

WEAPONS OF MASS DESTRUCTION: A REVIEW OF ITS USE IN HISTORY TO PERPETRATE CHEMICAL OFFENSES

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ABSTRACT

The use of weapons of mass destruction for military purposes is a problem that has its origins in the early history of humanity. Many substances were used as weapon but the chemical ones were the first to be used in history. The first use of chemical agents dates back to 7th century B.C. during the siege of Cirrha, a Greek city. In the literature of that time there are many examples of the use of chemicals, for example in Thucydides' papers, in which the Greek author describes how the Spartans had burned trees previously soaked with sulphur to produce toxic gases that would have reduced the Plataea city's protections. Unfortunately, their plan failed when the wind direction suddenly changed, poisoning their troops instead. Even the Middle Ages offer many testimonies of the use of chemicals as weapons. A real large-scale use of these substances took place in many other events, for example: during the American Civil war (1861-1865) when General Gilmore used explosive shells against the Confederates. In 1865, when Napoleon used hydrogen for military purposes and in 1900, during the Crimean war, when sulphuric gas was used against the Russian troops near Sevastopol. However, the highest levels of use of chemical agents were achieved during World Wars I and II (WWI and WWII). During these years of wars, the international community deemed necessary to regulate the use of this kind of substances and for this aim a couple of conferences were organized in 1899 and 1907 in The Hague to discuss the regulation of chemical agents' use during war. The most important conference took place in Geneva in 1925 where the Chemical Weapons Convention was born. This work is a review of the historical events involving dangerous chemical agents.

Keywords: *Chemical warfare agents (CWA); World Wars I and II (WWI and WWII); Chemical Weapons Convention (CWC), Organization for the Prohibition of Chemical Weapons (OPCW); toxic.*

1. INTRODUCTION

The term weapons of mass destruction (WMD) was used for the first time on December 28, 1937, in a London Times article on the aerial bombing of Spanish cities by Germany, which noted “*Who can think without horror of what another widespread war would mean, waged as it would be with all the new weapons of mass destruction?*” The United Nations (UN) has been using this term since 1947, defining it as “*atomic explosive weapons, radioactive material weapons, lethal chemical and biological weapons, and any weapons developed in the future which have characteristics comparable in destructive effect to those of the atomic bomb or other weapons mentioned above*” (WHO, 2004). The US administration defined WMD as nuclear, chemical and biological (NBC) weapons, which is the most common use of this concept.

The problems of weapons of mass destruction (WMD): chemical, biological, radiological and nuclear (CBRN), their proliferation, detection and interdiction, use and deterrence, dismantlement and destruction – are back with a vengeance on the international agenda. The WMD agenda has three interlinked components: non-proliferation, arms control and disarmament. Proliferation refers to the dispersal of weapons, capabilities and technologies. Weapons can be sought for many different reasons, for example, deterrence of enemy attack, defense against attack, compulsion of the enemy to one's preferred course of action, leveraging adversary and great power behavior, status and emulation (Thakur, 1999). Specific causes of proliferation are many, diverse and usually rooted in a local security complex. On the supply side, a major proliferation challenge is the globalisation of the arms industry, the flooding of the global arms market and a resulting loosening of supplier constraints.

In history, the worst consequences of war have been the destruction of cities and the great number of victims. These consequences have influenced many legal rules developed to face such particular events. Legal rules that regulate warfare (*ius in bello*) known in present times under the name of international humanitarian law, should conciliate two contrary notions: military need (*ratio belli - necessitas belli*) and demands of humanity (Raicevic, 2001). For these reasons, over the years, some limitations in warfare have been adopted, limitations that concern both people and means of warfare. The most important limitations regard the use of weapons, it is prohibited especially to use weapons that could cause non-combatants' death, civil targets' destruction or unnecessary increase of suffering of combatants and disproportional destruction of military targets. Chemical weapons (CW) are one of the means of warfare and the prohibition of those weapons has been present since ancient times in international law. CW could be, in the shortest possible way, defined as “each weapon containing chemical substances, nonliving matters capable of causing consequences against people, animals and plants and infrastructures” (Raicevic, 2001).

