

UN Vision Project on Global Public Policy Networks

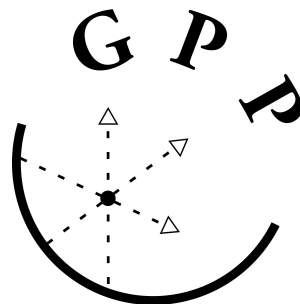
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THE TRILATERAL NETWORK ASSOCIATED WITH THE CHEMICAL WEAPONS CONVENTION

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Case Study for the UN Vision Project on Global Public Policy Networks



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Abbreviations

AG	The Australia Group
BW	Biological Warfare
BWC	Biological Weapons Convention
CBI	Confidential Business Information
CBW	Chemical and Biological Warfare
CD	Conference on Disarmament
CEFIC	Council of European Chemical Industry Federations
CMA	Chemical Manufacturers Association
CSP	Conference of the States Parties
CW	Chemical Warfare
CWC	Chemical Weapons Convention
DOCs	Unscheduled Discrete Organic Chemicals
ENDC	The Eighteen-Nation Committee on Disarmament
GICCW	Government-Industry Conference Against Chemical Weapons – Canberra
IAEA	International Atomic Energy Agency
INF	The 1987 US-Soviet Intermediate-Range Nuclear Forces Treaty
JCIA	Japan Chemical Industry Association
NA	National Authority
NATO	North Atlantic Treaty Organisation
NTIs	National Trial Inspections
NPT	Non-Proliferation Treaty
OPCW	Organisation for the Prohibition of Chemical Weapons
PrepCom	Preparatory Commission
TS	Technical Secretariat
UN	United Nations
UNSCOM	United Nations Special Commission
US	United States

1. Introduction

This paper presents an analysis of how actors from the public, private and civil sectors came together to deal with a global issue: chemical warfare (CW) armament. The issue of CW armament had been approached by several entities at different levels of international organisation such as the Western European Union (WEU), the Eighteen-Nation Committee on Disarmament (ENDC), the North Atlantic Treaty Organisation (NATO) and the Australia Group (AG). However, the Geneva Conference on Disarmament (CD), where the intergovernmental negotiations to ban CW armament started in earnest in 1984 after more than a decade of talks within its antecedent bodies and from which the 1993 Convention on the Prohibition of Chemical Weapons (the CWC) resulted, was the only forum capable of providing a global and effective policy output –the CWC. Moreover, this global policy output had been shaped through the interactions of a trisectoral network. Our case study will therefore focus its analysis on the particular CW network that led to the conclusion of the CWC, and which has since been involved in implementation of the CWC.

The CWC prohibits the development, production, acquisition, stockpiling, retention, transfer and use of chemical weapons. This multilateral disarmament *cum* anti-proliferation treaty was opened for signature on 13 January 1993 and entered into force on 29 April 1997.

The CWC may be regarded as the first concrete manifestation of the statement adopted by the United Nations Security Council in January 1992, when it met for the first time ever in summit session. The statement displayed a new resolve on the part of the international community to undertake measures against proliferation of weapons of mass

destruction¹. Member states declared any such proliferation to be "a threat to international peace and security" and committed themselves to cooperate so as "to prevent the spread of technology related to the research for or production of such weapons and to take appropriate action to that end".

The CWC is a new type of treaty because not only does it affect a large and global civilian industry –the chemical industry– but the nature of the technology that the CWC aims to control is "dual-use", thus necessitating a link between an arms control treaty and civilian industry. While the nuclear weapons Non-Proliferation Treaty (NPT) also reached into the civil sector, the civilian nuclear industry was a tiny one in comparison to the chemical industry and had entirely grown out of weapons production. Chemical weapons, in contrast, are rooted in an enormous and long-established civilian industry. The implementation of the CWC thus gives rise to a new and fundamentally different type of practice in arms control.

Because of the dual-use character of chemical technology, an instrument for policy intervention in the CW armament issue had to be devised that would control technology. In essence, the device was to require the chemical industries of states party to the CWC to account for the use of specific chemicals identified in control schedules. This is done through declarations of activities related to these scheduled chemicals and on-site inspections by an international inspectorate to validate the declarations. Moreover, trade in scheduled chemicals is to be controlled or prohibited. The CWC thus implies major changes that have no antecedents in arms control. The unprecedented scope and

¹ Weapons of mass destruction are defined as "atomic explosive weapons, radioactive material weapons, lethal chemical and biological weapons, and any weapons developed in the future which have characteristics

complexity of a compliance-verification system covering the entire chemical industry made the CWC the most complex arms control and disarmament treaty ever negotiated.

The trisectoral approach to the CWC is an interesting analysis for at least two reasons. First, the network analysis allows a certain distance to be taken from the subject studied – the ban on CW armament – so as to examine at a more aggregated level how different parties with varied interests came to play a role in the final policy. Secondly, the analysis is important for other disarmament and non-proliferation treaties, such as the projected Biological Weapons Convention (BWC) Protocol, where there is opportunity to learn lessons and avoid errors.

This paper is organised into six sections. After the introduction (section 1), section 2 – *Pre-network situation: The nature of the CW problem* – presents the issues that were to be addressed by the CW network, and then gives an overview of the global public policy – the CWC – that the CW network achieved.

In section 3 – *Initiating the CW network: Origin and Purposes of the CW network* –, we analyse the origin of the network, the specific circumstances under which the network was created and review the main interests of the private sector as well as the role of the civil sector at the outset of the CW network.

Section 4 – *Policy formulation and negotiation of the CWC* – reviews the role of each sector during the negotiations of the global public policy and their particular inputs into the CWC.

Section 5 – *Implementation of the CWC* – reviews the implementation of the CWC two and a half years after its entry into force. It presents first the evolution of the network and the problems encountered. Secondly, it reviews the current major implementation

problems and their consequences for the policy. Finally, it examines the solutions put forward to try to manage these problems by some of the network actors.

Conclusions and policy implications are presented in section 6.

2. Pre-network situation : The Nature of the CW Problem

2.1 *The Nature of the CW Problem*

2.1.1 Weaknesses of the underlying regime outlawing chemical weapons

Chemicals have been used as weapons since antiquity and their proscription seems as ancient as the weapons themselves. Toxic warfare regulations can be found in the Manu laws of India, in Roman Law and in the "law of The Hague" of more recent times that has sought to modernise the law of warfare, as in the 1899 Gas Projectile Declaration and in the 1899 and 1907 Regulations on Land Warfare. However, following the extensive use of chemical weapons² –notably chlorine, phosgene and mustard gas– during World War I, the international community agreed to strengthen the existing regulations prohibiting the use of toxic chemicals as a method of warfare with the 1925 Geneva Protocol.³ This treaty prohibits "the use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices", as well as "bacteriological methods of warfare", hence also encompassing the prohibition of the use of biological weapons.

However, this Protocol has, by today's standards, several important shortcomings. Amongst them, the Protocol solely outlaws the use but not the production, stockpiling or transfers of chemical weapons; it lacks provision for international procedures in the event of alleged non-compliance; and finally there is a general understanding that the Geneva Protocol is a no-first-use agreement, not an absolute prohibition, thus allowing place for the possibility of retaliation in kind, even legitimisation for possessing the means of such retaliation.

² Chemical weapons are weapons that work through toxicity.

³ The 1925 Geneva Protocol entered into force on 8 February 1928 and had 145 states parties as of

The weaknesses of the underlying regime outlawing CW plus the signs of resurgent interest in CW in the 1960s were thus some of the reasons for which members of the international community decided to put their efforts towards the reinforcement of the existing regime. As one of us has argued, the CWC was response to "a widespread sense that the existing regime of international law and custom which inhibited resort to toxic warfare was coming under increasing threat, and that it might well prove to be in the best interests of all states if the regime, symbolised by the Geneva Protocol of 1925, were somehow strengthened" (Robinson, 1993:37). Moreover, as of the 1960s, the regime lacked important parties such as the US and Japan. Military alliances that included such non-parties, for example NATO, did not find easy, therefore, to formulate collective policy towards CW.

2.1.2 The military value of CW armament

The military usefulness of chemical weapons has been, and still is, controversial. Resort to CW since World War I has been infrequent.⁴ This may either imply that the regime outlawing this form of warfare was indeed influencing state behaviour, or that toxic weapons were only of limited utility –*viz.* useful in some, not all, situations.⁵ The second view tended to prevail. Indeed, due to the latest technologies, rich militarised countries could afford new types of weapons, which were deemed more powerful in comparison with CW armament (e.g. nuclear weapons). Moreover, these countries could develop antichemical protection, thus negating much of the value of chemical weapons. The main reason why CW remained largely unused during World War II was probably that

November 1999, including the five Permanent Members of the United Nations Security Council.

⁴ There have been less than a dozen proven occurrences of poison-gas warfare in the several hundred wars that have been fought since then.

⁵ Both guerrilla and counter-insurgency warfare provide scenarios in which CW has seemed to have greater utility than in other forms of warfare.

technological development had favoured other forms of warfare during the interwar period, meaning that CW armament had, after all, not become fully assimilated into the military doctrine and force structures of the industrialized countries. Because the weapons were unassimilated when war came, their possessors were content to be deterred from using them.

However, there were two other factors which were responsible for the keeping of chemical weapons in the arsenal of rich industrialised countries after their surprising non-use in World War II: first, the scientific discoveries of three important elements which dramatically increased the usefulness of CW –namely the discovery of new classes of quick-acting poison, notably the nerve gases; the feasibility of the use of pathogenic microbes as payload for munitions, and the discovery of herbicides, as deadly to plants as the nerve gases were to people. Associated with all of this was the role played by the chemical warfare institutions: notably the Russian Chemical Troops and the US Army Chemical Corps. An eradication of chemical weapons entailed not only the destruction of the weapons, but also of their related CW institutions. This was certainly also a reason why countries such as the US, the former Soviet Union, the UK and France continued their chemical armament efforts after World War II (Robinson, 1981b and 1989b).

