensive biological weapons programme, and today we face the possible applications of genomics, if only to modify classical agents.

As the Final Declaration of the fourth Review Conference of the BTWC stated in 1996, there were:

> ... apprehensions arising from relevant scientific and technological developments, *inter alia*, in the fields of microbiology, biotechnology, molecular biology, genetic engineering and any application resulting from genome studies.

Although the 2001 fifth Review Conference of the BTWC did not produce a Final Declaration,[10] it is possible to understand the growing concerns of states parties by analysing the background papers on relevant scientific and technological developments that some of them produced.[11] These papers reveal an awareness and concern over the huge revolution underway today in the life sciences. It is quite clear that developments in structural and functional genomics, proteomics, bioinformatics and combinatorial chemistry, together with advances in specific areas such as neuroscience, are having a massive impact on our capabilities for benign and malign applications. One particular point is that the divide between chemistry and biology becomes increasingly difficult to maintain as we understand and grapple with events at the molecular level in living organisms.

It is therefore appropriate and necessary that there is an overlap between the scope of the CWC and the BTWC in relation to mid-spectrum agents such as chemical incapacitants. In short, we have to deal with the control of a biochemical threat spectrum ranging from classical lethal chemical agents, industrial chemicals, bioregulators and toxins (covered by the CWC) through bioregulators, toxins, classical biological agents and genetically modified biological agents (covered by the BTWC).

It is necessary to grasp the enormity of the issue we face. A long-term student of chemical and biological weapons arms control, Professor Matthew Meselson of Harvard University, has rightly argued that every major technology in the past has been intensively exploited for military purposes. He asks whether we are going to allow this to happen with modern biology. In his opinion:

> During the century ahead, as our ability to modify fundamental life processes continues its rapid advance, we will be able not only to devise additional ways to destroy life but will also become able to manipulate it—including the processes of cognition, development, reproduction, and inheritance ... .[12]

He continues his argument:

> A world in which these capabilities are widely employed for hostile purposes would be a world in which the very nature of conflict had radically changed. Therein could lie unprecedented opportunities for violence, coercion, repression, or subjugation ... .

So what we are now proceeding to discuss is indeed no small issue. As with David Fidler's concerns about the possible eventual overthrow of all current standards of international law by the development of new non-lethal weaponry, our discussion of potential new chemical incapacitants has to be seen as but a particular early example of scientific and technological developments that could completely alter the nature of human conflict. The stakes here should definitely not be underestimated.

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Neuroscience

In 1990 the United States Congress designated the coming decade as the 'Decade of the Brain'. The achievements of that decade were marked by a special meeting at the National Academy of Sciences in Washington in 1999.[13] The Society for Neuroscience, which organized the meeting, noted that 'The past decade has delivered more advances than all previous years of neuroscience research combined.'

That gives some idea of the scale of this successful research into the mechanisms underlying human behaviour. We are familiar, of course, with the accomplishments of neuroimaging from media stories, for example of scientists discovering anomalies in the way people with dyslexia process information. Such elucidation of neuronal circuits is of critical importance but less well known, and of equal importance for future progress, are the spectacular advances of the 1990s in psychopharmacology. Advances in this area are of particular importance for the development of new non-lethal incapacitants affecting the central nervous system.

It became clear only at the end of the nineteenth century—through the use by Ramón y Cajal of Golgi's staining techniques—that the nervous system is made up of individual cellular units, the so-called neurons. These are of three main types: sensory neurons that detect changes in the environment; effector neurons that, for example, cause muscles to move; and interneurons that, through simple or complex chains, link the other two types together. Neurons have diverse structures but all possess a cell body containing the nucleus (and thus the DNA of the cell), dendrites which receive input information to the cell, and an axon which conveys output information from the cell. Information is known to be conveyed *within* the neuron by electrical means. After the discovery, in the early decades of the twentieth century, of acetylcholine's effect on heart muscle, it gradually became clear that transmission of information *between* neurons is overwhelmingly by chemical means—by so-called *neurotransmitters*. Acetylcholine was the first neurotransmitter to be discovered. Other well-known examples such as noradrenalin, serotonin and glutamate then gradually followed.

The transfer of information between neurons, and between neurons and effector systems like muscles, occurs at places of close contact called synapses. An electrical event in the axonal ending of the pre-synaptic cell leads to the release of the neurotransmitter(s) which moves across the gap (or synaptic cleft) between the cells, links up with receptors in the membrane of the post-synaptic cell, and causes changes in that cell. This is clearly a complex system which requires storage of the neurotransmitter in the pre-synaptic cell, mechanisms for its release and then for its destruction or removal from the synaptic cleft when it has done its job, and a receptor by which it is recognized and responded to appropriately by the post-synaptic cell.

The incredible complexity of the human nervous system makes it difficult to analyse, but many of the basic features of nervous systems can be fruitfully studied in simpler organisms and deductions can be made about how the more complex systems function. Nevertheless, our understanding of the human nervous system has also developed by quite serendipitous means. In particular, in the middle years of the twentieth century, a series of drugs was discovered—basically by accident—that greatly helped in the first successful treatment of major mental illnesses. Furthermore, research demonstrated that these new drugs had functions related, albeit in complex ways, to the operations of known neurotransmitters. Against that background, major efforts were inevitably made to gain a better understanding of the events occurring at synapses and to develop further drugs with increased effectiveness and greater specificity.

The initial research obviously concentrated on drug chemistry. Following the discovery of a substance with an effect of interest, medicinal chemists would elucidate its molecular structure and

then begin systematically to create variations in the hope of enhancing that specific effect. However, despite the high capability of the chemists, this task was very difficult. The human nervous system has many sub-systems and it is not easy to affect just one and leave the rest untouched. Furthermore, the nervous system is intimately linked to the endocrine (hormone) system and, as is now becoming clear, to the immune system. All these systems, and many others in the body, communicate by chemical means and the same—or very similar—chemicals have, in the course of evolution, come to serve different purposes in the different systems. Finding new chemical drugs for benign purposes, or new incapacitants for the military, was therefore not easy in the decades following the initial breakthrough in the mid-twentieth century.

It was clear also that the nature of the transmitter was not the only factor of importance at a particular type of synapse. Nicotine, for example, was found to mimic the effect of acetylcholine at synapses on skeletal muscle but to have no effect on heart muscle. On the other hand, muscarine, a hallucinogenic component of some mushroom species, has no effect on skeletal muscles, but mimics the effect of acetylcholine at (acetylcholine) synapses on heart muscle. There clearly had to be differences in the receptor systems in these two cases, but it was not possible to discover how complex receptor systems really were until the advent of molecular biology in the latter part of the twentieth century.

Some of the body's signalling chemicals operate by entering the cell body and directly affecting metabolic activities therein, but those of interest to this article are among the ones which operate by affecting receptors on the *surface* of the cell. As it became possible to identify different genes and their products, and because these receptors fall into a relatively small number of general categories, a vast cornucopia of knowledge has accumulated during the 1990s. This has led, and will increasingly lead, to the development of more specific and useful drugs—and perhaps also to new incapacitants.

It is essential to recognize how quickly knowledge of all these receptor systems developed during the 1990s. In 1990, one standard listing was some thirty pages long and contained structural information on only a quarter of the receptors listed. By contrast, in 1999 the editors commented: ' ... In this tenth edition, 106 pages are required to accommodate current information on approximately 50 receptor and ion channel classes, for which structural information is presented for over 99% ... '.[14]

The difficulties of designing a drug or incapacitant with a specific effect before this level of complexity was understood is quite obvious. What has now changed is that the receptors and the chemical neurotransmitters (ligands) operating in particular circuits are being increasingly clarified. This opens up the possibility of specific interference with the central nervous system and with particular behaviours that could well be of military interest.