The use of chemicals as a means of war is almost as old as human history (poisoned arrows, arsenic smoke and noxious fumes, for example). As with other types of weaponry, the means, range, accuracy and lethality of CW and their delivery systems increased exponentially over the course of the last century. The efficient harnessing of CW for large-scale deployment and use owes much to modern industrial processes and organization (Thakur & Ere, 2006). A CW attack on a city could be expected to produce thousands of deaths. During World War I, successful gas attacks would use tons of gas and produce hundreds of thousands of deaths and thousands of injured. An Office of Technology Assessment report suggests 1,000 kg of sarin gas aerially dispersed on a city with a density of 3,000 to 10,000 people per square kilometer would result in 300 to 8,000 deaths, depending on the climatic conditions at the time of attack (OTA, 1993).

The use of non-conventional agents (like chemicals) to perpetrate an unconventional event is not only a past but also a recent reality. The solutions to such problems are various, and the Quantum Electronics and Plasma Physics Research Group (University of Rome Tor Vergata) has been conducting research to develop innovative hardware solutions (Bellecci *et al.*, 2009; Gaudio *et al.*, 2010; Pazienza *et al.*, 2013, 2014; Malizia, Camplani *et al.*, 2014; Carestia, Pizzoferrato, Cenciarelli *et al.*, 2014; Sassolini *et al.*, 2014; Gelfusa *et al.*, 2015). The group is also working on a new Decision Support System (DSS) (Gelfusa *et al.*, 2014; Malizia, Carestia *et al.*, 2014; Gaudio *et al.*, 2014; Lupelli *et al.*, 2014; Carestia, Pizzoferrato, Gelfusa *et al.*, 2014; Carestia *et al.*, 2015; Ciparisse *et al.*, 2015), and analyzing particular events using state of the art techniques and technologies in order to understand and address the problems (Malizia *et al.*, 2010; Gaudio *et al.*, 2011; Cacciotti *et al.*, 2014; Cenciarelli *et al.*, 2014; Cenciarelli, Gabbarini *et al.*, 2015; Cenciarelli, Pietropaoli *et al.*, 2015; Baldassi *et al.*, 2016).

The success of a CW attack depends on the purity of the agent; climatic factors, such as wind, cloud cover, temperature, and precipitation; the physical properties of the chemical, including density, vapor pressure, and boiling point; persistence in the environment; and delivery mechanism (Caldicott, 2002). Moreover, the lethality of a CW attack depends on whether and how the targets are defended.

2. CHEMICAL WEAPONS BEFORE WORLD WAR I (WWI)

The use of certain chemical agents in warfare has been known for a long time. Chemical agents emerged considerably prior to biological and nuclear weapons. However, the forms of chemical agents and the modes of their use were primitive. In spite of the fact that a great number of wars had been waged, it was only in some of them that the use of chemical agents was recorded. It is well known that the Chinese in olden days used smoke preparations – “*pungent substances that cause nausea and disgust*”. Poisons have often been used for criminal poisoning of people. In the struggle of power and heritage, people were fighting among each other by using various poisonous agents, and poisons were also used for war purposes. For example, arsenic smoke clouds were used to defend Belgrade against the Turks in 1456 (SIPRI, 1971). There were also examples of the use of chemical agents in war in the modern times such as the American civil war and during the Boer War in 1900 when explosive shells filled with a poisonous gas were employed. These mentioned cases of use of chemical agents cannot be considered a usual form of warfare, but accidental and periodical events. Chemical agents used during wars were not intended for military needs, it was their incidental purpose. There were no special devices for their use. Therefore, CW, in the ordinary meaning of the word, cannot be spoken of during this period.

The history of humankind does not recognize such an odious form of warfare as is the use of poisonous substances for military purposes. The use of such agents was condemned for numerous reasons. They were considered perfidious combat agents inconsistent with military chivalry and, accordingly, should not be used by combatants. Their use had been condemned long before, for instance by ancient writers, such as Philius, Ulpian, Tacitus and Claudianus. The Roman Senate stuck to the principle that war should be waged using weapons but not poisons, also Hugo Grotius thought that it was “forbidden to kill anybody by means of poison” and that “it is not allowed to poison weapons and water”. Initially, prohibitions were being established under the customary law to gradually take, later on, the form of a treaty (Schindler & Toman, 1973).