But all these CW armament programmes had come to an end by the beginning of the 1990s. We have argued elsewhere that the main reason was a "slowly building realisation that the promise held out by those wartime discoveries was actually a false promise: that scientific developments were not after all, capable of overcoming the inherent technical limitations of toxic warfare to the point where its weapons had more than marginal utility. (...) Incentives began to grow, therefore, for deproliferation" (Robinson, 1993:47). However, these Western incentives for deproliferation were not universal and in other parts of the world quite a different analysis might prevail: in the

absence of anti-chemical protection, chemical weapons could be seen as attractive cheap force-multipliers (Robinson, 1987).

2.1.3 The "Dual-Use Technology" Problem and Civil-Military Relationships in CW

"Dual-use technology" is a technology that may be applied for both civilian and military purposes. Chemicals represent a pure dual-use technology. In other words, a chemical used for commercial purposes in a civilian industry could be turned into a CW agent in a military facility. For example, thiodiglycol, a chemical substance used for making ink for ball-point pens is also a precursor of mustard gas. Not only chemicals, but also equipment, facilities, skills and knowledge can serve dual uses. Theoretically, many civilian industries may serve military purposes without involving radical changes.⁶

As regards transfer of chemical dual-use technologies, the military sector relied, and still relies, on innovation originating from the civilian sector. It was the birth and growth of industrial chemistry in Europe during the 19th Century that "brought toxic weapons out from their prehistory" (Robinson, 1998a:17), and therefore the civilian chemical industry played a central role in the technological changes that have occurred in chemical weaponry. Military laboratories for CW research and development (R&D) had been responsible only for minor developments in CW agents, while most of the major innovations and breakthroughs originated in the civilian industry (Robinson, 1981a and 1992).

A more recent example of the reliance of the military sector upon the civilian industry comes from Iraq. In 1984, the United Nations Secretary-General provided conclusive verification that chemical weapons were being used in the Iraq-Iran War;

⁶ During World War I, the conversion of the German chemical dyestuff industry to the production of CW agents did not require fundamental changes. See Haber, 1986.

though unnamed at that time, Iraq was clearly the responsible party. Some years later, it was found that the Iraqi CW facilities had relied upon chemical technology supplied by Western European chemical companies such as the German firm Karl Kolb GmbH. This had several effects. It accelerated the Geneva negotiations and created the Australia Group (AG)⁷ in 1985. It also raised another point; the fact that the chemical economy is becoming increasingly international, and that individual states or companies are unable to control their technology transfers through the sole control of national exports, even where this control exists. The Iraqi case called for international co-operation in the field of chemical dual-use technology. It also revealed to the members of the international community their interdependence in terms of an awareness of mutual vulnerability (see Vogler, 1992:132), thus bringing the problem of governance for dual-use technology at the international level. However, a fundamental problem of international governance is the absence of a central agency of rule (Kratowil and Ruggie in Ashley, 1989:252) where no "world-government" exists. McGrew (1992:318) argues that "as a consequence, international regime and institutions of global management tend to lack the authoritative means to ensure compliance with their decisions".

The dual-use nature of technology thus posed problems regarding its governance. A proper balance had to be found between interdiction and permission of dual-use technology; and a policy had to be designed in order to enable as well as prevent the use of dual-use technology.⁸ The growing dependency of military products upon dual-use

⁷ The AG which first met in Paris, at the Australian Embassy, in 1985 as an outgrowth of intra-European consultations the previous year in Brussels, is an informal group which functions by consensus. It is today composed of 30 members and 1 observer. Created as a consequence of the use of CW during the 1980s Iran-Iraq War and the discovery that Iraq had used chemicals international trade and other related technologies to build its chemical and biological warfare (CBW) facilities, it is aimed at harmonising national exports and measures on relevant chemical materials in order to halt the spread of CBW. The AG has an export control list for CW and BW agents and a "warning list" of items which are deemed very sensitive dual-use technologies.

⁸ We are concerned here with the misuse of dual-use technologies, *i.e.*, the appropriation for undesired purposes, such as the production of weapons of mass destruction, of a technology which has legitimate

technologies originating from the civilian sector led to the problem of technology control. This also stresses the difficulty of controlling dual-use technology without affecting the legitimate civilian use. Indeed, it would have been unwise and unfeasible to ban outright, through a global treaty, some of these dual-use technologies which are crucial for the well-being of the society.

2.2 *Overview of the CWC*

The CWC bans an entire class of weapons –those of CW– and requires the destruction of existing stocks of the weapons as well as the dismantling of the related production facilities. It also establishes a technology control system seeking to preclude new CW armament. In this sense, the CWC is a revolutionary treaty because it affects the civilian chemical industry in regards to the dual-use characteristic of chemicals. These two features –disarmament and anti-proliferation– are assured through an ambitious verification system.

The CWC, which establishes an international organisation, the Organization for the Prohibition of Chemical Weapons (OPCW)⁹ that oversees the implementation of the CWC, prohibits all toxic chemicals and their precursors –all chemicals which may produce any toxic chemicals– "except where intended for purposes not prohibited under this Convention, as long as the types and quantities are consistent with such purposes"¹⁰. By having such a wide scope –the CWC essentially embraces all chemicals– the CWC

purposes in the civilian sector.

⁹ The OPCW is based in The Hague and is composed of the Conference of the States Parties (CSP) in charge of the general policy; the Executive Council (EC) which deals with the day-to-day functioning of the OPCW; and a Technical Secretariat (TS) which is the staff of the organisation and runs the verification system. A relationship agreement between the OPCW and the UN is currently nearing completion.

¹⁰ This is the General Purpose Criterion. The purposes not prohibited by the treaty are, according to Article II, industrial, agricultural, research, medical, pharmaceutical or other peaceful purposes; protective purposes, military purposes not connected with the use of chemical weapons and law enforcement including domestic

ultimately reaches civilian research and industry. The particularity of the CWC is that it bans CW not in terms of particular chemical products but in terms of purposes –the General Purpose Criterion. This means, for example, that the production of thiodiglycol is not proscribed by the CWC if it is for a purpose not prohibited and if the quantity in which the thiodiglycol is produced is consistent with that purpose.

The fact that the CWC is not a ban on a particular chemical technology but a ban on activities whose purposes are prohibited under the CWC was necessary because the technology the CWC wishes to control is dual-use. In this sense, the CWC allows the use of dual-use technologies for peaceful, commercial non-prohibited purposes and by this means, valued civil applications of dual-use chemicals can proceed unhindered by the strictures of the treaty. The General Purpose Criterion allows the Convention not to become technologically fixed because it permits for the CWC to cope with technological change in encompassing all chemicals, already known ones but also new ones.

Given the scope of the Convention, its system for verifying compliance is ample and very ambitious. In order to facilitate control in terms of production, consumption and transfers, the CWC negotiators have grouped specific chemicals and their precursors into three schedules, according to categories of risks.¹¹ These Schedules are subject to a different regime of declarations and inspections

riot control purposes.

¹¹ Schedule 1 lists highly toxic chemicals –such as Sarin and VX– which have few peaceful purposes. Schedule 1 chemicals are, in effect, banned from production for industrial or commercial purposes. Schedule 2 and Schedule 3 respectively include high toxic and moderate toxic chemicals, which are dual-use because of their important peaceful as well as CW applications. Production and use of Schedule 2 and 3 chemicals, which are allowed for commercial and industrial purposes, must be declared if facilities that are using or producing one or more of these chemicals annually produce or consume more than a given reporting threshold of particular chemicals. Facilities will also be subject to routine inspections if they annually produce or consume more than a given inspecting threshold. Since Schedule 2 chemicals are considered more of a risk than Schedule 3 chemicals and are not produced in large commercial quantities, inspections are lengthier and more frequent for Schedule 2 than for Schedule 3 chemicals. During an inspection of Schedule 2 facilities, inspectors will be permitted to take data (samples and records); they will ask for permission to take these in Schedule 3 facilities.

Transfers of Schedule 2 and 3 chemicals are subject to different regimes. After the completion of the third

and transfers in accordance with their degree of risk they represent for the CWC. The verification tasks have also been divided between two levels of governance, the national level of the states parties with the National Authorities (NA) and the international level with the OPCW, thus establishing an NA/OPCW division of labour (Robinson, 1994).

At national level, states parties are required to enact national legislation to implement the CWC in their country and to establish a NA. These NAs are required to collect data declarations from chemical facilities, to transfer these, in aggregate form, to the OPCW, and to assist the OPCW international inspectorate during the inspection of a chemical facility. The OPCW supervises two types of inspections as regards the scheduled chemicals mentioned above: the routine inspections designed to validate data of the states parties declarations, and the challenge inspections designed to investigate allegations of non-compliance with the treaty.

The CWC encompasses a vast, complex and unprecedented array of procedures. But it is through these procedures that the regime is acquiring a real substance. Indeed, by having a strong verification system, the CWC regime acquired the capacity for ensuring compliance, which was essential given the lack of authoritative means at the international level. And, thanks to the General Purpose Criterion, the CWC is flexible, like the technology it wants to govern. It *enables* dual-use technologies as well as, through its verification system and export control, *controls* and *prevents* their misuse. In other words, the CWC is a disarmament and non-proliferation treaty but also a means for the

year of entry-into-force of the CWC (May 2000), transfers of Schedule 2 chemicals will be prohibited except among states parties of the CWC. Meanwhile, chemicals may be exported to non-states parties only with an end-use certificate. Schedule 3 chemicals may be transferred without encumbrance except for non-states parties where an end-use certificate must be provided.

Other chemical plant sites annually producing by synthesis more than 200 tonnes per year of unscheduled discrete organic chemicals (DOCs), or facilities producing by synthesis more than 30 tonnes per year of an unscheduled DOCs containing phosphorus, sulphur or fluorine (referred as "PSF-plants" or "PSF-chemicals") have also to be declared, except facilities that exclusively produce hydrocarbons or explosives. Only after the CWC will have been in force for three years (May 2000), will these facilities be subject to routine inspection.

international governance of dual-use chemical technology.

2.3 Conclusions

This section reviewed the principal underlying problems which led the international community to consider CW armament as a global problem, and resulted in the CWC –a global public policy. Three issues –the weaknesses of the regime in place, the military value of CW and the dual-use technology– constituted the basis of the future global public policy and the problems to be dealt with by the future CW network. These issues also suggest the kind of actors and accommodations the future CW network will have to encompass and negotiate in order to shape a policy which will be implementable and effective. The constellation of the three issues that have led to the initiation of the CW network was thus a mixture of stalemate and emergence of issues. Stalemate in the sense of weaknesses in the CW regime, and emergence of issues in the sense of dual-use technology and military value of chemical weapons.