Bioregulators and the military

Neurotransmitters are best regarded as a sub-set of bioregulatory chemicals. In his detailed review 'Bioregulators as instruments of terror', Elliott Kagan defined these substances as ' ... naturally occurring organic compounds that regulate diverse cellular processes in multiple organ systems ... '.[15] He added that, as such, they are produced in very small quantities and are essential for normal body functioning. Bioregulators are structurally diverse and, as has been shown in many background scientific and technological papers for BTWC Review Conferences since 1991, used in abnormal amounts or modified (synthetic) forms they can do untold damage to living organisms.

Kagan discussed cytokines such as endogenous pyrogens that deregulate temperature, eicosanoids that cause spasms and mucus production in the lungs, hormones such as insulin that can cause coma, and plasma proteases that can produce hypotension or blood coagulation. His paper is of interest

because it discussed the potential advantages to terrorists of use of such substances—for example, that they are not usually on anyone's threat list, are difficult to diagnose, cannot be vaccinated against, and can cause massive effects over large areas via unusual routes of dispersion. As the United Kingdom Foreign Secretary's 2002 Green Paper noted:[16]

> ... advances in biotechnology thus create the potential for the misuse of peptide [chemicals made up of short strings of amino-acids] bioregulators in offensive BW programmes. Advances in the use of viral and bacterial vectors enhance the possibility for direct delivery of a toxin or bioregulator to the human target or they could be used to transfer the toxin or bioregulator genes to the target.

So it is possible to envisage the use of bioregulators to cause disease or to use our increasing understanding of the immune system to destroy the body's natural defences. However, if we look down the road ahead, why should anyone wish to take such action if they could simply control the victim's (target's) behaviour? The real question here is how far along that road are we? Is it possible to see evidence in the open literature of an ability to use a specific chemical to affect a specific receptor or even a sub-type of receptor in a specific circuit to bring about a (beneficial or dysfunctional) behavioural change?

Targeting the central nervous system

The first thing to understand is the considerable military interest in this issue. The Soviet offensive biological weapons programme is known to have included the substantial 'Ovchinnikov' bioregulator component.[17] In the United States the Joint Non-Lethal Weapons Directorate[18] has as an objective 'to identify possible non-lethal chemical materials for further testing which have minimal side effects for immobilizing adversaries in military and law enforcement scenarios'. The Applied Research Laboratory at Pennsylvania State University, which works closely with the Joint Non-Lethal Weapons Directorate, produced a major report on calmatives (pharmacological compounds or agents that cause a calm or tranquil behavioural state) in 2000.[19] Among the objectives of this report were to provide ' ... an in-depth review of selective calmatives identified by the literature search with a high potential for further consideration as a non-lethal technique ... ' and ' ... to identify and provide recommendations on new areas in pharmaceutical drug development that may uniquely meet the requirements of calmatives as non-lethal[s] ... '. It should be noted that the report pointed out other classes of pharmaceutical agents that were also worthy of detailed review in regard to such objectives.

The report reviews a very wide range of calmatives with effects on the central nervous system such as benzodiazepines, dopamine agonists, serotonin transporters and so on, which clearly shows how modern benign civil research is being studied for means to produce other, less benign effects. Not surprisingly, given previous work by the American military,[20] the report states that in regard to adrenergic receptors: ' ... The researchers identified several drug classes (e.g. ... alpha 2-adrenoreceptor agonists) and individual drugs (... dexmedetomidine) found appropriate for immediate consideration as non-lethal[s] ... '. It is not difficult to understand the attractions of the alpha 2-adrenoreceptor system for advocates of non-lethal chemicals. Most of the noradrenaline-containing nerve cells in the brain are located in an area called the locus coeruleus. The axons from this small group of cells branch widely through the brain and the output of noradrenaline from their axon endings plays a major role in determining the state of alertness and attention. Alpha 2-adrenoreceptors limit the production of noradrenaline by inhibitory feedback. Hence introduction of a specific *agonist* (a chemical with the same effect as the alpha 2-adrenoreceptors), such as dexmedetomidine, will reduce alertness and

attention—in fact, it will put the target person to sleep. Furthermore, elucidation of the precise roles of the various receptor sub-types, thus facilitating even more discriminating interventions, is proceeding apace.[21]

A similar problem can be seen in regard to the muscarinic M2 acetylcholine receptor. It is clear that the cognitive deficiencies manifested in Alzheimer's disease are related to a deficiency in acetylcholine function in the higher nervous system. Muscarinic M2 receptors are again inhibitory autoreceptors on acetylcholine-producing cells that limit the neurotransmitter's production through negative feedback. In relation to the treatment of Alzheimer's disease, much effort has therefore gone into discovering specific *ant*agonists that block the receptor and thus maintain higher production of acetylcholine. At least in mice this approach does seem to have positive effects on cognition.[22] A highly specific *agonist* might be expected to have the opposite effect. There was considerable work in the 1960s and 1970s on potential military agents to target this system.[23] With the increased knowledge today of receptor sub-types, such investigation might now lead to much more successful results.

So there is little room for doubt that in regard to two of the original, and important, small molecule neurotransmitters—noradrenaline and acetylcholine—it is possible to target specific receptor sub-types with specific chemicals in specific circuits, and that the behavioural functions affected could be of interest to the military seeking new non-lethal weapons. The situation regarding peptide neurotransmitters is perhaps even more worrying because the vast amount of data on new neuroreceptors has shown quite clearly that there are many more natural ligands—probably with important behavioural functions—to be discovered. The race is on amongst pharmaceutical companies to find these new ligands because they will almost certainly be important in the development of beneficial new drugs.

Two examples of peptide neurotransmitter research can give an indication of the kinds of function that could soon come under attack. Substance P is a tachykinin. It has been known for some time that substance P and two related peptides operate through three different receptor sub-types, for example in the perception of pain. Recently, it has also been discovered that substance P probably plays a role in depression. Appropriate receptors are found in plausible parts of the brain and specific substance P *ant*agonists alleviated depression and anxiety in human clinical trials.[24] Clearly, if substance P is involved in this way, effective delivery of a synthetic *agonist* via one of the many new means of drug delivery under development might well have the opposite effect of *inducing* anxiety or depression.

A specific example of such an impact is known in the case of the cholecystokinin B (CCKB) receptor. Administration of CCKB receptor agonists to animals causes indications of increased anxiety, and administration of the natural ligand CCK4 causes panic attacks in humans with a history of such attacks as well as in healthy volunteers.[25] There is even some evidence of natural variations in this receptor being linked to susceptibility to panic attacks.[26]

The ugly possibility therefore arises that rather than, as Meselson argued, the human race being at a crossroads and having to decide whether to accept or prevent the major military application of modern biology, we may already have taken the wrong path. At the very least, in regard to the above examples, there are clear warning signs of the necessity to act.[27]

The ugly possibility therefore arises that rather than the human race being at a crossroads and having to decide whether to accept or prevent the major military application of modern biology, we may already have taken the wrong path.

What should be done?