The first written treaty under which the use of chemical agents in warfare was limited is a Franco-German agreement of 1675 concluded in Strasbourg. The use of poisoned shells was prohibited in warfare under this agreement on bilateral grounds. The prohibition of the use of chemical substances in warfare is also contained in Lieber's instructions of 1863 also known as Lieber Code, an instruction signed by President Abraham Lincoln to the Union Forces of the United States during the American Civil War that dictated how soldiers should conduct themselves in wartime. Francis Lieber, an international law scholar-professor, prepared it. “Lieber's Instructions” represent the first attempt to codify the laws of war (Schindler & Toman, 1973). That prohibition is discussed twice in these Instructions. Part I includes a general prohibition of the use of poisons in war (Article 16). In Part III of the Instructions (Article 70), that prohibition is partially made precise, and this Article reads: "The use of poisons in any manner, be it to poison wells, or food or arms, is wholly excluded from modern warfare. He that uses it puts himself out of the pale of the law and usages of war." The first deed at a multilateral level that contains a prohibition of the use of poisonous substances in war is the Brussels Declaration of 1874 (Schindler & Toman, 1973). It was not an agreement in the ordinary meaning of the term, it remained at the stage of a project, but its provisions were important for the future development of the law of war. Article 12 of the Declaration provides that belligerent powers shall not have full liberty in choosing means and methods of fight against the enemy. Article 13 prohibits certain means and methods of warfare among which is the prohibition of the use of “poison and poisoned weapons”. The ban of the use of poison in war was the conclusion that the Declaration would reach.

The two Hague Conventions are the other documents under which the use of chemical agents in warfare is prohibited. The relevant provisions are contained in the annexes to these Conventions, which represent their most important parts and are known under the name Hague Regulations. The provisions concerning the prohibition of poisonous substances are identical in both Regulations (1899 and 1907). The prohibition of the use of poisonous substances in warfare is regulated under Article 23 of these Regulations. Two paragraphs of this Article are essential for that prohibition, paragraphs a

and e. There is a general prohibition to employ arms, projectiles or material of such a nature as to cause unnecessary injury (paragraph e): since poisonous substances, in view of their effects, can be considered means that cause unnecessary injury, they fall under this paragraph as well. Paragraph a of the same Article explicitly stipulates that the utilization of “poisons and poisoned weapons” is prohibited. In addition, a Declaration concerning Asphyxiating Gases was discussed and the prohibition is formulated as follows: “The contracting powers prohibit the use of projectiles the sole objects of which is the diffusion of asphyxiating or deleterious gases”. The particularity of these statements was the prohibition of weapons not yet in existence at that time, but the creation of which could be envisaged in the future to come. At the time when the Declaration was adopted, projectiles filled with deleterious gases were still an idea. These were the legal norms in the field of prohibitions of the use of CW at the outbreak of WWI, when the relevant norms gained a practical value (Thakur & Ere, 2006).

3. FROM WWI TO THE NEW MILLENNIUM

3.1 WWI

WWI has been the turning point in the use of chemical agents as weapons. A large quantity of chemical agents were used resulting in many victims. Chemical agents were used by the Germans and the allies as well. The turning point occurred in Ypres on April 22, 1915 when Germany used bottles filled with chlorine against the Allied forces. As a consequence of that attack there were 15,000 wounded soldiers on the side of Allied forces, out of which 5,000 were killed. This new and unexpected attack provoked great losses because the soldiers were not well equipped for this substance. The Allied forces, as a response to the German attack, began using CW too. At this point the war made a big progress, CW were used more and more often. New devices for the chemical and poisonous gases dispersion were created and improved in this period. More than 50 different toxic compounds amounting to 125,000 tons are supposed to have been used by Germany and the Triple Entente over the period from 1914 to 1918. Such frequent use of poisonous gases resulted in mass victims (SIPRI, 1971). Table 1 shows the number of said victims.

**Table 1: Number of victims of Chemical agents during WWI.
(Modified from SIPRI, 1971)**

State	Total casualties from Chemical agents (fatal and nonfatal)	Fatal casualties from Chemical agents
Germany	200,000	9,000
France	190,000	8,000
Great Britain	189,000	8,100
Austria-Hungary	100,000	3,000
Italy	60,000	4,600
Russia	475,000	56,000
USA	73,000	1,500
Belgium and Portugal	10,000	1,000
Total	1,297,000	91,200