3. Initiating the CW network : Origin and Purposes of the CW Network

3.1 Getting the public actors together: Origin of the CW network

The intergovernmental talks on chemical (and biological) weapons started in 1968 at the Eighteen-Nation Disarmament Committee (ENDC) –later transformed into what became the Conference on Disarmament (CD)– in Geneva and ended in 1992 with agreement on the text of the CWC. Chemical and biological warfare (CBW) armament had hardly been mentioned in international fora before 1968. Other East-West arms talks had taken the lead over CBW issues, notably the negotiation of a partial nuclear weapons test ban and a nuclear Non-Proliferation Treaty (NPT). It was only after these arms talks had been concluded that CBW entered the Geneva agenda. The assent of the two superpowers to place CBW on the CD agenda was a sign, especially coming from the US¹², that real and serious arms control progress could be made among the public actors.

¹² The background to the proposal by Sweden that the ENDC should take up CBW was Egypt's resort to poison gas warfare in the Yemen and, more conspicuously, the upsurge in the chemical warfare (though not gas warfare) which the United States, not yet a party to the Geneva Protocol, was conducting in Vietnam.

It was the public sector –namely the military, the intelligence and the *détente*-promoting circles of a relatively small number of countries, mostly in the North–, that formally initiated the CW network. However, this formal start had been promoted by informal domestic and civilian stimuli rooted in opposition to the Vietnam War. In US domestic politics, the increasing use of chemical weapons in Vietnam made CBW into a symbol of that war, so much so that influential figures in government came to believe that opposition to the war might be reduced if steps were taken to suppress CBW. And the fact that the most heavily used chemical weapons were directed against food crops and jungle cover brought the growing environmentalist movement in the US into common cause with the anti-war movement.

This gathering of part of the public sector appeared at the end of the 1960s when some individuals in these countries, particularly coming from the two superpowers and the UK, came gradually to the conclusion that the military usefulness of CW armament was of greater value to their potential enemies than to their own countries; that it was in their interests to suppress cheap weapons of mass destruction and finally that there was more which they could gain by giving the weapons up than by continuing to retain and develop them.

These Northern views were not entirely shared by countries from the South, particularly where it was believed that deterrence relationships could keep the peace. As a policy objective, such counter-proliferation made excellent security sense for rich countries of East and West alike. The problem would be to persuade key countries of the Third World that it could be in their best interests also. As mentioned before (cf. section 2.1.2), one of the chief problems was the lesser military utility and political value of CW armament to the rich industrialised countries as compared with the rest of the world. Countries asked to give up much might reasonably expect much in return.

Other events came to influence the negotiations among public actors. In November 1969, President Nixon announced that his administration had decided to seek ratification of the 1925 Geneva Protocol and to close down the US biological weapons program. Less than three years later, the BWC was signed, entering into force in March 1975, which was an additional sign attesting the seriousness of the US about arms control. It has to be noted that some countries such as the Soviet Union were opposed to treating CBW separately. Others, such as the UK, favoured a splitting up and proposed that biological weapons be considered before chemical weapons. Article IX of the BWC is proof of the concession the supporters of the division had to make to those who opposed the separation of CBW: the obligation to continue the negotiations for the prohibition of CW armament.

It was thus the public sector that formally launched what would become the CW network. Their gathering (and in some cases their division) had originated from various factors such as the military usefulness of CW armament, the problem of governance of dual-use technologies and the lacunae of the underlying regime regulating CW. In addition to these factors was the sharpening of East-West divergences and the beginning of an era where serious multilateral arms control could be negotiated. Although East-West tensions seemed to lessen, North-South differences began to surface within the public actors.

3.2 *Interests of the private sector in the CW network*

The chemical industry has been the most important private actor. The contemporary chemical industry is a diversified, large and global industry. The industry is global in the sense that chemical industries are present in almost every country in the world. Although they occur everywhere, chemical industries are concentrated in the US, Europe and Japan and are dominated by a few large firms (Freeman, 1990:79 and Reuben and Burstall, 1973:101), which tend to be responsible for a high share of the total sales (Cook and Sharp, 1991:198).

During the negotiation and implementation stages of the CWC, chemical industries were represented by their industrial representative associations such as the Council of European Chemical Industry Federations (CEFIC) for Western European chemical companies, the Chemical Manufacturers Association (CMA) for US companies and the Japan Chemical Industry Association (JCIA) for Japanese industries.

Another private sector element, but much smaller in size, was the anti-CBW protection industry. It was not obvious that, in domestic politics, this industry might not continue to align itself with its allies in the defence sector whence opposition to the negotiations was still quite vociferous. It eventually moved into support of the treaty, the language of which, in its final form, expressly preserves the right of states parties to continue defending themselves against CW attack.

3.2.1 Main Factors explaining Private Support to the future CWC

The main factors which persuaded the chemical industry that it would be better off inside the CWC regime than outside it are the following:

The relationship between military and civilian technology. Because modern CW originates in the private industry and in the civilian scientific research, many industrialised countries have taken measures to control exports of chemical dual-use technologies. Because of these, multinational firms have to cope with different national export control regulations – which was and still is laborious in terms, *inter alia*, of bureaucratic burden, but small firms also have to juggle with different and ever-growing national regulations. Hence, with the CWC, the private sector was hoping to have a more integrated type of regulation and an harmonised export control measures which would serve as a mean to getting out from unilateral export control measures and provide a level playing-field.

A second factor –related to the previous one– was the damage caused by allegations of CW involvement on the image of the chemical industry. The boycott of Dow Chemicals during the Vietnam War heavily marked the memories of chemical industry to the point where they decided that it might be worth welcoming the protection that the verification arrangements for the CWC could give them against unjustified accusations [cp. GDR accusations against Bayer et al].

3.2.2 Main Private Interests for joining the CW network

Besides having an idealistic reason –a true anger against chemical weapons– industrial interests to enter the CW network were also the expression of a more pragmatic motive (Olson, 1992:206). When industrial representatives became aware of the CWC implications they realised the risks they were taking by staying outside the negotiation process. The consequence of non-participation in the negotiation process might have been equal to an increase, in number and intensity, of the constraints put on their legitimate activities (*idem*). Because the chemical industry was already highly regulated –regulatory requirements of health, environmental and safety authorities already imposed costs and time delays on the industry's products (Sharp et al., 1993:21)– involvement in the CWC negotiations was thus a means to reduce the likely costs that industry would have to bear. This was clearly shown when the President of the Chemical Confederation of Australia, T. Reynolds (1989:29) stated in the 1989 Canberra conference (cf. section 4.2.1) that "there certainly is a voluntary way of participating with governments to ensure that the impact of the regulations is the least intrusive on the industry and the most efficient to achieve the objectives of governments".

Moreover, it is important to note the crucial role of innovation and R&D in the chemical industries to better understand their interests to enter the CW network. The chemical industry is a science-based industry where basic research, especially in synthetic chemistry, was responsible for many innovations. The role played by innovation and in-house R&D laboratories was crucial for the survival of the chemical industry, and this remains unchanged today.

3.3 *Role of the civil sector in the CW network*

The civil sector dealing with CW armament has been, at the very beginning, mostly constituted by natural scientists who, by and large, are conditioned to regarding scientific knowledge as a powerful agency of benefit to society, not harm. It was natural scientists, for the most part, who brought new ideas about arms control into the public sector. Non-governmental organisations such as the World Federation of Scientific Workers or the Federation of American Scientists did concern themselves with CW but their work was more focused on nuclear weapons. Others such as the Quakers, the Women's International League for Peace and Freedom and Amnesty International were also active on CW as, more recently, have such newer organisations as Greenpeace and Human Rights Watch. But it was the Pugwash Conferences on Science and World Affairs which, because it was well organised, has been the most active organisation on a long-term basis.

3.3.1 *Origin and aims of Pugwash*

The Pugwash Conference on Science and World Affairs, a "movement" of scientists which received the 1995 Nobel Prize jointly with the biophysicist Joseph Rotblat for their work on nuclear weapons, has been, and still is, one of the most important civil catalyst on the work related to CBW. This movement started on 9 July 1955 when the British mathematician and philosopher Bertrand Russell released a manifesto in which ten world-wide eminent scientists, including Albert Einstein, expressed their concerns about the misuse of scientific knowledge, the dangers of nuclear war and, more generally about the perils of weapons of mass destruction. In addition to expressing these concerns, the manifesto was a call for action: scientists around the world should assemble in a conference to appraise the perils that have arisen as a result of the development of weapons of mass destruction: the Pugwash Conferences.

3.3.2 The Structure and Organisational Processes of Pugwash

The first Pugwash conference took place in July 1957 in Nova Scotia, Canada, in the village of Pugwash where fifteen scientists discussed the issues raised in the Russell-Einstein manifesto. The aim of the annual Pugwash Conferences, which constitute the essence of the Pugwash movement "is to bring together, from around the world, influential scholars and public figures concerned with reducing the danger of armed conflict and seeking cooperative solutions for global problems" (Robinson, 1998b:229). People¹³ are invited in function of the agenda of each conference.

During Pugwash meetings, participants are considered as individuals rather than representatives of their governments or institutions. Their main objective is to "exchange views and explore alternative approaches to arms control and tension reduction with a combination of candour, continuity, and flexibility seldom attained in official East-West and North-South discussion and negotiation" (*idem*). The selection and attendance of the participants to the meetings is done on a national quota basis but primarily regarding the expertise of the individuals regarding the topic discussed. Because of this, the Pugwash meetings tend to gather people with a high stature in their relative countries (e.g. advisers to governments, important figures of the academic field, etc.) and thus, insights from Pugwash discussions tend to penetrate quickly to the appropriate levels of official policy-making. Moreover, the *modus operandi* of Pugwash is based on confidentiality meaning that every Pugwash discussion takes place under ground rules that forbid disclosure of which individual said or did what, unless that person has expressly consented.