There are many ways in which action can be taken to help prevent the misuse of the modern life sciences: students can be taught the history of the misuse of their subject so that they are properly alerted to the potential dangers; professional associations can develop codes of ethics that reinforce

the norm of only peaceful uses of modern chemistry and biology; national governments can introduce laws that increase the protection of dangerous materials and knowledge. Yet the foundation for all this evolving 'web of deterrence' must be the international resolve to safeguard the prohibitions embodied in the 1925 Geneva Protocol, the 1975 BTWC and the 1995 CWC. Without international resolve, national and sub-national efforts are inevitably fragmentary and likely to be transient.

Yet how can international treaties be protected in a time of such fundamental—seismic—change in our scientific and technological capabilities? Fortunately, both the BTWC and CWC have their prohibition enacted in a general purpose criterion which specifies that only peaceful purposes are allowed. This provides robust, if not complete, protection of the norm.[28] Moreover, in regard to the BTWC, the succession of review conferences has provided a means by which the states parties can elaborate their shared understandings of the scope of the convention. Thus the fourth Review Conference stated in its Final Declaration that ' ... the Convention unequivocally covers all microbial or other biological agents or toxins, naturally or artificially created or altered, as well as their components, whatever their origin or method of production ... '.

Prior to the fifth Review Conference of the BTWC in late 2002 Pearson suggested adding this additional explanatory sentence:[29]

> Consequently, prions, proteins and bioregulators and their synthetically produced analogues and components are covered.

Of course, given the current state of disarray of the BTWC,[30] it is not surprising that the opportunity to strengthen the restraints on the misuse of bioregulators was not taken.

In such circumstances, it would be a sensible step forward if the Final Declaration of the CWC Review Conference were to state, in regard to the scope of the convention, that:[31]

> The Conference also reaffirms that the Convention unequivocally covers all chemicals regardless of their origin or of their method of production ...

and it should add:

> Consequently, toxins, prions, proteins, peptides and bioregulators and their biologically or synthetically produced analogues and components are covered.

That, at least, would provide a clear point of reference in the rapidly changing times ahead and help to safeguard the important prohibition at the heart of the CWC, both in regard to the specific example of bioregulators like neurotransmitters, and to a much wider range of substances that could also be subject to misuse. However, it is far from clear that it will be possible for the states parties to achieve this objective. In that event it will be necessary for non-governmental organizations such as professional scientific and medical societies, and bodies such as the International Committee of the Red Cross,[32] to generate the public and political interest that will eventually lead to a stronger preservation of the barriers against the ghastly prospect of the widespread misuse of the scientific and technological developments in the life sciences which will dominate the twenty-first century.

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Organizational culture of the OPCW Secretariat

Maurizio BARBESCHI

The Organisation for the Prohibition of Chemical Weapons (OPCW) oversees the international chemical weapon disarmament and non-proliferation regime. Based in The Hague, the OPCW is made up of three elements: the Conference of the States Parties (CSP), the Executive Council and the Technical Secretariat. The CSP is composed of representatives from all states parties of the OPCW; it oversees the implementation of the Chemical Weapons Convention (CWC). The Executive Council promotes the effective implementation of and compliance with the CWC, and comprises representatives from forty-one states parties. The Secretariat carries out the actual verification measures outlined in the CWC and assists the CSP and the Executive Council.

Little has been written about the internal workings of the Secretariat. This article provides a glimpse of the unique culture of the Secretariat (including the Provisional Technical Secretariat) and how this culture has influenced the OPCW's development and actions. The wider influences of both external factors (such as its contacts with states parties) and internal factors (such as the relationship between the Secretariat and the Executive Council) will only be touched upon here as they are beyond the scope of this paper. This is an area that would considerably benefit from study and reflection, perhaps through the lens of organizational or strategic management theory.

Acknowledging the complexity

The process of becoming an organization is simultaneously (i) the growth and maintenance of relationships among a set of individuals who are working towards a common goal, and (ii) the actual accomplishment of tasks, individually and collectively. Although it is impossible to distinguish these processes in real terms, it is important to distinguish between them at the conceptual level.

Looking at the OPCW Secretariat, one can identify various 'characteristics' or features, such as its physical location, the rules of interaction that are taught to newcomers, the basic values and beliefs that underscore the OPCW's founding idea or philosophy, the underlying conceptual categories and assumptions that enable members of the Secretariat to communicate and to interpret everyday occurrences, etc. These characteristics can be grouped into two 'dimensions': the *technical dimension* and the *political/cultural dimension.*

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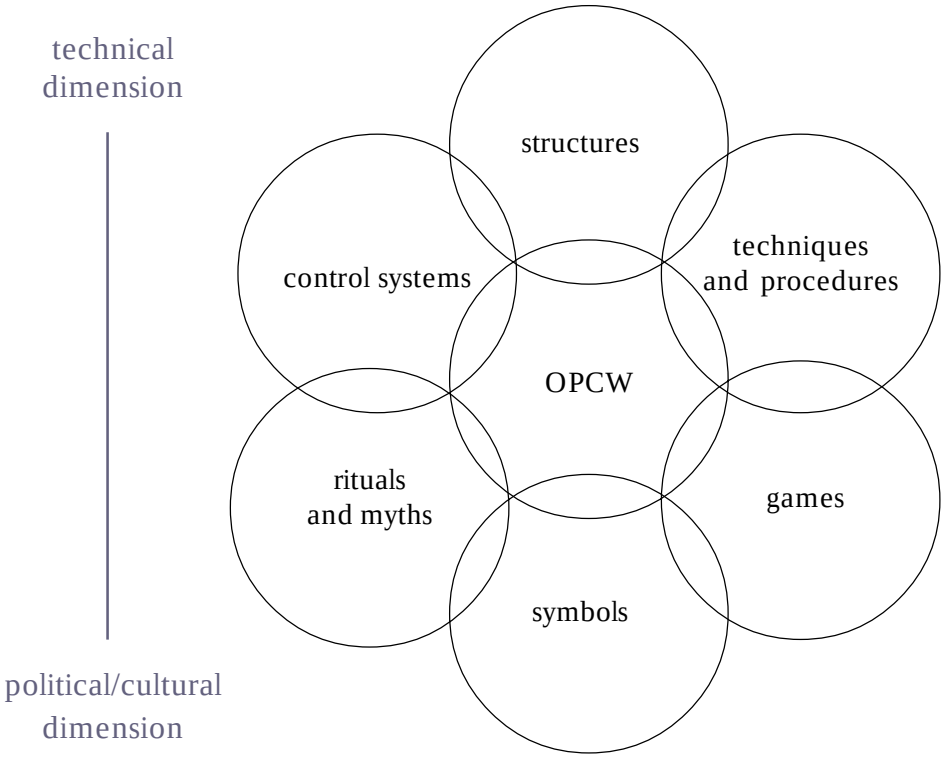
The bi-dimensional map of the OPCW



The technical dimension includes characteristics that are generally 'visible' but might be difficult to decipher. It includes the following elements.

1. *Control systems*—recruitment mechanisms, administrative rules and procedures, personnel evaluations, the budget, etc.;
2. *Structures*—not merely departments, divisions and branches, but also the physical facilities, the layout of offices, information systems, etc.; and
3. *Techniques and procedures*—professional performance, the verification process and its evaluation, working methods, etc.

The technical dimension affects almost all tasks undertaken by the Secretariat. The rigid set of bureaucratic norms and procedures of the United Nations, known as the 'common system', has made a powerful contribution to the technical dimension where administration, management, resources and programmes are concerned.