3.2 From WWI to World War II (WWII)

After WWI, as a consequence of the use of new methods of war, the field of international law radically changed to try to regulate the use of CW in warfare. One group of authors condemned the use of CW and considered it a violation of international law, while another group held that the use of those weapons did not constitute a violation of the existing legal prohibitions. The German law theory was particularly persistent in justifying the use of CW, and this may be because they were one of the

first to use CW. Some argued that Germany respected the rules of the Hague Declaration Concerning Asphyxiating Gases until 1916, because the German army used bottles to spread poisonous gases that could not be classified as “projectiles”, which were prohibited under the Declaration. It was also pointed out that the projectiles used were filled with explosive in addition to a chemical charge, for which reason they were not covered by the Hague Declaration, because the spreading of asphyxiating gases was not their “only” purpose. The starting point is that the sources of the law of war are not made up only by treaty rules, but customary law as well.

During WWI, the limitations about the use of chemicals and poisonous gases were general and this is why the need to conclude a treaty was felt after the War whose only purpose should be to regulate the prohibition of the use of CW. This was done in 1925 with the adoption of the Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases and of Bacteriological Methods of Warfare. This Protocol was preceded by two international deeds containing provisions limiting the use of CW. The first of them is the Versailles Peace Treaty, the second act is the Washington Conference, also known as Treaty on the Use of Submarines and Noxious Gases in Warfare between France, Italy, Japan, United Kingdom and United States (Washington D.C. February 6, 1922). The Treaty did not enter into force, because France did not ratify it. Article 5 reads: *“The use in war of asphyxiating, poisonous and other similar gases having been declared in treaties to which a majority of the civilized Powers are parties. The Signatory Powers declare their assent to such prohibition, agree to be bound thereby as between themselves and invite all other civilized nations to adhere thereto.”* This Article is important in that it confirms that the use of CW had already been prohibited under customary law. As to the 1925 Geneva Protocol itself, its purpose was to eliminate the imperfections and voids existing in the former prohibitions to use CW. Legal regulations should be harmonized under it with the new technological accomplishments related to the use of CW, such as airplanes, airplane bombs, etc. The Protocol contains a general formulation of the prohibition of the use of chemicals without indicating the means of their possible use.

Some would argue that only the use of CW was prohibited, but not their improvement, production and transfer, nor was the destruction of existing CW requested. The risk that CW were used would be greatly reduced if they were to be eliminated, by destroying the existing stocks and prohibiting their further improvement, production and transfer. The unlimited possibility of making observations to the Protocol’s provisions may be considered an imperfection; in fact, this possibility was widely used by different states to frequently hinder the purpose and spirit of the Protocol, for instance, using CW against the non-signatory states, or to seek revenge and respond in kind if attacked with CW by another state. The States kept on accumulating large stockpiles justifying them by the necessity of creating capacities of countering the -internationally illegal - use of CW of potential rivals (Raicevin, 2001).

It happened in the Italo - Ethiopian war of 1935-1936 and was a violation of the Geneva Protocol, because both Italy and Ethiopia were among its signatory states. Italy used around 700 tons of chemical agents, mostly delivered by the Italian air force (SIPRI, 1971). During those attacks, in addition to soldiers, there were civilian victims as well. Reports on horrible consequences were obtained mainly from physicians, representatives of national organizations of the Red Cross and journalists. John Melly, head of a field hospital of the British Red Cross, describes that war as follows: *“It is not a war, it is not even a slaughter – it is a torture of thousands of defenseless men, women and children”* (Baudendistel, 1998). Poisonous gases were not only used during the 1935-1936 war, but also during the subsequent occupation against Ethiopian rebels. The Italians justified the use of CW by necessary reprisals against the brutality committed by Ethiopian troops over Italian soldiers.

The use of CW was recorded also in the Sino-Japanese war of 1937-1945. The Japanese army used different chemical agents several times. Over the period between the two World Wars, further investigations and developments of CW were continued. New poisonous gases were produced which were several times stronger than those used in World War I. The improvement of CW, their mass

production was commenced specially prior to the outbreak of the War in order to lead the war more effectively (Raicevin, 2001).

During WWI, the use of CW in war became systematic and some European army began attacking the enemy with those agents. Ypres, in 1915, was the first battle fought with the use of liquid chlorine. At the end of WWI, some nations tried to stop the crazy stroke to find the perfect chemical/biological agent to give the final rush in future wars, therefore in 1925 a specific convention for chemical and biological weapons was prepared. The discussion began in 1921, when the League of Nations considered banning the use of CW in war. After the experience of WWI, the Geneva Protocol in 1925 was prepared. All the great powers and most of other nations ratified the Geneva Protocol that entered into force on February 8, 1928. The Protocol is considered an agreement that forbids the use of chemical and biological weapons except in case of retaliation.