The Pugwash movement is structured around the Pugwash Council, the Executive

¹³ Such people now total some 2,800 (not counting those among them who have since died) and come from 107 countries.

Committee and a Secretariat. All are funded by a system of voluntary levies on the national groups and by central fund-raising activities. Besides the Conferences, there are also some symposia and study-groups which hold meetings on a specific topic. It is at this level of study-group that most of the Pugwash work related to CBW has been undertaken.

3.3.3 Pugwash Work on CW

The first Pugwash conference dealing with CBW issues took place in Pugwash, the 24-29 August 1959, nine years before the CD put CBW on its agenda. Participants –most of them scientists experienced in CBW related issues– coming from both the East and the West had, for the first time since the beginning of the Cold War, the opportunity to discuss CBW issues. This meeting was crucial and had no precedent. It was the first clear marker on the route towards the new international anti-CBW regime that exists today.

In 1974, a Pugwash CW Study Group was set up, modelled on an earlier BW Study Group that had been active throughout the 1960s promoting what become the BWC. Its steering committee included a Soviet scientist as well as US and European ones. A series of workshops dealing with different aspects of the future CWC ensued. During this period, from 1974 to 1992, Pugwash created or expanded pre-existing links with research institutions such as the Stockholm International Peace Research Institute (SIPRI) in Sweden, the Midwest Research Institute of Kansas city in the US, the University of Sussex Science Policy Research Unit (SPRU) in the UK, the Finnish Research Project on the Verification of Chemical Disarmament and the Leipzig Institute of Toxicology in East Germany. Through these and other such arrangements, the CW Study Group was able to produce a succession of competent papers and reports, transmitted to the disarmament delegations in Geneva and their head offices, setting out ideas and schemes that might

prove helpful if and when serious multilateral negotiations on the projected CWC began (which finally happened in 1984) (Robinson, 1998b).

One important work of the Pugwash CW Study Group during the intergovernmental exploratory talks was on the philosophy and design of on-site inspections in the civil chemical industry. This work had been done with the cooperation of SIPRI but also with some private companies such as Shell, Bayer, the latter's US subsidiary Chemagro, and Albright & Wilson. Later, European, US and Japanese companies were also involved. The work of the Pugwash CW Study Group also encompassed some national trial visits at chemical industries in some countries such as West Germany, the US, Switzerland and Sweden in the late 1970s and early 1980s. Because of this work, prominent figures in the chemical industry became aware of the demands that CW arms control, if it succeeded, would inevitably place on their corporations. All of this eased the way of the Geneva negotiators when it subsequently became opportune for them to draw the industry in their talks.

The Pugwash movement thus represents a perfect type of global public policy network. It gathers individuals from different sectors –natural and social scientists, public policy-makers and private actors and individuals acting in their own names –who do not represent their own organisation or countries. The entry selection criteria is based on the qualifications of the actors in accordance with the subject under discussion, and Pugwash pays attention to balanced representation. The Pugwash, as well as other NGOs, was mainly acting as a forum of discussion and as a policy adviser. However, as time went on and as the image of science changed, the fact that Pugwash did not seek to operate in the public eye as a mass movement enabled governments to tolerate it, sometimes to listen to it, and sometimes to use or exploit it.

3.4 Conclusions

This section has presented the principal actors of the CW network. Although the public actors were the ones who officially launched the network, a deeper analysis shows that the civil sector certainly had a decisive influence.

However, although the end of the Cold War facilitated the negotiations, conflicting views regarding the nature of the problems –particularly the one regarding the military value of CW and later the one concerning the control of dual-use technologies– constituted the main causes of the divergences between the Northern and Southern countries. But countries were also using dual-track approaches regarding CW. Disarmament as the policy to be achieved and, at the same time, rearmament were going hand-in-hand as the devices for coping with CW. The climate of uncertainty associated with concepts of non-assimilation and the fear of retaliation in kind was acting as an incentive for some governments to pursue re-arming their military forces with chemical weapons.

While the private actors did not yet enter the network, they were already expressing, with consenting views, their concerns regarding the future CWC thanks to some forum of discussion organised by the civil sector. By gathering the different sectors together; by providing an informal platform of discussion besides the formal negotiation place; and by suggesting ways forward by means of research papers, the role of the civil sector was more informal, though important.

4. Policy Formulation and Negotiation of the CWC

The negotiation of the CWC lasted two decades. While exploratory talks started in 1973, it is not until 1984 that real negotiations for a "final elaboration" of a CW armament ban started with the establishment of an Ad Hoc Working Group. At that time, several key elements of the future CWC were already achieved such as precursor control, treaty oversight through a Consultative Committee of states parties with a permanent secretariat, verification by challenge (though not yet with mandatory inspection), and the use of systematic international on-site inspection for verification in a routine mode.

4.1 Role of the public sector in the CW network

The public sector constituted one pillar of the CW network. It took the leadership of the CW network in the sense that it formally initiated negotiations on chemical weapons. The public sector was regarded as the most qualified and legitimated sector to launch the negotiations by providing the underlying principles and structure of the future CWC. The public's leadership was thus crucial for the CWC negotiations and the initiation of the CW network. Had it not been there, the CWC would certainly never had a chance to emerge.

A closer look at the public sector itself shows that the "leadership" was in fact principally taken by the two superpowers and more generally by the Northern countries. The role of the superpowers was essential, for, without constructive US and Soviet involvement, rather little could be achieved. Their agreement to undertake negotiations on chemical weapons was thus crucial to building a real disarmament and arms control treaty. This was obvious since together they possessed some 70,000 tons –between 90 and 95 percent of the 75,000 agent-tons of chemical weapons that would later be declared for

destruction under the CWC. Moreover, their political influence was certainly another important factor for the success of the future treaty.

Although the word "leadership" has been used here, it is quite difficult to determine who were the real "leaders" or "movers". While the two superpowers co-chaired the CD, other countries and influential individuals in several delegations had an important place in the CW network. If it is true that the agreement of the US and of the Soviet Union on a ban on CW armament was essential for the policy to be launched and achieved, other "leaders" and "movers" did impact on the network and the final policy.

During all of the negotiation process, besides the continual negotiation deals, the two superpowers used to intervene by submitting "package of policy changes" in which important elements for the CWC were accepted. For example, in 1987 the Soviet Union announced *glasnost* in the Soviet military chemical programmes, and accepted the proposal for mandatory challenge inspection and other such intrusive verification measures for which the United States had put forward in its 1984 draft treaty. The US policy response came in 1989 when President Bush stated that the US no longer considered chemical arms control in terms of verifiability but in terms of seeking a certain level of verification which provides confidence among the states parties to the convention. The US recognised what had always been the case, that no international ban on chemical weapons could ever be fully verifiable but what mattered was the level of confidence states would have by complying with the CWC. In this package of policy changes was also the US willingness to conclude a bilateral agreement with the Soviet Union under which both countries were to begin destroying their stockpiles by the end of 1992, and neither country was to be permitted more than 5000 agent-tonnes of chemical weapons after the year 2002. With the exception of one case –when in 1974, the US and the Soviet Union declared their wish to undertake a bilateral "leadership" on the CW issue which turned out

to freeze the multilateral activity for at least two years–, the US-Soviet Union *presence* in the multilateral negotiations proved to be essential and successful.

As mentioned earlier, countries of the South had a different approach to CW. Not only because of the divergence regarding the military significance and the political value of CW armament but also regarding the dual-use aspects of the chemical technology. They feared for instance to have another type of Northern counter-proliferation regulations, such as the AG, where countries of the North control their technology transfers to the South arguing the dual-use nature of certain sensitive technologies. Countries of the South were thus hoping to have a significant powerful OPCW in which they might have some expectation of controlling through sheer weight of numbers, and thus, use this organisation as a means to counter-balance unilateral Northern measure. This point, associated with the one regarding the military utility and political value of CW armament, certainly constituted one of the chief reasons causing North-South divergences among the public sector.

However, with the exception of some Southern countries that link their adherence to the CWC with the Israeli accession to the NPT, the supposedly significant security value of CW within the Third World was rarely referred to directly. It found expression, instead, in a variety of proxy issues, these typically being portrayed in Western commentary as sticks or carrots for increasing adherence to the treaty. The consensus within the North-South public sector has thus been achieved by some "mutual accommodations" such as the Article X of the CWC which provides assistance and protection against CW and with the Article XI of the CWC on economic and technological development where it is stated that

"The provisions of this Convention shall be implemented in a manner which avoids hampering the economic or technological development of States Parties, and

international cooperation in the field of chemical activities for purposes not prohibited under this Convention including the international exchange of scientific and technical information and chemicals and equipment for the production, processing or use of chemicals for purposes not prohibited under this Convention."

4.2 *Entry and role of the private sector in the CW network*

4.2.1 The 1989 Canberra Conference

Soon after the beginning of the negotiations, representatives of the chemical industry in the western world committed themselves to support the projected CWC. As a consequence, international meetings bringing together chemical industrial representatives and negotiators of the CWC followed, climaxing in September 1989 at the Government-Industry Conference Against Chemical Weapons (GICCW) which the Australian government convened in Canberra.

It is important to note that before the private sector formally joined the CW network with the Canberra conference, they had already voiced their concerns regarding the future CWC in national seminars and in meetings organised by the civil sector. For instance, exploratory talks between industry and government representatives had already started in the 1970s and early 1980s within fora established by non-governmental organisations such as SIPRI and Pugwash. By the mid-1980s, governments in the UK, the US and no doubt other countries too had established formal government-industry contact groups. In 1986, an international seminar on the chemical industry and the projected CWC organised in Rotterdam by the Dutch government opened the way to GICCW and the appearance of chemical-industry advisers among some of the negotiating delegations in Geneva.

The aim of the Canberra conference, which gathered the world-wide chemical industry and the negotiators of the CWC, was to find ways in which industry and governments could work together for the support of a comprehensive Convention (Evans in Robinson, 1989:18). The world's chemical industries, represented by industry representatives, submitted a first formal statement in support of a CWC which reflected two important elements.