The political/cultural dimension is more intangible and strategic in nature. The day-by-day operating principles that guide the behaviour of the members of the system are derived in large part from this level. Here we find the basic assumptions about the essence of the Secretariat's culture. Culture plays a vital role in an organization's ability to develop, adapt and maintain itself. The political/cultural dimension comprises three groups of characteristics: 'rituals and myths', 'symbols' and 'games'.

Rituals and myths

Rituals and myths are important elements of culture. Through common 'language' and behaviours, conceptual categories and collective perceptions, an organization can develop a sense of internal integration. Internal integration lead to rituals and myths shared by the members of the organization. For example, one of the 'founding myths' of the OPCW was that it would be completely unlike UNSCOM; it would work in a multilateral fashion and be 'above' the political games played during the Iraqi inspections.

Symbols

In a sense, all cultural learning ultimately reflects the original values of individuals, and their sense of what 'ought' to be as distinct from what is. When a group faces a new task, issue or problem, the first solution proposed to deal with it might be considered a value because there is not as yet a shared basis for determining what is factual and real. Someone in the group, usually one of its founding members, has convictions about the nature of reality and how to deal with it, and will propose a solution based on those convictions. That individual may regard the proposed solution as a belief or principle based on facts, but the group cannot feel the same degree of conviction until it has collectively shared in the successful resolution of the problem. If the solution works, and the group has a shared perception of that success, the value gradually starts a process of cognitive transformation into a symbol. As will be described in detail in a later section, many in the Secretariat considered the Director-General's resistance to letting the OPCW be 'pushed around' by strong states parties as a symbol of his commitment to the independence of the organization.

Games

In organizational theory, games are defined as the systems of influence of an organization, which are distinct from the administrative power structure or hierarchy. Games can be overt or covert, intricate or simple, played simultaneously or singly. Some of the more popular games that have been observed at the Secretariat are noted here.

- *Sponsorship games* are played to build a power base by using superiors; individuals attach themselves to those with higher status, and offer professional loyalty in return for power.
- *Alliance-building games* are played amongst peers—often branch heads or inspectors—who negotiate implicit contracts of support for each other in order to build a stronger power base.
- *Empire-building games* are played by middle mangers or directors to build power bases, not cooperatively with peers, but individually with subordinates.
- *Budgeting games* are played overtly and have relatively defined rules; resources, not positions *per se*, are the ultimate prizes.
- *Expertise games* are the non-sanctioned use of expertise to build a power base, either by flaunting or by feigning such expertise. Experts play by exploiting their technical skills and knowledge, by emphasizing its uniqueness, its indispensable nature, and also by keeping the knowledge to themselves or controlling information flows.

- *Management versus staff games* are of a sibling-rivalry type, played not just to enhance personal power, but to defeat a rival; they pit middle management with formal decision-making authority against staff advisers with specialized expertise. Each side tends to exploit legitimate power in illegitimate ways.
- *'Whistle-blowing' games* are generally brief and simple, and can be played to effect organizational change; privileged information is used by an insider, usually a lower level participant, to 'blow the whistle' on questionable behaviour.

This list is far from exhaustive. Other games include gender games, regional grouping games, nationality games, etc.

The growth stages of the OPCW Secretariat

It has been argued that the creation, development and maturation of an organization can be compared to the life cycle of a living organism. Organisms require a genetic code. In this case, the CWC might be considered the OPCW's DNA—its blueprint for future development. Examining the OPCW's growth phases could help us understand how the Secretariat has coped with conflict and crises, and how well it has met its aspirations. This sort of stocktaking is especially important as we approach the first Review Conference.

The lifetime of the young organization could be roughly divided into the following stages:

1. Its gestation during negotiations at the Conference on Disarmament, followed by its birth with the establishment of the Preparatory Commission at the CWC signing conference;
2. Infancy, the work of the Provisional Technical Secretariat;
3. The Secretariat's first steps following entry into force;
4. Growing pains, as evidenced by financial, political and administrative crises; and
5. Moving towards adulthood under new leadership.

How have the political/cultural and technical dimensions outlined in the previous section played a role in the Secretariat's stages of growth and development?

Gestation and birth (prior to 1993)

The end of the Cold War, concerns raised over chemical weapon (CW) use in Iraq, and the bilateral American-Soviet agreement[1] on the elimination of their CW stockpiles all raised the profile of and expectations for CW disarmament and non-proliferation. This was a conducive environment for the gestation of the CWC through negotiations at the Conference on Disarmament. The long-awaited convention was born in early 1993. At its signing conference in Paris, a Preparatory Commission was created to 'look after' the infant organization until entry into force (EIF). To accomplish all of the necessary preparations for EIF, the Preparatory Commission lost no time in establishing the Provisional Technical Secretariat (PTS), which would be the precursor of the OPCW Secretariat.

Infancy (1993–1997)

During the infancy period of the PTS, both the technical and political/cultural dimensions played crucial roles. Concerning the technical dimension, the genetic code of the CWC dominated most administrative aspects, such as the decision to adopt the United Nations common system. The verification process as codified in the text of the CWC was conceptualized and assumed an embryonic form, and the relevant models, procedures, training methods and manuals were crafted accordingly. The first wave of personnel were recruited, predominantly experts from former CW-developing countries.

As for the political/cultural dimension, the 'founders' of the PTS perceived themselves as disarmament pioneers with a shared vision. They were convinced that the CWC was the most sophisticated arms control tool ever developed, that the organization would be truly multilateral and staffed by 'the best of the best'. Their mantra was to create a managerially unique organization, a polar star for the rest of the United Nations system—a system unanimously perceived as politicized and ineffective. As most of the first employees were either diplomats or experts straight from the negotiations at the Conference on Disarmament, they quickly developed a strong set of shared rituals, myths and symbols.

The 'founders' of the PTS perceived themselves as disarmament pioneers with a shared vision.

First steps for the OPCW Secretariat (1997–1999)

On 31 October 1996 the deposit of the sixty-fifth instrument of ratification triggered the 180 day countdown to EIF. Uncertainty about the actual timeframe of the sixty-fifth ratification and about the participation of the two major possessor states had complicated planning and final preparations. As a consequence of the legally binding timelines stipulated by the CWC, which had been optimistically agreed over a table in Geneva, there was an enormous amount of work to be done in a short amount of time. Several of the tasks that were to be completed before EIF on 29 April 1997 remained unfinished due to political disagreements and at EIF were passed to the Executive Council to resolve.

In less than a year, more than 100 inspectors (CW and chemical industry experts, analytical chemists, and logistical, health and safety specialists) were selected and trained to verify the incoming declarations from states parties. The Secretariat staff at headquarters almost doubled in size, reaching a total of about 400 individuals at EIF. With EIF, the Secretariat began processing the initial declarations from states parties and started inspection activities. One week after EIF, Ambassador José Bustani was confirmed as the OPCW's Director-General. The massive number of new staff from a diversity of cultures generated a positive cultural shock, and the 'genetic code' was reproducing itself as quickly as possible, with all efforts focused on the effective fulfilment of the CWC's timelines. Inspection procedures and a manual, verification reporting templates, a declaration handbook and risk assessment processes were finalized by the Secretariat and put into practice immediately after EIF.

To cope with the pace of the verification activities a second group of about eighty inspectors and some headquarter staff were selected and recruited. This had a significant effect on the political/cultural dimension. The selection process was not immune from certain alliance-building games and political pressure from states parties. The influx of new staff was perceived as less committed to the ideals of the CWC, which diluted the strength of shared symbols, myths and rituals of the previous stage.