3.3 WWII

At the beginning of WWII, the states involved had their own programs to create and use chemical and biological weapons. In the period prior to the CW Convention (CWC), large stockpiles of CW were in possession of both belligerent sides at the outbreak of World War II and their production continued during the war. However, there was no mass use of these agents during this war and there are several reasons stated for it. One of the reasons for non-use was some statements made during the war. Great Britain and France obligated themselves under the joint declaration of September 3, 1939 and the government of Nazi Germany under the declaration of September 9, 1939, that they will strictly observe the provisions of the Geneva Protocol, under the condition that the other party would do the same.

In addition, the reasons of military nature contributed to the non-use of CW. These reasons partially explain why the prohibition of the use of CW was the most observed prohibition in World War II (in contrast to the prohibition with reference to civilians, wounded, prisoners and targeted premises), but it is still uncertain why the use of CW were deterred. After World War II, due to the advent of nuclear weapons, the interest of great powers in CW diminished for some time. Greater importance to CW was attached by states that had no nuclear weapons. However, after the nuclear balance had been redressed the interest in CW was again revived.

3.4 From WWII Until the New Millennium

There were accusations that in certain wars waged after 1945 some belligerent states used CW. However, few of those accusations were proved before international entities, and in even fewer cases, the accused party admitted to have used such weapons. Below are some of the wars in which CW were used (OPCW, 1999):

1945-1949: China. During the Chinese civil war, both parties to the conflict heavily accused each other of using chemical agents;

1947: Indochina. The French forces were accused of using CW in battles against the Vietnamese nationalists. However, such accusations were refuted by French officials;

1948: Israel. In January 1949, the Israeli military officials refuted the accusations by Egypt on the supposed use of CW against Egyptian troops;

1949: Greece. "Tanjug", the Yugoslav news agency reported that a poisonous gas was used by the governmental entities against the war forces in Peloponnesus. However, the Greek defense minister stated that only excitant gases had been used for the purpose of expelling guerrillas from the caves;

1951-1952: Korea. The US were accused of using CW several times in that conflict, the heaviest attack being that on May 6, 1951, when the American bombardiers B-29 dropped bombs filled with poisonous gases nearby the city of Nampo;

1957: Cuba. Cuban emigrants requested inspection by the United Nations because of a supposed use of chemical agents –mustard- by the Cuban government against the guerrillas;

1957: Algeria. The French forces were accused of using chemical agents against the Algerian rebels. The accusations were refuted by the French commanders in the field;

1958: China. Radio Peking accused the Chinese nationalist forces of using shells filled with chemical agents when bombing the Chinese people's army. On that occasion, the Peking defense minister threatened to take revenge in case of continued attacks. The nationalists and American authorities in Taipei refuted those statements;

1963-1967: Yemen. There were several reports that the Egyptian forces had used CW during their intervention in the Yemen civil war. All the accusations were refuted by Egypt, considering them to be propaganda against Egypt;

1961-1973: Indochina. There were several reports on the use of CW during the war in Vietnam. The mass use of herbicides and excitant gases by American troops and the South- Vietnamese army was proved by sources in the US. However, the US emphasized the fact that the use of excitant gases and herbicides was not prohibited either under customary law or under the Geneva Protocol - the signatory state of which US was not, but observed its provisions. US was supported in such interpretation of law by some states, particularly by Great Britain (SIPRI, 1973).

There were opposing views, however the majority of states supported the US at that time. Within the United Nations, and elsewhere, it was emphasized that the use of any kind of chemical and biological weapons was prohibited in warfare. Such attitude was adopted by the General Assembly of the United Nations under its Resolution 2603 of 1969. Laid down in which is that the use of: "*Any chemical agents for warfare – chemical substances, whether gaseous, liquid or solid – which might be employed because of their direct toxic effects on men, animals or plants*" in armed conflicts is prohibited under the Geneva Protocol of 1925. There were accusations that the US in that war used mortal poisonous gases. However, the US refuted the use of such poisons. The use of herbicides and excitant gases in Vietnam caused serious consequences. The use of poisonous gases was particularly severely criticized by the member states of the Warsaw Pact and the effects of that use were widely reported by the press of those states. The American army is supposed to have dropped 100,000 tons of poisonous matters in Vietnam. Around two million people were afflicted by the consequences of the use of these poisonous matters, not only the Vietnamese, but the Americans too. About one million of Vietnamese died of starvation due to destruction of rice fields and other agricultural products. More than 43 percent of the cultivable soil in Vietnam was unusable due to the effects of herbicides. The use of poisonous gases resulted in a number of inborn defects with the children born after the war, both in Vietnam and with the children of the Americans who participated in the Vietnamese war.