First, through this statement, the private sector demonstrated to the policy-makers –the public sector–, that it would behave in accordance with the dispositions of the Convention once the latter was implemented, provided the negotiation proceeded acceptably. Industry in fact set out its conditions for supporting the CWC; and only favoured a global solution to the problem of CW armament which protected the free transfer of chemical technology.¹⁴ Secondly, this statement constituted an important milestone towards the building of a high consensus over the goal and objectives of the CWC among the public and private sector. This statement thus set out the relative bargaining power of the private sector but also expressed a relative consensus regarding the work already achieved by the public sector.

At this conference, government representatives officially recognised that support of the private sector and co-operation between the private and public sectors were both vital to the proper design and implementation of the CWC (Hawke, 1989:2 and Evans, 1989:8). The Australian Minister of Foreign Affairs and Trade, Senator Evans (*idem*) argued that "obviously our chances of securing such an outcome are enhanced the more governments discuss these issues with industry, and the more industry is involved in the formulation of procedures which will have an impact on their operations". Policy-makers

¹⁴ Because of these conditions, the industry's statement was also an anti-partial measure statement. One may thus conceive the statement as an anti-Australia Group.

thus recognised quite early that the involvement of the private sector during the decision making process was essential to the success of the future implementation stage. By emphasising that the draft Convention was already substantial and had political support, Evans (*ibid*:6) even suggested how an active collaboration with the private sector should work: practical will for translating good intentions into a workable and practicable treaty was needed.

This conference was thus the officialisation of the participation of private non-states actors into the CW negotiations and into the CW network to build a global CWC policy. This public-private partnership was essential for the network and the Convention successes because of the dual-use chemical technology. The private sector thus became the second pillar of the CW network.

4.2.2 Concerns of the private sector and how the CWC addresses those concerns

The private sector expressed several concerns regarding the CWC which can be categorised under two headings: concerns related to the scope of the CWC and concerns associated with its verification system.

The first category of concerns is associated with the important number of chemical facilities which need to be monitored (Olson, 1989:21; Findlay, 1993:3). The actual number of facilities subjected to declarations and inspections could not be known before the very implementation of the CWC, but estimates stated that about 20,000 industrial facilities may become subject to declarations¹⁵. This is much higher than the number of nuclear sites that the International Atomic Energy Agency (IAEA) has to control in

¹⁵ Estimations of the number of declarable/inspectable facilities anticipated by the OPCW Preparatory Commission (PrepCom) were of about 75 for Schedule 1 facilities, 950/400 for Schedule 2 facilities, around 1500/1200 for Schedule 3 and more than 5000 inspectable DOCs facilities.

overseeing the INF Treaty (Olson, 1989:21).

The private sector also expressed concerns regarding the scope of verification procedures in facilities which represent a high risk to the CWC. Because those facilities such as Schedule 2 include pure dual-use technologies, their declarations had to be more detailed. These declarations not only include information about the location of the facilities which consume, process or produce Schedule 2 chemicals, but also require data on the quantities of Schedule 2 chemicals produced and/or consumed (*ibid*:23). These will be particularly sensitive for industry due to potential endangerment for confidential business information¹⁶ (CBI).

The second category of concerns expressed by the chemical industry is associated with the implementation costs that the verification system will have on their industries. These potential costs are directly connected with the declarations that industries must fill up and the inspections they will host. It was often heard that the declaration forms would set additional bureaucratic burdens on chemical companies which already had to deal with many types of regulations. Moreover, on-site inspections might disrupt the production of the inspected firm. But all industrial representatives agreed that their most serious concern was the potential loss of CBI that may occur during declaration-reporting and, more significantly, during industry inspection. The fact that inspections are to be run by an international inspectorate under the supervision of an international organisation certainly increases the attention given to this issue. Indeed, besides the inadvertent disclosure of CBI, industrial espionage was an important fear of the industry. Inspectors will notice how the technology is functioning, will take records and sample and may interview personnel.

The confidentiality issue is backed by the features of the chemical industry

¹⁶ Confidential Business Information (CBI) is any information or data, not known to public, which gives its holder a commercial advantage. Technical CBI may include know-how, processing details, production

presented in section 3.2.2. In-house innovation is crucial for the survival and competitive edge of the chemical industry but is risky and costly. Moreover, the know-how and many trade secrets of industry cannot be patented, and the fact that the environment in which the chemical industry works is very competitive adds a fear of having to disclose precious information which represent years of development and for which price estimation is quasi-impossible.

4.2.3 Role of the private sector

Having expressed its concerns and having been invited into the negotiation process, the chemical industrial representatives adopted an active attitude. The private sector essentially contributed by sharing with the negotiators the technical expertise that most of diplomats were lacking. Chemical industry inputs were particularly important on technical questions dealing with the handling of confidential information during inspection activities, the elaboration of protocols regulating verification activities, and data reporting methods (Bernauer, 1993:65). Chemical industry also hosted several national trial inspections (NTIs) aimed at designing proper inspection procedures. The NTIs were, according to Trapp (1993), valuable in the sense that they helped to promote an effective and sound regime of verification. As Trapp (*ibid*:51) argues "Inspections are no longer requested to answer the unanswerable or the irrelevant".¹⁷

Regarding the first category of concerns and, especially those concerned with inspections of Schedule 2 facilities, the CWC requires each state party to conclude a "facility agreement" with the OPCW, setting rules for inspections of each Schedule 2

hardware and production formulation. Non-technical CBI encompasses *inter alia* information about suppliers, price and customer lists.

¹⁷ Trapp (1993) observes that the NTIs changed the concept of the industry verification regime from quantitative concepts (non-diversion) to more qualitative inspection aims (non-production). This was because NTIs demonstrated that detecting deliberate diversions at the national level was practically

facility. These agreements were established to adapt inspections to the specific features of each facility.

As regards the confidentiality issue, the CWC has two major provisions. One is set out in Article VIII (paragraph 5) which states that "The organisation shall conduct its verification activities provided for under this Convention in the least intrusive manner possible consistent with the timely and efficient accomplishment of its objectives (...) It shall take every precaution to protect the confidentiality of information on civil and military activities and facilities coming to its knowledge in the implementation of this Convention and, in particular, shall abide by the provisions set forth in the Confidentiality Annex [see hereafter]". The second provision is that the negotiators agreed to include in the Convention an Annex on the Protection of Confidential Information. The "Confidentiality Annex" contains a whole range of safeguards against inspection abuses and leakage of CBI during their transfer from companies to the OPCW via the NA. The annex was designed to lessen industry concerns associated with the protection of CBI.

Thus, by dealing with the concerns of industry, the policy-makers of the CWC established a stringent information security regime. OPCW documents and data and information about the implementation of the CWC are publicly disclosed only with the consent of the state party to which they refer. Only NAs are entitled to receive all the data they require to reassure themselves of compliance by other states parties.

But this information security regime may be a likely source of tension during the CWC implementation. Indeed, the aim of the verification regime is not to ascertain that states parties are not producing chemical weapons. This would be unrealisable. Instead, the purpose of verification is to build sufficient confidence in the elimination of chemical weapons for states parties to continue accepting the burdens and restrictions of the regime.

To achieve confidence in the system, one has to witness how implementation procedures of the regime are applied in all states parties, and this requires some degree of transparency in the verification system. However, with the addition of the Confidentiality Annex, the whole regime is skewed towards opacity, not transparency. Given this over-tendency towards opacity and confidentiality, transparency will not be easy to achieve.

Thus, while supporting the CWC, the industry also recognised that the CWC will raise costs and maybe financial losses in terms of leakage of confidential information. But industrial representatives rapidly perceived that industry could handle these costs and build them into their business (Reynolds, 1989:27). Negotiations regarding the verification system of the CWC were certainly very difficult. A balance had to be found between establishing an effective verification system capable of yielding confidence among states parties and at the same time reaching an acceptable level of security on CBI.

4.3 Role and interests of the civil sector in the CW network

As mentioned in the previous section, the role of the civil sector in the CW network was essential in providing a forum of discussion next to the official CD one. However, its role was more an informal one in the sense that it did not participate in the negotiation rounds: this was not the interest of the civil sector. Instead, its interest was to expose governmental policy actors and negotiators to a wider range of opinion and ideas that they would otherwise face.¹⁸ The Pugwash meetings tended at first to gather academic scientists (1950s), then also public policy-makers (1960-1970s), and then progressively included public and private actors.

Whereas the agenda of the Pugwash CW Study Group workshops during the exploratory talks was directed to issues that participants considered important for future negotiations, this way of devising the agenda changed during the negotiations. At the beginning of the 1980s, due to considerable governmental attention to CW issues, the Study Group developed working contacts with the diplomats, with the officials in capitals who were instructing them, and with the growing number of technical experts on CW now being assigned to the delegations in Geneva, some of whom were already members of the Study Group. Because of the arrival of new participants, the agenda of the workshops were accordingly changed, now moving towards particular negotiating issues in which technical and political consideration were intertwined.

¹⁸ CW was still a matter of secret and negotiators were only briefed by their own governments. Pugwash thus broadened this aspect.

It is thus striking to notice that the civil sector anticipated the likely topics on which public negotiators might have encountered difficulties and later, when the negotiations started, focused its work on the negotiating issues. Because Pugwash was trying to gather all the relevant individuals in the field on CW, its work was always closely related to current issues and its agenda included issues for which informal debates were needed. The Pugwash workshops were thus certainly not counter productive for the official forum of negotiations. However, it is not yet possible to assess the influence which this type of interaction had on the agreement, with or without the prior consciousness-raising phase of the work of the Study Group. But given the closeness and the duration of the interaction, and the variety of levels at which it occurred, it is hard to imagine that there were no influence at all.

4.4 Conclusions

This section was concerned with the establishment of the CW network in the policy-making process of the CWC. It analysed how major public and private interests were taken into account in the CWC. The entry of private sector into CW network was especially crucial because of the nature of technology the CWC wants to govern. The private sector supported the projected CWC and provided policy-makers with their technical expertise to render the CWC implementable. Policy-makers in turn recognised the importance of industrial assets by inviting industry into the regime building-process; this, *inter alia*, provided to ensure policy-makers against implementation policy failures. In terms of public-private co-operation the relation was unparalleled in the arms control experience. Moreover, the public North-South divergences about the military significance of CW armament and the transfers of dual-use chemicals were also important elements to be taken into account during the policy formulation for the CWC to be achieved.