States parties responded at different rates to obligations concerning the CWC declaratory process and their national norms. For instance, the United States mastered the CW side of the verification equation, but its delay in adopting a national normative mechanism left the American chemical industry unverified until long after EIF. Several states parties placed the Secretariat under enormous political pressure, demanding why their chemical industry facilities were being inspected while those in the United States were not. The Director-General pleaded with states parties to not hold the CWC verification regime, the OPCW Programme of Work and its budget 'hostage' to this issue.[2] By the time on-site inspections of American industrial facilities began in 2000, the whole verification process had become convoluted, suffering from unnecessary political scrutiny from the Executive Council and states parties, and resulted in a hostile, uncooperative climate in the Secretariat.

At the same time the CWC in particular, and disarmament-related issues in general, slipped down the political agenda of most states parties. As little attention was paid in capitals to questions concerning CW, implementation of their CWC obligations and the OPCW itself, delegations were left waiting for instructions and were unable to offer their informed participation in the CSP or in the Executive Council. This contributed to a cycle of poor and slow decisions from the Executive Council and the CSP, which impeded the work of the Secretariat, which in turn raised questions regarding the effectiveness of the Secretariat, etc.

In this phase it became clear that the Secretariat needed 'just-in-time' guidance on political matters from the Executive Council.

In this phase it became clear that the Secretariat needed 'just-in-time' guidance on political matters from the Executive Council. The backlog of necessary decisions remaining from the period prior to EIF and political disagreements within the Executive Council slowed the number of decisions that it was able to take. Left adrift, the Secretariat was forced to adopt informal practices (concerning, for example, the inspections manual, verification reporting templates and the declaration handbook) while awaiting formal decisions or approval from the Executive Council and the CSP.

To illustrate, according to the CWC the Secretariat must negotiate a draft Facility Agreement (a kind of facility-specific contract between the inspected state party and the OPCW that regulates all future inspections of a site) no more than thirty days after a site's initial inspection, and have it approved by the Executive Council. To insure consistency in how inspections are conducted the Executive Council was tasked with developing Model Facility Agreements that would be the basis for those that the Secretariat would negotiate. The Secretariat began inspections in 1997, but only in 2000 did the CSP finally agree on all of the modalities concerning Model Facility Agreements. Yet despite the fact that there is now an agreed framework upon which to base future agreements, few Facility Agreements have been approved by the Executive Council.

For example, to date there have been 196 inspections at 181 Schedule 2 facilities.[3] Over a dozen Schedule 2 facilities have been re-inspected without a Facility Agreement to simplify the inspection process. The backlog is mainly due to dissent among the states parties concerning the non-proliferation risk posed by the various types of industrial facilities and how frequently a certain facility ought to be re-inspected. As long as the Executive Council does not approve specific Facility Agreements, the more complicated the work of the Secretariat becomes as inspectors' access might need to be renegotiated for each subsequent inspection of a site.

Growing pains (1999–2002)

The OPCW approached the new millennium with significant internal tensions as the consequences of the diplomatic and financial compromises made during the CWC's negotiation surfaced. During the

negotiations there was a tacit understanding that the personnel would be 'undergraded' with the comprehension that once the CWC entered into force, the grade of professional Secretariat posts would be reassessed. At the request of the Director-General, in the beginning of 1998 an external consultant undertook the reassessment and recommended to raise the grade of many Secretariat staff. The Director-General informed the Secretariat of the results of the reassessment in August 1998 and announced his decision to apply the reassessment as of 1 January 1999.

The Executive Council and later the CSP stated that reclassifying posts was not within the power of the Director-General and decided to postpone the decision considering reclassification. Additionally, the CSP formally requested the Director-General not to move ahead with the reassessment in the meantime. The ensuing battle over who had the authority to make such a decision divided the three components of the OPCW. A group of eighty-nine Secretariat personnel eventually tired of waiting and took their grievance to the Administrative Tribunal of the International Labour Organization in mid-1999—which ruled in their favour in July 2000. By late 2000, the Tribunal's judgement was implemented in the Secretariat, the costs being partially offset through a reorganization of the planned activities for the end of 2000 and 2001.

The reassessment exercise generated considerable resistance among some states parties, which expressed their dissatisfaction both overtly through the Executive Council and the CSP, as well as covertly through their delegations. Bustani stood firm in his belief that he had the mandate to decide such issues, which led to mounting frustration as states tried to assert their power as the final authority of matters concerning the management of the OPCW Secretariat. A number of states claimed that the reassessment exercise was more a question of status and 'self-promotion' than of fair treatment for Secretariat personnel. There were also strong concerns regarding the financial implications for the organization.

This experience illustrates how an element of the technical dimension (budget authority, a part of control systems) is inseparable from the political/cultural dimension. The fact that the Director-General decided to undertake the post reassessment exercise notwithstanding the opposition of members of the Executive Council became a powerful symbol to the Secretariat of having a leader that was willing to stand up to states parties to defend the integrity of the Secretariat staff and independence of the organization.

Although the OPCW's budget grew from less than US$ 9 million in 1993 to more than US$ 50 million in 2001, its inadequacies became impossible to ignore. By far the largest share of the budget was staff costs. These costs included the salaries of inspectors verifying the destruction of CW. According to the CWC, inspection costs associated with verification of CW-related facilities are to be paid by the possessor state. The significant delays before reimbursement meant that the OPCW was operating on 'fictitious income' and constant budget shortfalls. The Director-General viewed this problem as rooted in the technical dimension, stating '... the source of the deficit is structural, and we should now unite to repair the damage, to restore adequate financing, and to ensure, through changes to the structure of the budget, that such a situation never recurs again.'[4]

However, a less widely known contributing factor to the budget crisis derives almost completely from the political/cultural dimension. The principles on which the budget instrument is based were developed by the PTS in 1995, in accordance with the principles of the accounting technique called Activity-Based Costing (ABC). This accounting process proved to be rather cumbersome, and became one of the key elements of the OPCW's financial difficulties. What went wrong? Two of the pillars of ABC were simply not implemented in full. These pillars are: (i) the mechanism for feedback into the budgeting process in order to modify unnecessary activities; and (ii) personal accountability, throughout the managerial chain of command, for any problems with budgetary objectives and/or resources. These are elements of the political/cultural dimension, reflected through political culture, how staff are

rewarded or disciplined, how personnel are held accountable, etc. Implementation of ABC accounting focused on the technical dimension, while the importance of the political/cultural dimension, especially of games and power structures, was neglected. Without feedback and accountability, the Secretariat was unable to modify ineffective activities or minimize financial waste—contributing factors to the crisis.

The financial famine forced a reduction of the Secretariat's activities across the board, which it carried out amidst growing discontent.

The financial famine forced a reduction of the Secretariat's activities across the board, which it carried out amidst growing discontent. The verification process in the industrial facilities of two countries resulted in outstanding uncertainties, mainly due to novel interpretations of the inspection teams' access rights and revisions of the definition of what constitutes the boundaries of the declared facility to be inspected ('facilities delineation'). There were also growing animosities among states parties concerning how well other parties were meeting their CWC obligations. Alliance and empire building, budgeting games and whistle blowing were played between the major states parties players and the Secretariat.

It is worth reflection that despite these administrative, financial and political problems, the states parties decided unanimously in May 2000 to renew the appointment Director-General Bustani for a second four-year term. While some might claim that this reflects the states parties faith in the OPCW and its leadership, others might suggest that it demonstrates a lack of interest in the work of the OPCW and essentially was a decision carried out through apathetic inertia.