1975: Laos. Vietnamese forces, supported by Soviet experts, were suspected to have used chemical agents in Laos;

1978-1980: Laos, Cambodia and Afghanistan. The US and the United Nations point to the use of CW in Laos and Cambodia and then in Afghanistan.

1980- 1988: Iraqi-Iranian war. Starting from 1984, Iran permanently accused Iraq of the use of CW. Iraq sent a number of victims of those attacks to Western Europe for treatment. A committee for establishing the supposed use of CW by Iraq was set up by the United Nations Secretary General and

that team confirmed the accusations of Iran. In addition, Iran was accused by Iraq by the end of the war to have used CW weapons as well, but the accusations were not confirmed.

1992-1995: War in Bosnia and Herzegovina (Stock *et al.*, 1996). During the war there were mutual accusations that each party to the conflict -Serbs, Moslems and Croats- used CW in certain battles. However, the independent experts did not confirm such accusations.

In addition to the use in warfare, CW become attractive for terrorist as well. After the terrorist use of a poisonous gas by a religious sect in the Tokyo under-ground, the international community became aware of the great danger if CW reached the hands of terrorists (Stock *et al.*, 1996).

Considerably contributing to the CW prohibition negotiations were particularly the Iraqi-Iranian war and the Tokyo terrorist attack. After World War II until the adoption of the CWC in 1993, no international agreement was concluded referring to CW. However, it does not mean that no efforts have been made in the domain of controlling that kind of weapons. The greatest efforts have been made within the United Nations and the International Red Cross.

The following resolutions of the General Assembly of the United Nations with respect to CW are listed below: Resolution 2162B (XXI) of 1966; Resolution 2444 and Resolution 2454A (XXIII) of 1968 and Resolution 2603 (XXIV) of 1969. Under these Resolutions the existing prohibition of the use of CW is pointed out by the General Assembly of the United Nations, states are called up to observe this prohibition and those states that have not joined the treaties are called up to do so. Also worth mentioning is a report of a group of experts (United Nations, 1969), set up at the request of the United Nations Secretary General in 1969, on the consequences of possible use of CW, in which it is ascertained that, if they should widely be used in warfare, no one could predict how lasting the consequences would be.

In the Draft Rules for the Limitation of the Dangers Incurred by the Civilian Population in Time of War, drew up by the International Committee of the Red Cross in 1955, the use of asphyxiating, poisonous and similar gases, bacteriological agents as well as similar liquids, substances and methods are prohibited. In addition, appeals from many international conferences of the Red Cross have been made to all states to join the Geneva Protocol of 1925.

An appeal of similar content was also made at the conference on human rights held in 1968 in Teheran. However, a need was being noticed to make an international agreement that would eliminate imperfections of the existing rules in the domain of prohibition of the use of CW. For that reason, negotiations were taken up in 1968 on the convention under which prohibition of CW would be regulated, and they would, as it turned out, last until 1993 when the Convention on the Prohibition of the Development, Production, Stockpiling and Use of CW and on Their Destruction was signed.

4. GENESIS AND HISTORICAL DEVELOPMENT

4.1 From the End of the 19th Century to the First Years of the 20th Century

The history of the serious efforts to achieve chemical disarmament that culminated in the conclusion of the CWC began more than a century ago. Although toxic chemicals have been used as a method of warfare throughout the ages, it is clear from some of the earliest recorded incidents that such weapons have always been viewed as particularly abhorrent. An international peace conference held in The Hague in 1899 led to the signing of an agreement that prohibited the use of projectiles filled with poison gas.