The CW network represented thus a case of trisectoral network where public, private and civil sector have been involved throughout the CWC decision-making processes. The public and the private actors represented the two pillars of the network while the civil actors were holding a more informal role by being not formally involved in the negotiations. However, the work achieved by the civil actors was essential in gathering the public and private actors and in providing policy resources. The civil sector was thus intimately involved in all the negotiation process of the CWC. The issue of the leadership in the CW network has also been approached here by arguing that it is difficult to adequately define the "leaders" or the "movers". Is it the political influence of some countries which matters or the continuity of some countries in the negotiations, or again the number of interventions in the negotiations? National delegations but also individuals –private or public– had an important role in the CW network. This issue of leadership in the CW network thus raised problems of measurement but also of unit of analysis.

The implementation issue has thus been dealt with great care during the negotiations. Important concerns of the public and private sector have been taken into account in the CWC. Altogether, these efforts are likely to ensure the smooth implementation of the Convention. But the end of the negotiations is only a first step. Problems would not tend to disappear; on the contrary, new ones arose.

5. Implementation of the CWC

5.1 *Evolution of the CW network*

The CWC was opened for signature on 13 January 1993 and entered into force on 29 April 1997. The implementation of the CWC provoked the evolution and extension of the CW network. While most of the CWC public policy-makers (or diplomats) turned their attention towards other topics, new actors appeared with the entry-into-force of the CWC. These actors were principally the ones that the negotiators devised to implement the convention –the OPCW and the NAs. These actors represent one element of the public sector. The other is composed by the states parties to the CWC.¹⁹ The private sector has also been extended with the entry-into-force of the CWC. Indeed, while it is still represented by its industrial representatives in the CW network, the private sector now encompassed all the individual chemical companies which have to submit declarations and who are subject to the OPCW inspections. In this sense, the status of the private sector changed: from negotiators during the implementation phase, they now moved to be one important implementers of the CWC.

5.1.1 The OPCW and the National Authorities (NAs) – the public sector

The OPCW and the NAs –the two implementing agencies for the CWC– together perform the tasks of overseeing the implementation of the Convention.

The OPCW is staffed by around 500 members and sixty percent of the staff is directly involved in verification activities (Gee, 1999:2). The performance of the

¹⁹ The states parties to the CWC meet at least annually as the OPCW CSP in The Hague. The CSP

inspection teams was crucial for the success of the verification system and was thus given great attention and preparation during the period of the OPCW Preparatory Commission (PrepCom)²⁰. As a result, but also because of the success of the first two years of inspections, inspection teams have earned the reputation of being highly professional which gives great confidence in the inspection processes and in the capacity of OPCW.

The OPCW has however experienced severe problems related to the long-standing issue associated to the lack of staff regulations. In particular, the lack of agreement on a policy over length of tenure.²¹ This lack of resolution on staff regulations had adverse effects on staff morale and on the vitality of OPCW, and has led to a high number of resignations.²² This in turn may affect the competence of the OPCW and hence the confidence-building process which was well underway since the entry-into-force of the Convention.

Regarding the second implementing agency –the NA–, the OPCW has so far only

constitutes the ultimate authority regarding the implementation of the CWC.

²⁰ The CWC was opened for signature on 13 January 1993 and entered into force on 29 April 1997. *Ad interim*, the negotiators decided to establish a Preparatory Commission (PrepCom) "for the purpose of carrying out the necessary preparations for effective implementation" (CD/1170, 26 August 1992, 19). The main tasks of PrepCom²⁰ were, *inter alia*, to establish the infrastructure of the OPCW, to draft the OPCW budget, to develop detailed procedures for implementing the CWC provisions and especially those related to verification methods (Mathews and Taubman, 1995:161). In addition to preparing the practical details for implementing the procedures of declarations and inspections, another major activity was to raise awareness among future states parties about their obligations. The PrepCom organised training courses for future NAs, convened regional seminars gathering industry and NAs, and conducted trial inspections of chemical industries facilities and trials of Model Facility Agreements. After a period of preparation which lasted four years, the PrepCom managed to fulfil the main lines of its mandate. The basic structures of the verification system were in place. Declarations and inspections procedures were sufficiently resolved to enable states parties to make their declarations and to allow the OPCW to proceed with the inspections. However, the PrepCom was unable to fully resolve all the tasks it had been assigned for preparing the entry-into-force of the CWC and left many issues unresolved.

²¹ Some propositions suggested a three-year or a seven-year tenure policy and the Fourth Conference of the States Parties (CSP) (June-July 1999) finally agreed for the latter option. The CSP decided in the Fourth CSP on a tenure of seven years (doc. C-IV/DEC.25). However it is still not certain when new contracts should start from. While the states parties and the TS wanted the OPCW to be a non-career organisation, they differ on the interpretation. The states parties wanted a very short tenure policy, which would provide a high turn-over and increase the capacity to cope with rapid technological change –as one means for the regime to keep abreast with technological breakthroughs. The TS however preferred a longer period with the possibility of extensions in exceptional cases. This would also maintain an institutional memory, an "esprit de corps", which was not feasible with a large turnover of staff every few years.

²² In the first months of 1999, the number of staff resignations was equal to all those in the whole of 1998

received 88 notifications in which states parties declare having an NA; more than 25% of the states parties thus still have to establish, or notify, their NA to the OPCW.

The experience of each NA varies considerably from state to state and some NAs are still under the learning process. However, concerns have been raised in association with the work of some NAs. The first of these concerns is associated with the incorrectness of declarations. This was due to several factors, among which the most important were the fact that many NAs do not have industry representatives in their team; that many NAs are inexperienced regarding the CWC; and that some NAs have a tendency to be too bureaucratic. As a result, several NAs are for instance not checking industry declarations before sending them to the OPCW. This may explain the fact that 60% of the Schedule 2 initial declarations were wrong (Kane and Gilliquet, 1999:6) which in turn may affect the confidence-building process on a long-term basis.

Some difficulties experienced by NAs illustrate some of the side-effects caused by the evolution and inclusion of new actors into the CW network. Indeed, current (or new) people have a tendency to look only at the "words" of the CWC and their legal implications. As a consequence, some NAs do not understand, or forget, the Convention's culture and principles. And this leads to situations where, even if it is understandable, NAs have a tendency to over-protect their industries.

Regarding the inter-relations of the implementing agencies, some improvements are also required. There seems to be a lack of communication and co-operation between some NAs and the OPCW, or communication is sometimes too superficial. The bottlenecks, both within the OPCW and between NA and the OPCW, do not for instance facilitate implementation of the CWC.

5.1.2 The chemical companies – the private sector

As mentioned in section 2.2, with the implementation of the CWC, chemical companies in states parties to the Convention, have to submit declarations if they are using or producing one or more of the scheduled chemicals. Facilities will also be subject to routine inspections if they annually produce or consume more than a given inspecting threshold.

Regarding the industrial declarations and inspections, they generally have encountered no major problems. Even if inspections have been more demanding on time management than was expected, the private sector recognised that this may be partly explained by the fact that inspection teams and companies were still learning. Moreover, confidentiality, the most crucial private concern during the negotiations, is still important but it is no more an issue. The OPCW and its related policies thus seem to have handled this issue well.

The quality of the relationship between NAs and the private sector differs from states to states, but the work achieved by several NAs was outstanding, such as the development of handbooks giving basic rules to be prepared for inspections at any time. Moreover, in June 1999, the OPCW organised a first meeting which gathered industrial representatives and a first annual meeting with NAs from different states parties. These meetings were aimed at promoting communication, to share information and problems between the NAs and for the private sector to express its concerns regarding the implementation of the CWC. These meetings may be held on an annual basis.

5.1.3 Role of the civil sector

With the entry-into-force of the CWC, the Pugwash CW Study Group has been reconstituted into a new body –the Pugwash Study Group on Implementation of the CBW Conventions. Its current work is aimed at promoting the efforts to strengthen the 1972 Convention and to bring the 1993 Convention properly into force. Such work necessitated the establishment of the same sort of relationship with the cognizant intergovernmental bodies as had existed between earlier embodiments of the Study Group and the negotiators in Geneva. In practice this came to mean two series of workshops, one on each treaty, but with each workshop including a session on the other treaty. This tie between the two conventions is important to link the CW network and the compliance problems of the CW with the BW network. Moreover, a continuing close relationship between the Study Group and the OPCW Technical Secretariat (TS) is essential because the confidentiality regime under which the OPCW is obliged to operate greatly obscures the civil sector's views of the its work.

This new Group has also now another function: to be the private international contact-point of, so to say, friends of the CBW treaties. Because the CWC policy impacts widely across science, technology and industry, the importance of communication and education on the CBW treaties is crucial. In a related vein, the SIPRI research programme on CBW has also included an educational module on CBW treaties in association with Centre for Peace and Security Studies of the Free University of Brussel (VUB).

5.2 Main implementation problems

As of July 1999, the CWC had been ratified or acceded by 126 states, and 44 states have only signed it. Among the 126 states are the five permanent members of the Security Council and states covering an important share of the chemical industry. This was essential for the CWC regime to be effective.

5.2.1 Inspections and declarations

By the end of April 1999, the OPCW TS had conducted 464 inspections at 276 sites in 29 states parties. The majority of these inspections (84% of 30,000 inspector days) had been on verification of disarmament activities –destruction of chemical weapons and the closure of production and storage facilities of them. The remainder concerned industrial inspections of Schedule 2 and 3 facilities and Schedule 1 facilities²³. Generally, even with states parties and inspectors on a learning curve, no major problems were encountered during the conduct of inspections. Problems or misunderstandings have been quickly resolved.

These inspections were based on the initial declarations submitted by states parties. As of 29 April 1999, the OPCW had received 91 initial declarations, including chemical-weapons-related declarations and industrial declarations. This means that, after two years of CWC implementation, about one quarter of states parties have not yet completed their initial obligations of submitting declarations. If we limit the analysis to industrial declarations, between entry-into-force and 16 April 1999, the TS received industry declarations from 48 states parties (Feakes, 1999b:12).

²³ It has to be mentioned that TS focused on initial inspections of chemical-weapons-related facilities and Schedule 1 facilities because the CWC states that facility agreements for these facilities have to be completed by the entry-into-force + 180 days which was the 28 October 1997.