By early 2002, the United States made it clear that it wanted a new Director-General, citing 'a steady decline in Bustani's performance'. The American-led initiative (backed by other states including Germany, Japan, Poland and the Republic of Korea) used covert and overt manoeuvres to lobby states parties (and Secretariat staff) for his removal. A range of tactics—asking him to step down, requesting his government to recall him and tabling a no confidence vote in the Executive Council—all failed. Rumours circulated that the United States was threatening not to pay its dues—which make up 22% of the OPCW's budget—if Bustani was not removed. The Secretariat was thrown in to a state of chaos, where game playing, staff divisions, jockeying for power and uncertainty about possible outcomes to the leadership crisis were the main daily activities.

In a final showdown, a special session of the CSP was called in April 2002. In his statement to the Conference, Bustani warned of the dangerous precedent 'whereby the Director-General or Secretary-General of any international organisation can be removed from office at any time during his or her tenure', in essence a situation where an organization is held hostage to the whims of a single state party. In a controversial decision of questionable legality, on 22 April 2002 the Conference removed the Director-General from office by a vote of forty-eight to seven, with forty-three delegations abstaining.[5]

Aftershocks of this power struggle shook the Secretariat to its foundations. A large number of personnel, including some of the 'founders', left the OPCW, thereby depriving it of a significant amount of institutional knowledge. This experience has raised concerns about how any multilateral organization—and the OPCW in particular—can fulfil its mandate in an independent way.

Moving towards adulthood (2002 and beyond)

The new Director-General, Ambassador Rogelio Pfirter, took the helm of the Secretariat in July 2002, indicating new priorities and challenges for the OPCW. In his acceptance speech, he noted that '[t]he Organization, the Member States of the Chemical Weapons Convention have been through one of the most complicated periods in its brief history'. He asserted:

> We wish to open a new chapter. First, one of my top priorities will be to ensure appropriate funding in 2003. The destruction of chemical weapons and their production facilities must be completed as soon as possible. A number of countries have yet to join the Organisation and should do so without delay. And finally, the Technical Secretariat must keep pace with new technological challenges and scientific advances to maintain the Convention's security relevance.

While it is too early to evaluate these changes and identify their implications for the Secretariat, it is worth noting that these priorities are related to the technical dimension. The new Director-General should be encouraged to tend to the important political/cultural dimension of the Secretariat.

The first Review Conference and beyond

The individuals present throughout the gestation and birth of the Secretariat developed a unique shared culture. As the OPCW grew, the degree of competence of the new staff was often traded off in political bargains, game playing spread distrust, and the politicization of the verification process poisoned the original culture through disaffection, inaction and bureaucracy. The image of the Secretariat as perceived by capitals was that the OPCW was just 'another UN organization'—a far cry from its original ideals and one that led to disillusionment and disappointment among many in the Secretariat.

Today, few things are as they were when the OPCW was first envisioned. Security threats, the structure of the chemical industry and verification techniques have all changed, and novel toxic chemicals or so-called 'non-lethal' agents pose new threats. Universality, export controls, innovative and safer verification techniques, the implementation of the general purpose criterion, as well as managerial skills and reforms of the administrative system loom large on the agenda of the first Review Conference. The Review Conference offers an opportunity to take stock of how the OPCW can meet these internal and external challenges and remain relevant in our changing world.

Successful responses cannot come from technical solutions alone but by accepting that the technical and political/cultural dimensions are so interlinked that these two distinct, independent elements are like a Möbius strip—where it is impossible to see where one ends and the other begins. Only through the mutual reinforcement of both dimensions will it be possible for the OPCW Secretariat to move forward in a way that couples future developments with the full strategic intent of the CWC.

Notes

1. The 23 September 1989 Memorandum of Understanding between the United States and the USSR.
2. *Statement by the Director-General to the Conference of the States Parties at its Third Session*, OPCW document C-III/DG.12, 16 November 1998. Official documents from the Conference of the States Parties are available on the OPCW web site. Go to <http://www.opcw.org/html/global/docs_frameset.html> and select the relevant session.
3. Data as 2 December 2002. See <http://www.opcw.org/ib>.
4. Opening Statement of the Director-General at the Sixth Session of the Conference of the States Parties, May 2001.
5. *Statement by the Director-General at the Special Session of the Conference of the States Parties*, OPCW document C-SS-1/DG.7 of 21 April 2002. Documents from the First Special Session of the Conference of the States Parties are available on the OPCW web site. Go to <http://www.opcw.org/html/global/docs_frameset.html>, click on 'C Series', and then on 'CSS1' on the top of the page.

Select online resources

compiled by Melinda MENNEL

Arms Control Today http://www.armscontrol.org/act/

Access current and past articles in *Arms Control Today*, journal of the Arms Control Association. 'Chemical Weapons Chief Removed at US Initiative' (May 2002) describes the successful American-led initiative to remove the OPCW's Director-General. 'The CWC: Has it Enhanced US Security?' (April 2001) outlines how the United States has weakened the CWC by not complying fully with its affirmative obligations and by failing to make use of mechanisms within the treaty, such as challenge inspections, to resolve compliance concerns.

Chemical and Biological Arms Control Program of the Federation of American Scientists
http://www.fas.org/bwc/index.html

Provides links to background information, publications, press releases, etc. Good section on non-lethal weapon research. Search complete site for chemical weapon-related information, such as documents concerning Iraq's covert programme.

Chemical and Biological Weapons Nonproliferation Program of the Center for Nonproliferation Studies at the Monterey Institute of International Studies
http://www.cns.miis.edu/cns/projects/cbwnp/index.htm

Monitors the global proliferation of chemical and biological weapons and develops strategies for halting and reversing their spread. Recent papers include 'The Chemical Weapons Convention: Implementation Challenges and Solutions', 'The Conduct of Challenge Inspection Under the Chemical Weapons Convention', and 'The CWC: Issues for the First Review Conference'. The Chemical and Biological Weapons Resource Page provides links to resources concerning CBW proliferation and terrorism (http://cns.miis.edu/research/cbw).

Chemical and Biological Weapons Nonproliferation Project of the Henry L. Stimson Center
http://www.stimson.org/cbw

Examines issues associated with chemical and biological weapons. Issues reports on topics such as weapons destruction technologies, the utility of export controls, terrorism involving chemical and biological weapons, and the status of chemical and biological weapons programmes in various countries. Site provides access to articles in the *CWC Chronicle*.

Chemical and Biological Weapons Reports and Statements of Pugwash Conferences on Science and World Affairs http://www.pugwash.org/reports/cbw/cbwlist.htm

Posts reports of Pugwash meetings; nos. 16 and 17 are particularly relevant.

Harvard Sussex Program on Chemical and Biological Warfare Armament and Arms Limitation
http://www.sussex.ac.uk/spru/hsp/ or http://www.fas.harvard.edu/~hsp/

Provides information about the research programme and the CBW regime, and access to the *CBW Conventions Bulletin*, which contains articles such as 'The Chemical Weapons Convention and the OPCW: The Challenges of the 21st Century' and 'What should be the scope of the CWC?'.

International Security Information Service
http://www.isisuk.demon.co.uk/0811/isis/uk/regpapers/no75.html

'Controlling Chemical Weapons' reviews the first two years of the convention and defines some of the linkages between the CWC and BWC.

International Union of Pure and Applied Chemistry
http://www.iupac.org/news/archives/2002/report-to-OPCW.html

Contains the report 'Impact of Scientific Developments on the Chemical Weapons Convention'.