The efforts of the twentieth century were rooted in the 1899 Hague Peace Conference. The contracting parties to the 1899 Hague Conventions declared their agreement to abstain from the 'use of projectiles, the sole object of which is the diffusion of asphyxiating or deleterious gases'. Their

intentions unfortunately proved futile. The rules of warfare agreed at the Hague Conference and its successor (the 1899 and 1907 Hague Regulations) prohibited the use of poisoned weapons. Nonetheless, CW was used on a massive scale during WWI, resulting in more than 100,000 fatalities and a million casualties (Gay, 2001)

The result of this renewed global commitment was the 1925 Geneva Protocol for the Prohibition of the Use of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare. However, the Geneva Protocol does not prohibit the development, production or possession of CW. It only bans the use of chemical and bacteriological (biological) weapons in war. Furthermore, many countries signed the Protocol with reservations permitting them to use CW against countries that had not joined the Protocol or to respond in kind if attacked with CW. Since the Geneva Protocol has been in force, some of these States Parties have dropped their reservations and accepted an absolute ban on the use of chemical and biological weapons. During the first half of the twentieth century, many developed countries spent considerable resources on the development of CW, particularly after the discovery of powerful nerve gases renewed interest in the field. A number of countries used CW in the inter-war period, and all the major powers involved in World War II anticipated that large-scale chemical warfare would take place. Contrary to expectations, however, CW were never used in Europe in World War II. The reasons are uncertain, and historians still debate whether it was fear of retaliation in kind, the level of protection of enemy troops, or moral reasons that deterred their use. The fate of some of the stockpiles built up in anticipation of World War II is also uncertain. Many CW were abandoned, buried or simply dumped at sea. In any event, following World War II, and with the advent of the nuclear debate, several countries gradually came to the realization that the marginal value of having CW in their arsenals was limited, while the threat posed by the availability and proliferation of such weapons made a comprehensive ban desirable. At that time, the issues of chemical and biological weapons disarmament were linked to each other. Both issues became the subject of active consideration when, in 1968, Sweden was able to include them on the agenda of the multilateral Geneva disarmament conference. At that time, the conference was called the Eighteen Nations Disarmament Committee (ENDC) (Thakur, 1999; Thakur & Ere, 2006).

4.2 From the 1970s to the 21st Century

Shortly thereafter, the negotiations on biological and CW issues diverged. In 1969, the United Kingdom tabled a draft biological weapons disarmament treaty. After several modifications that reduced its effectiveness, the draft Biological Weapons Convention was agreed upon in the disarmament conference, and was endorsed by the United Nations General Assembly. The treaty opened for signature in 1972 and entered into force in 1975. The Biological Weapons Convention was an incremental step forward in the commitment to achieving a CW ban. Each State Party to this Convention affirms the recognized objective of effective prohibition of CW and, to this end, undertakes to continue negotiations in good faith with a view to reaching early agreement on effective measures for the prohibition of their development, production and stockpiling, and destruction. In addition, appropriate measures concerning equipment and means of delivery specifically designed for the production or use of chemical agents for weapons purposes are necessary. The issue of CW was therefore retained on the agenda of the Geneva Conference, and various states tabled drafts during the 1970s. This era also saw the announcement of a joint US–Soviet initiative on CW, which was to be submitted to the Geneva Conference. A US–Soviet working group set up during this period began discussing some key ideas, which eventually formed the building blocks of the CWC. These included the need to control the precursors of CW, to establish mechanisms such as a conference or committee of all states parties and a secretariat to oversee the implementation of the treaty, and to use routine and challenge inspections as part of the verification regime. In 1978, the Geneva conference -it was renamed as the Conference on Disarmament in 1980- was restructured. Its membership increased to 40, and the chairmanship was to rotate among the members. The Conference decided in March of that year to establish an ad hoc working group on CW, which was required to 'define, through substantive examination, issues to be dealt with in the negotiations' on the Convention. Significant developments in the elaboration of the draft Convention were made in 1984. The United States submitted a new