While the number of initial declarations regarding chemical-weapons-related facilities exceeds the estimates made by the PrepCom, the number of industrial declarations has been lower than anticipated (cf. footnote 15). This may partly be explained by the fact that many initial declarations were incorrect and incomplete. Complexity is certainly one of the factors of industrial declaration errors. Many mistakes and inconsistencies have been resolved after the first inspections as it was shown that 60% of the initial declarations had to be amended after the initial inspections (Kane and Gilliquet, 1999:6). But declaration incompleteness is also due to the lack of national implementation legislation by states parties. In accordance with the CWC, states parties would have to, *inter alia*, report their legislative and administrative implementing measures within 30 days of the entry-into-force of the CWC (cf. section 2.2). However, as of July 1999, only 40 states parties have done so. These declarations incompleteness apply for the US who holds a major share of the worldwide chemical industries. For instance, although a national legislation exists, the US have not yet completed the regulatory process necessitated and empowered by that legislation. Because of this, they remain unable to submit their industrial declarations, and are therefore not yet in compliance with central provision of the CWC.

The problem is that, without initial declarations, the OPCW cannot plan any industrial inspections in a state party who has not submitted its declarations. This implies that the verification system of the CWC is not applied universally among the states parties. As a consequence, and as far as industry is concerned, this unbalanced implementation may affect the competitiveness of facilities which are subject to inspections.

While the chemical industry supported the CWC with the proviso that the CWC should rigorously protect CBI, that it should not hinder the legitimate business of industry and finally, that the CWC should be equitably applied throughout the world –the level

playing-field issue, this uneven implementation of the CWC is causing disadvantages for the complying chemical industries: the fact that European and Japanese industries are inspected, while other parts of the world are not, creates a competitive disadvantage for the firms inspected. This lack of universality leads to uneven implementation of the CWC; this in turn does not create the "level playing-field" that was one of the factors which led industry to support the CWC.

5.2.2 The "unresolved issues"

The "unresolved issues" are issues for which negotiators in Geneva could not find a consensus. The problem was that negotiation had deliberately left issues unresolved in the CWC text because they were considered as "constructive ambiguities". These, *inter alia*, allowed the CWC negotiation to be completed at the cost of leaving opposite states requirements in an ambiguous manner. These "unresolved issues" were then passed on to the PrepCom which was also unable to find an agreement. Moreover, the number of "unresolved issues" increased from 23 during the negotiation period to 63 at the end of PrepCom period (Feakes, 1999a:2).

While some of these issues have been resolved through the establishment of a procedure for addressing unresolved issues, a core of important issues are still pending for resolution.

These issues now create problems for the implementation of the CWC. For instance, a current industry concern is the low concentration or mixture issue.²⁴ This issue

²⁴ The low concentration issue affects declarations for exports of products containing Schedule 2 and 3 chemicals. The Convention states that declarations for mixtures containing a low concentration of Schedule 2 and 3 chemicals are not required from industries. But because there is no agreed definition of a low concentration, states parties have applied different thresholds; several states have adopted limits between 0 and 30% while others, like the US in the case of Schedule 3, are in favour of an 80% threshold. It has to be noticed that the lower the limit, the more industries are likely to declare their activities and become liable to inspections. This means that, in the absence of a harmonised rule, facilities in certain states parties are

has several effects. Firstly, the fact that different states parties apply different concentration limits does not facilitate the work of multinational companies that must operate with different rules in various countries. Secondly, and more importantly, these different limits result in the CWC verification regime being unevenly applied. This leads to a third problem: declarations cannot be compared and this complicates the capacity of OPCW to obtain a sound picture of the worldwide chemical industry, impeding the proper monitoring of the chemical industries by the OPCW.

Other "unresolved issues" concern the implementation of Article X and XI of the CWC. The implementation status of these articles on international assistance and cooperation –which are important articles for the Southern states parties to the CWC– are still at a very early stage. For instance, the CWC requires, under Article X, that states parties exchange information regarding their national programmes on protective purposes. However, neither the negotiators nor the PrepCom actors were able to design guidelines to exchange this type of information. As a consequence, few states parties have actually submitted this type of information despite the fact that the Director-General of the OPCW stated that the lack of procedures did not mean that states parties do not have to submit the required information (Feakes, 1999a:3). Regarding the international cooperation for peaceful purposes related to the exchange of information and chemicals (Article XI), "the difficult issues of export controls and external regimes such as the Australia Group" have hardly been addressed (*idem*), and this slows down the implementation of these particular articles.

subject to on-site inspections whereas similar facilities in others –which have applied a less stringent limit– are not inspected.

5.2.3 Non-Universality of the CWC

Another concern is the non-universality of the Convention. The fact that there a number of countries are still not party to the CWC is threatening the treaty's efficacy.

For the private sector, universality of the CWC was and still is a key factor. Indeed, it is important for worldwide industries to undergo the same additional layers of regulation.

For the public sector, universality is crucial. In the Middle East and the North, countries whose participation in the global policy is essential have still to accede or ratify the CWC (e.g. Egypt, Iraq, Israel, Lebanon, Libya, Syria and Yemen). In Africa, 21 countries have still to ratify or accede to the CWC. In Asia, countries such as Afghanistan, Democratic People's Republic of Korea, and the United Arab Emirates are not parties to the CWC. The reasons explaining this non-universality are various: some states have linked their accession to the CWC with the adherence of Israel to the NPT, other states have other priorities in their agenda or demand implementation advises.

5.3 *Enforcement activities and measures to enhance the compliance to the CWC*

Regarding the relationships between the OPCW and the NAs, it is important to note the work undertaken by the OPCW in trying to achieve better communication and co-operation with the NAs. Regional seminars and the establishment of the expert networks are only some of the measures taken to enhance the division of labour. This is really appreciated by states parties because some states were fearing a type of UN bureaucracy but this is not the case. The OPCW recognises that there are some problems and tries to resolve them. This helps to maintain confidence.

In order to resolve the declaration problems and national implementation measures, the OPCW set up a programme to assist states parties in their declarations and

in other areas related to implementation. The OPCW established a network of experts from states parties to assist NAs who required it in preparing their declarations. Likewise, the OPCW is conducting specialised workshops dealing with practical aspects of CWC implementation (Gee, 1999:6).

In order to implement Articles X and XI, the OPCW has launched a series of programs for international cooperation among states parties. For instance, the OPCW organised regional workshops with some states parties on the assistance and protection against CW. The OPCW is also supporting NAs through training courses and declaration support programme and by sponsoring the participation of scientists from developing countries to international conferences (Feakes, 1998:15).

Universal adherence but also universal compliance are important issues for the effectiveness of the regime and were often emphasised in the speeches of the states parties at the last CSP in June-July 1999. The trade sanctions of the CWC are some of the incentives pressing states parties to ratify the treaty and encouraging non-states parties to become part of the CWC. The OPCW is also organising regional seminars for non-states parties with the intention of encouraging the universality of the Convention.

Two of the most urgent and direct problems affecting the chemical industry –the "technical non-compliance" of some states parties and the low concentration issue– are both caused by the same factor: the lack of political attention and willingness. The "technical violation" of the US is due, *inter alia*, to domestic problems. The national implementation measures of the US are simply not given much attention in the current US agenda. As regards the low concentration issue, all interviewees agreed that it is a political issue, and this was already shown during the PrepCom period. It was and is still the lack of political consensus which is causing a problem, not the difficulty in finding a technical solution.

One of the fundamental problems of the concept of international governance mentioned in section 2 is the absence of a central agency of rule. And this is precisely what is now weakening the processes of CWC governance at the global level. Even if the CWC has sanctions to ensure and encourage compliance with its objectives –namely the intrusive verification system, the challenge inspections in the case of an alleged violation and the trade sanctions for states not parties to the CWC–, the policy-makers did not envisage a situation such as that of "technical non-compliance" and they thus did not forecast any mechanisms for sanctioning this violation. Likewise, they did not fully appreciate the eventuality of having long-standing unresolved political issues. And because of the absence of a central authority at the international level, these issues have important consequences for the credibility of the CWC regime. It is only with the regeneration of political momentum that the resolution of some outstanding issues and the achievement of complete compliance will be attained. Political support and consensus is thus crucial to filling up the lack of international authority, and to alleviate the implementers' concerns.

At first glance, the above problems tend to the conclusion that if they remain unresolved for a long time, the complying chemical industries will be severely affected in terms of uneven burdens leading to important competitive disadvantages. We argue that chemical industries will not be affected by a long-term uneven implementation, because states parties will defend their industries. However, through these actions, states parties will fail to reach the purposes of the Convention and the CWC will collapse.

5.4 Conclusions

The implementation of the CWC led to the evolution and establishment of a new CW network and showed the limits of the existing network. Because of this evolution, the network encountered some problems.

These are, first, communication problems between the implementing agencies –the public sector- and also between the implementing agencies and the chemical industries –the private sector. Secondly, the inexperience of new private and public actors within the CWC, which led, for example, to incorrect declarations. This poses the question of the continuity of the network and the related learning activities due to the evolution of the network, which are important elements to take into account when designing and implementing a policy. The OPCW and some NAs did an important work in trying to organise and host workshops for dealing with implementation problems. However, the problem is how long should learning be used as an excuse for incorrectness.

The CWC implementation showed that the CW network has dealt with the confidentiality issue with great care during the negotiation period. Indeed, confidentiality is no longer a crucial issue for industry, yet this might affect the transparency of the CWC.

Finally, the uneven implementation of the Convention has become a major concern for the industry. Linked with other problems occurring during the implementation such as the absence of staff regulation, lack of political attention, communication problems between the implementing agencies, incompleteness and absence of declarations and non-notification of national implementation measures, these problems influence each other and, directly or indirectly, have an impact on the performance of policy. While it is now clear that implementation is actually taking place, its "imperfect" application is raising important concerns and is affecting the implementation of the global public policy.

6. Conclusions and Policy Implications

6.1 Conclusions

A set of three principal problems –the weaknesses of the underlying CW regime, the military value of CW and dual-use technology– constituted the basis for which a global public policy was needed. These issues also determined the function of the future network: lessening the diverging views about the military value of CW armament and persuading Southern countries to join the network; achieving an implementable and effective policy and, finally, trying to tackle the problem of the control of dual-use technologies.