The Markland Group http://www.hwcn.org/link/mkg/

Works for compliance with disarmament treaties. Their newsletter, *Compliance Matters*, regularly features articles about chemical weapons and the OPCW. The full text of Markland Group Papers, such as 'Statement re Dismissal of OPCW Director General', are also available online.

National Council for Science and the Environment
http://www.cnie.org/NLE/CRSreports/waste/waste-25.cfm

'IB94029: Chemical Weapons Convention: Issues for Congress' outlines the American administration's stance on the CWC, including ratification and implementation, universality and verification. Links to relevant government documentation.

Nuclear Threat Initiative http://www.nti.org/e_research/e3_issues.html

Issues and Analysis section of the Research Library provides links to current issue briefs, such as 'Dusty Agents and the Iraqi Chemical Weapons Arsenal'. Each brief has an introduction and an excellent set of further reading and resources. Briefs are prepared by the Center for Nonproliferation Studies. See also 'Treaty Parties Grant Significant Budget Increase', which addresses the steps taken by the OPCW to restore financial stability (http://www.nti.org/d_newswire/issues/2002/10/15/7s.html).

Organisation for the Prohibition of Chemical Weapons http://www.opcw.org

Presents the text of the convention, official documents, an introduction to the organization, news and the newsletter *Synthesis*.

Preventing Chemical Warfare: Strengthening the Chemical Weapons Convention
http://www.brad.ac.uk/acad/scwc/

Project of the Department of Peace Studies, University of Bradford. Newly constructed site provides background papers and conference papers concerning the Chemical Weapons Convention.

SIPRI Chemical and Biological Warfare Project http://projects.sipri.se/cbw/

Contains papers and fact sheets on such topics as maintaining the effectiveness of the CWC, universality, terrorism, and compliance issues. Links to relevant *SIPRI Yearbook* chapters, policy papers such as 'Maintaining the Effectiveness of the Chemical Weapons Convention', and an excellent educational module.

The South African Chemical and Biological Warfare Programme at the Centre for Conflict Resolution
http://ccrweb.ccr.uct.ac.za/cbw/cbw_index.html

Undertakes research on South Africa's chemical and biological warfare programme that was established during the apartheid era. Site includes detailed weekly reports of the trial of Wouter Basson.

The Sunshine Project http://www.sunshine-project.org

Works to strengthen the global consensus against biological warfare and to ensure that international treaties effectively prevent the development and use of biological weapons. The site contains information on American research on chemical non-lethal weapons.

Verification, Research, Training and Information Centre http://www.vertic.org/contents.html

Promotes effective and efficient verification as a means of ensuring confidence in the implementation of international agreements. Relevant papers include 'Getting Verification Right: Proposals for Enhancing the Implementation of the Chemical Weapons Convention', 'Exploiting Synergies Between Non-Proliferation Verification Regimes: A Pragmatic Approach', and 'Verifying Chemical Weapons Destruction: a Long, Slow Haul'. Site includes access to VERTIC's journal, *Trust and Verify*.

OPEN FORUM

Tactical nuclear weapons in South Asia: the need to disavow development and deployment

India and Pakistan have a window of opportunity at this time to disavow the development and deployment of very low-yield nuclear weapons in the sub-kiloton or 1–2 kiloton range. Weapons such as these have apparent utility on a battlefield, and in compact forms can even be fired from artillery guns. They may have limited blast damage radii measured in hundreds of meters, cause relatively low levels of casualties, and are aimed primarily at military targets. The control of such weapons, once deployed, is problematic, as their control may be delegated to battlefield commanders. They could also be more susceptible to misuse than strategic weapons kept under a more centralized command structure.

Recently, the United States National Academy of Sciences issued a report on Technical Issues Related to the Comprehensive Nuclear Test-Ban Treaty.[1] The panel of experts that wrote the report concluded, amongst other matters, that India and Pakistan probably need additional tests to develop low-yield compact weapons in the 1–2 kiloton and lower range, though they might be able to do so with great difficulty using sub-critical or very low-yield clandestine tests. Given their current moratorium on tests and their need for additional tests, it is possible therefore that India and Pakistan have not yet developed small and compact nuclear weapons of very low-yield—although India demonstrated such a capability through its sub-kiloton tests in May 1998.

Pakistan has a 'first use' policy towards nuclear weapons—that is, Pakistan will not hesitate to use nuclear weapons if faced with a sufficiently threatening conventional defeat of its armed forces. This is similar to the American policy of Flexible Response enunciated by the United States Secretary of Defense Robert McNamara in 1962 that 'the United States is also prepared to counter with nuclear weapons any Soviet conventional attack so strong that it cannot be dealt with by conventional means'. Pakistan's policy implies that 'first use' may be directed against Indian conventional forces, such as forward airfields, armoured columns and troop formations. Pakistan's first use is not likely to be an all-out pre-emptive strike against Indian nuclear capabilities and cities. This creates a problem for Indian strategic thought—if Pakistan's first use of nuclear weapons is tactical in nature, and limited to an attack on Indian military forces, perhaps even primarily on Pakistani territory, India's reliance on deterrence based on punitive retaliation could be called into question.

Without the possession of tactical nuclear weapons, and without the option of a flexible, measured and proportionate response, the Indian Prime Minister may be faced with the grim options of either

calling for a massive and suicidal attack against Pakistani cities in response to a limited tactical use of a low-yield nuclear weapon by Pakistan or surrendering. This could well be called the 'incredible nuclear deterrent', rather than India's professed aim to create a 'credible minimum nuclear deterrent'! Further, if India has no tactical nuclear weapons, then Pakistan will expect a massive retaliation from India for Pakistan's use of a tactical weapon. This could create an incentive for Pakistan to launch a more massive pre-emptive strike, if Pakistan were ever faced with the situation of being forced to use a tactical nuclear weapon for gains against a conventional Indian force.

One might mistakenly conclude, therefore, that the development and deployment of tactical nuclear weapons of low-kiloton yields by India and Pakistan is apparently beneficial—in that, if deterrence fails, the destruction caused by a nuclear exchange restricted to small tactical weapons may be limited, though there are no guarantees that the exchange would not escalate out of control. In actuality, the development and deployment of tactical nuclear weapons will be detrimental—making the use of nuclear weapons more probable, and deterrence less stable.

India's Draft Report of the National Security Advisory Board on the Indian Nuclear Doctrine does address the issue of India's possible response to tactical nuclear weapons use by an adversary though not very explicitly—and probably purposefully and rightfully so, to maintain ambiguity regarding India's resolve to escalate in a crisis. The draft doctrine states that India's 'peacetime posture aims at convincing any potential aggressor that … *any nuclear attack* on India and its forces shall result in punitive retaliation with nuclear weapons to inflict damage unacceptable to the aggressor' [emphasis added]. The phrase 'any nuclear attack' obviously includes a tactical nuclear attack. The Indian draft doctrine further states that India will 'not be the first to initiate a nuclear strike, but will respond with punitive retaliation should deterrence fail'. This raises the possibility that even against the use of a tactical nuclear weapon, India may escalate to a far greater retaliation—that is, one that is unacceptable, assuming that a smaller retaliation with tactical nuclear weapons may be acceptable to the aggressor. The question is—what is 'punitive retaliation' and 'unacceptable damage'? By remaining deliberately ambiguous, and not stating explicitly that the Indian punitive response will be proportionate, the Indian draft doctrine creates doubts for any potential aggressor, and increases in the aggressor's mind the potential risks associated with the use of tactical weapons. The Indian draft doctrine, however, also states that the 'strategic environment, technological imperatives and the needs of national security' will decide the 'actual size components, deployment and employment of nuclear forces'. Therefore, 'punitive retaliation' could well be a measured and proportionate response as long as it is unacceptable to the aggressor. The doctrine, therefore, holds open the possibility of India developing and deploying tactical nuclear weapons.

The problem for India and Pakistan with developing and then deploying tactical nuclear weapons is that this will make imagining 'limited nuclear war' more feasible and weaken deterrence. A limited nuclear war is certainly preferable to an all-out devastating nuclear exchange directed at major cities and agricultural and industrial infrastructure. However, the capability to engage in a limited nuclear exchange *increases* the likelihood of such an exchange actually occurring.

Therefore, now may be the time for both India and Pakistan to unilaterally declare that they will not develop and deploy tactical nuclear weapons.[2] It is possible that an agreement between India and Pakistan disallowing the development and deployment of tactical nuclear weapons of low-kiloton range may be of value to both in terms of strengthening deterrence stability. Such an agreement could pave the way for developing the infrastructure for intrusive monitoring and verification that will be needed in the future if the two countries ever decide to limit or eliminate nuclear weapons altogether. In the interim, instead of a mutually agreed upon framework, the two countries could simply adopt unilateral pledges to never develop and deploy tactical nuclear weapons.

A similar situation exists between India and China regarding tactical nuclear weapons—that is, it would be destabilizing for either or both to deploy such weapons against the other. China has already developed tactical nuclear weapons. India and China have pledged 'no first use' of nuclear weapons. They could strengthen their pledges by stating that they will also never deploy tactical nuclear weapons against the other.

India could take the lead in this regard in South Asia. India could make a pledge similar to its 'no first use' policy. Reserving the right to develop tactical weapons if needed, India could pledge that it would never be the first to develop and deploy tactical nuclear weapons against an adversary.

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The writer is an independent researcher and consultant on nuclear and environmental affairs based in New Mexico, United States of America. The views expressed here are entirely his own.

Notes

1. National Academy of Sciences, Committee on Technical Issues Related to Ratification of the Comprehensive Nuclear Test Ban Treaty, 2002, *Technical Issues Related to the Comprehensive Nuclear Test Ban Treaty*, Washington, DC, National Academy Press, available at <http://www.nap.edu/books/0309085063/html/> or <http://www.nap.edu/html/ctbt/>.
2. If either country has already developed tactical nuclear weapons (there is considerable ambiguity regarding the nature of each country's nuclear weapons capability), then the declaration could be to never deploy such weapons against the other.

The Weapons for Development Project: Monitoring and Evaluating Weapons for Development Experiences

At the end of many violent conflicts, enormous numbers of small arms and light weapons remain in circulation. These weapons jeopardize reconstruction efforts, as they can contribute to crime, continuing insecurity, and even to the re-emergence of conflict.

Voluntary weapons collection efforts have been a popular measure to remove weapons from circulation in the post-conflict period. The first weapons collection programmes targeted *individuals* by offering incentives such as cash, agricultural tools, toys and so forth in exchange for weapons. These efforts have evolved with the realization that working with a group, rather than individuals, offers a better chance of a successful outcome. Today, collection programmes known as 'weapons for development' offer the *whole community* (rather than a single owner) goods and/or services in exchange for weapons.

Collection efforts have been traditionally evaluated in quantitative terms, such as how many weapons have been collected in total. While certainly meeting the objective of removing weapons from circulation, these programmes do not offer an understanding of the social, political, economic and environmental contexts that feed the desire to obtain or retain weapons once a conflict has ended. Additionally, most programmes include little or no feedback from the stakeholders. For example what kinds of incentives do the communities themselves consider most appropriate? What implementation strategies should be pursued to ensure that the benefits of the project reach all of the intended beneficiaries? How do donors assess the return on their money?

It is with a view of answering these questions that UNIDIR has launched the *Weapons for Development Project: Lessons Learned from Weapons Collection Programmes*. Through evaluation of a number of weapons for development projects, the project will compile lessons learned and help to identify best practices. This information will make a valuable contribution to policy-makers, donor countries, United Nations agencies and NGOs, helping them to devise better strategies and incentives for weapons for development projects.

In each issue of *Disarmament Forum*, UNIDIR Focus highlights one activity of the Institute, outlining the project's methodology, recent developments in the research or its outcomes. UNIDIR Focus will also present a detailed description of a new UNIDIR publication. You can find summaries and contact information for all of the Institute's present and past activities, as well as sample chapters of publications and ordering information, online at www.unidir.org

This project is based on a participatory monitoring and evaluation (PM&E) approach. PM&E places the stakeholders themselves at the centre of the assessment and oversight process, enabling shared ownership of the project and its results. Community involvement in the process also serves a valuable awareness-raising function.

The project will monitor and evaluate weapons collection programmes in a range of countries, including Albania, Angola, Brazil, Cambodia, Mali, Mozambique, Papua New Guinea, Sierra Leone and Sri Lanka. The results of meetings, workshops and fieldwork will be synthesized into policy-relevant findings that can lead to better targeted and more successful weapons for development programmes.

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Project Coast: Apartheid's Chemical and Biological Warfare Programme

In the early 1990s, acknowledging publicly (and dismantling) its nuclear weapons programme allowed South Africa to take a moral lead in the prevention of nuclear weapons proliferation and in pursuit of global nuclear disarmament. Perhaps in much the same way, the revelations over South Africa's covert chemical and biological warfare (CBW) programme and the transparency with which the government has dealt with them, have enabled South Africa to vigorously pursue the global effort to ban biological weapons and take a lead role in the negotiations for strengthening the 1972 Biological and Toxin Weapons Convention. Openness concerning its experience during the apartheid years lends real credibility to South Africa's ethical and practical stance on international disarmament. South Africa went to the edge and beyond and then—under a new, enlightened regime—came back.

South Africa's covert CBW programme, code-named Project Coast, began in 1981 under the apartheid regime and ended formally in 1995. Ostensibly motivated by the need to develop better crowd calming agents for use by the police forces and defensive CBW capabilities for the armed forces, in practice the programme focused on the production of toxins intended for the assassination of state enemies within and outside the country and of chemical agents that lacked any calming properties whatsoever.

Conceived and operated beyond ordinary political, military and financial controls, Project Coast functioned on the basis of a myriad of personal relationships and invisible power structures. Project work was conducted at a number of front companies and supported by illicit foreign transactions. Its management was placed in the hands of Dr Wouter Basson, who was given enormous latitude in running the programme. Although in principle subject to formal controls, Basson worked through informal channels that explicitly evaded the normal chain of command.

Based on the evidence presented at the criminal trial of Dr Basson, the testimony and documents submitted to the Truth and Reconciliation Commission and interviews with other major figures associated with the programme, *Project Coast: Apartheid's Chemical and Biological Warfare Programme* by Chandré Gould and Peter Folb offers a meticulous account of South Africa's clandestine CBW programme under apartheid. Preceded by a vibrant foreword by Archbishop Desmond Tutu, the book makes a major contribution to our knowledge of South Africa's apartheid CBW programme and serves as a reminder of the perennial dangers of proliferation in the absence of adequate international controls.

Project Coast: Apartheid's Chemical and Biological Warfare Programme

Chandré Gould and Peter Folb
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