The network of actors that had to be set up to deal with these problems was firstly composed of public actors. The private actors joined the network after several years of intergovernmental talks. The private sector –the chemical industry– was soon recognised as a crucial actor in the building of an effective regime to govern dual-use technologies. By incorporating this private actor into the network, public policy-makers successfully avoided the policy failure of non-implementation, while the industry successfully managed to voice their concerns about the impact of implementation of the CWC. Their role was essential for the CWC to be implementable. These exchanges between the private and public were important and manifold, and were a first in the arms control and disarmament sector. They proved to be crucial and fruitful.

The role of the civil sector was more informal in the sense that it did not participate in the CWC negotiations. However its function as a platform of discussion where public, private and civil actors met as individuals was important to share ideas and to discuss issues next to the official CD forum of discussion. There was thus a kind of

two-tiered network –informal and formal. This was essential for the network to "breathe" and maybe to survive. The question of leadership between these two tiers does not have a straightforward answer. The public sector had its proper "leader" or "movers" in terms of influence and presence but also in terms of inputs into the negotiations. The private sector also had its leaders which were influencing public negotiations. The role of the civil sector but also the impact of events such as the end of the Cold War and the lessening of East/West divergences; the disclosure in the 1980s of the use of CW in the Iran-Iraq War and the growing threat of CW proliferation thus led to the finalisation of the CWC.

The CWC is an historic agreement and a global public policy which has been multilaterally shaped by public and private interests, and where the civil sector helped the two to collaborate. However, the CWC is not flawless and implementation is rarely a perfect process. Several problems have surfaced, such as the question of the continuity of the network which affects the culture and principles of the Convention. The "technical non-compliance" and other "unresolved issues" which are expressions of imperfect implementation clearly affect the CWC. Finally, concerns are raised regarding the non-universality of the convention.

Although the OPCW and some NAs are trying to tackle these problems through methods to encourage all parties to comply, it is often domestic problems and lack of political attention or momentum which they face. The CWC main's compliance problems are due to domestic problems and lack of political support. It is thus important that the network evolves to take measures to keep political attention at a reasonable level for the policy to be implemented, especially at the onset of the implementation when learning is crucial. A policy is never global when it is implemented but national or local. It is its results which may be global. Meanwhile, the intermediate phase is crucial.

On a short-term basis, these implementation flaws affect the complying chemical

industries. However, on a long-term basis, they will mostly affect the CWC and not the complying chemical industries, which will be protected by their states parties. These conclusions show firstly that international regimes are inherently fragile and dynamic structures of governance and secondly that private actors actually exert power on states actors in order to protect their economic interests.

6.2 *Policy implications*

The CWC is an important achievement in the area of arms control and disarmament and the above problems should not obscure this. These problems present an opportunity to learn lessons and to avoid errors for future global public policy which may control dual-use technologies, such as the projected BWC Protocol and biotechnology.

The flexibility of the CWC language allows the Convention not to become technologically fixed. This will also be crucial in an area such as biotechnology, in which technological change is fast and promising. But because of the current problems experienced in the CW network, one may wonder if it will prove robust enough to cope with technological change. The experience of the CWC also shows the importance of including the private sector during the negotiations, as well as the civil sector as an informal forum of discussion in order to ensure the smooth implementation of a convention. This must also be taken into consideration for the BWC Protocol and the biotechnology industry. However, until now, the attempts to translate the lessons from the CW network to the BWC network have been quite difficult. For instance, the private sector is not yet well included in the network. While it is clear that a "copy-paste" technique is not appropriate, if only because of differences in maturity between chemical technology and biotechnology, there are obvious lessons to be learnt from attempts to

govern dual-use technologies and from the implementation of CWC.

7. Bibliography

Ashley, R.K. (1992), "Imposing International Purpose: Notes on a Problematic Governance", *Global Politics*, McGrew, A.G. and Lewis, P.G. et al. (eds), Cambridge: Polity Press, 251-90.

Australia, Department of Foreign Affairs and Trade (1989), "Government-Industry Conference Against Chemical Weapons", Final Record, Canberra.

Bernauer, T. (1993), *The Chemistry of Regime Formation: Explaining International Cooperation for a Comprehensive Ban on Chemical Weapons*, UNIDIR, England: Dartmouth

Cook, L.P. and Sharp, M. (1991), "The Chemical industry", *Technology and the Future of Europe: Global competition and the environment in the 1990's*, Freeman, C., Sharp, M. and Walker, W. (eds), London & New York: Pinter Publishers.

Evans, G. (1989), "Opening Address", in Australia, Department of Foreign Affairs and Trade (op.cit. 1989), 6-16.

Feakes, D. (1998), "Progress in The Hague. Quarterly Review No. 21", *The CBW Conventions Bulletin*, Issue No. 39, 12-20.

Feakes, D. (1999a), "The Chemical Weapons Convention. Unresolved Issues", Paper presented at the 11th International Workshop of the Pugwash Study Group on Implementation of the Chemical and Biological Weapons Conventions, *Implications of the CWC Implementation for the BWC Protocol Negotiations*, 15-16 May 1999, Noordwijk, The Netherlands.

Feakes, D. (1999b), "Progress in The Hague. Quarterly Review No. 26", *The CBW Conventions Bulletin*, Issue No. 44, 9-17.

Findlay, T. (1993), "Peace Through Chemistry. The New Chemical Weapons Convention", *Pacific Research*, February 1993, 3-7.

Freeman, C. (1990), "Technical innovation in the world chemical industry and changes of techno-economic paradigm", *New Explorations in the Economics of Technical Change*, Freeman, C. and Soete, L. (eds), London&New York: Pinter Publishers.

Gee, J. (1999), "Opening remarks", Paper submitted for *the First Annual Meeting of National Authorities and Industry Representatives*, The Hague, 26 June 1999.

Haber, L.F. (1986), *The Poisonous cloud*, Oxford: Clarendon Press.

Hawke, R.J.L. (1989), "Address of Welcome", in Australia, Department of Foreign Affairs and Trade (op.cit. 1989), 1-5.

Kane, A. and Gilliquet, J-N. (1999), "Issues resulting from industry inspections", Paper submitted for the First Annual Meeting of National Authorities and Industry Representatives, The Hague, 27 June 1999.

Olson, K.B. (1989), "The U.S. Chemical Industry Can Live With A Chemical Weapons Convention", *Arms Control Today*, 19(9), 21-25.

Olson, K.B. (1992), "Industry and the implementation of chemical and biological weapons control", *Controlling the Development and Spread of Military Technology. Lessons from the past and challenges for the 1990s*, Brauch et al., Amsterdam: VU University Press, 205-12.

Mathews, R.J. and Taubman, A.S. (1995), "Preparing for Implementation of the Chemical Weapons Convention: Progress during 1994", *Verification 1995: Arms Control, Peacekeeping and the Environment*, Poole, J.B. and Guthrie, R. (eds), VERTIC:Westview Press Inc., 161-79.

McGrew, A.G. (1992), "Global Politics in a Transitional Era", *Global Politics*, McGrew, A.G. and Lewis, P.G. et al. (eds), Cambridge: Polity Press, 312-30.

Reuben, B.G. and Burstall, M.L. (1973), *The Chemical Economy. A guide to the technology and economics of the chemical industry*, London:Longman

Reynolds, T. (1989), "Keynote Address", in Australia, Department of Foreign Affairs and Trade (op.cit. 1989), 17-33.

Robinson, J.P.P (1981a), "Chemical arms control and the assimilation of chemical weapons", *International Journal* (Toronto), 36(3), 515-534.

Robinson, J.P.P. (1981b), "Chemical, biological and radiological warfare: futures from the past", submission to the Independent Commission on Disarmament and Security Issues [Chair: Olof Palme].

Robinson, J.P.P. (1987), "Disarmament and other options for Western policy-making on chemical warfare", *International Affairs* (London), vol. 63, No. 1, 65-80.

Robinson, J.P.P. (1989a), "Review: The Canberra Conference", *Chemical Weapons Convention Bulletin*, Issue No. 6, 16-22.

Robinson, J.P.P. (1989b), "Supply, demand and assimilation in chemical-warfare armament", *Military Technology, Armament Dynamics and Disarmament*, H G Brauch (ed), London: Macmillan Press, 1989, 112-23.

Robinson, J.P.P. (1992), "The Chemical Industry and Disarmament: Issues and Perspectives", presentation at the symposium on *The Chemical Industry and Disarmament* convened by the Swiss government during 24-27 January 1992 in Basel.

Robinson, J.P.P. (1993), "Origins of the Chemical Weapons Convention", *Shadows &*

Substances. The Chemical Weapons Convention, Morel B. and Olson K. (eds), Ridgway Series in International Security Studies, Westview Press, 37-54.

Robinson, J.P.P. (1994), "CBW weapons proliferation and control", memorandum for the UK House of Commons Foreign Affairs Committee (version as revised, 22 November 1994).

Robinson, J.P.P. (1998a), "The negotiations on the Chemical Weapons Convention: a historical overview", *The New Chemical Weapons Convention - Implementation and Prospects*, Bothe, M. et al., Netherlands: Kluwer Law International, 17-36.

Robinson, J.P.P. (1998b), "The Impact of Pugwash on the Debates over Chemical and Biological Weapons", Reprinted from *Scientific Cooperation, State Conflict: The Roles of Scientists in Mitigating International Discord*, Volume 866 of the Annals of the New York Academy of Sciences, December 30, 1998.

Sharp, M., Thomas, S. and Paul, M. (1993), "Technology transfers and innovation policy: chemicals and biotechnology", Steep Discussion Paper No.6, SPRU, September 1993.

Trapp, R. (1993), *Verification under the Chemical Weapons Convention: On-site Inspection in Chemical Industry Facilities*, SIPRI Chemical and Biological Warfare Studies No.14, Oxford University Press.

Vogler, J. (1992), "Regimes and the Global Commons: Space, Atmosphere and Oceans", *Global Politics*, McGrew, A.G. and Lewis, P.G. et al. (eds), Cambridge: Polity Press, 118-37.