draft text, which proposed intrusive verification measures, including mandatory challenge inspections. The negotiations received a new impetus when the Secretary-General of the United Nations announced that CW had been used by Iraq in its war against Iran. The Conference then agreed to begin elaborating a ban on CW, and mandated the ad hoc working group accordingly. The group worked based on a “rolling text” of the Convention on which areas of consensus and disagreement were reflected. Beginning in 1986, the global chemical industry actively participated in these negotiations. Unlike the BWC, the negotiators of a CW ban reached an understanding that this ban would be subject to international verification. To this end, trial inspections of both industrial and military facilities were undertaken, starting in late 1988. With the thawing of relations between the United States and the Soviet Union, there were a number of major breakthroughs in the negotiations on the Convention. In August 1987, the USSR indicated its willingness to accept, and even extend, the proposals for an intrusive verification regime contained in the 1984 US draft treaty. In the meantime, photographs of a chemical attack on civilians in Northern Iraq in March 1988 were widely published in the media. The international community reacted with repugnance against this use of CW, and within the Conference on Disarmament, the momentum for the conclusion of negotiations increased. In September 1989, President George Bush announced the new US position to the UN General Assembly: instead of total verifiability, the United States would seek “*a level of verification that gives us confidence to go forward.*” In 1990, the United States and the Soviet Union also signed a bilateral agreement on CW, under which the two countries agreed not to produce CW, to reduce their stocks of CW to 20% of current holdings; and to begin destruction in 1992. It was also agreed that neither country would have more than 5000 tons of chemical agents by 2002. This agreement never entered into force; it nevertheless marked a willingness on the part of the two major possessors of CW to work together to eliminate this class of weaponry (Thakur, 1999; Thakur & Ere, 2006).

While the differences between the Americans and Soviets appeared to be diminishing, other issues gained prominence. Several Arab countries, for example, linked chemical disarmament to progress on nuclear disarmament. Developing countries were generally concerned about whether the Convention would carry any benefits for them. Various new provisions were therefore developed for inclusion in the text of the Convention during the final years of the negotiations, such as:

- Assistance to victims of CW use;
- The exemption of some sectors of the chemical industry from routine inspections;
- The imposition of obligations on States Parties in relation to abandoned CW;
- Promise on the part of several developed countries, known collectively as the “Australia Group”, to review export controls and other barriers to trade in chemicals.

On the whole, the last “concession” from the industrialized countries, embodied in Article XI on economic and technological development, was probably the key to obtaining broad support for the Convention, since for a number of developing countries, free trade in chemicals for purposes not prohibited under the Convention was the only important issue. The solution that was found is perhaps best captured in the statement of the Australian representative to the plenary session of the Conference on Disarmament on August 6, 1992 (OPCW, 2016).

“The members of the Australia Group undertook to review, in the light of the implementation of the Convention, the measures that they will take to prevent the spread of chemical substances and equipment for purposes contrary to the objectives of the Convention” (OPCW, 2016). The aim was removing such measures for the benefit of States Parties to the Convention acting in full compliance with their obligations under the Convention. Paragraph 40 of the Report of the Ad Hoc Committee on CW to the Conference on Disarmament, CD/1170, dated August 26, 1992.

In 1992, another obstacle to agreement on the Convention was removed when the United States renounced its previous insistence on retaining the option of retaliation in kind, and accordingly dropped its demand for the right to retain security stockpiles. There was a strong push to conclude the CWC. This was affirmed when President Bush called for, and obtained agreement on, a one-year

deadline for the completion of negotiations. It was clear to everyone involved that 1992 offered a window of opportunity for agreeing on a text for the treaty. The Chairman of the ad hoc Committee on CW moved quickly and tabled a draft Convention which incorporated the latest 'rolling text' and possible compromise solutions. After two more revisions, the draft convention was approved by most delegations, and was transmitted to the Conference in the summer of 1992. The Conference on Disarmament adopted the draft text on September 3, 1992 and transmitted it in its Report to the UN General Assembly. The text of the Convention was commended by the General Assembly in December 1992, with the request to the UN Secretary-General, as Depositary of the Convention, that it be opened for signature in Paris on January 13, 1993. A total number of 130 States signed the Convention within the first two days and it was subsequently deposited with the United Nations Secretary-General in New York. Recognizing that considerable preparations were required, and that a number of outstanding issues still remained to be resolved before the Convention could enter into force, the signatory states in Paris approved a resolution -the 'Paris Resolution'- to set up a 'Preparatory Commission' for the future Organization for the Prohibition of CW.

Under the General Assembly resolution commending the text of the Convention, the UN Secretary-General was also requested to provide the services required by the signatory states to initiate the work of the Preparatory Commission. Accordingly, the Paris Resolution mandated the UN Secretary-General to convene the Preparatory Commission for its first session within 30 days of the fiftieth signature of the Convention. Since this threshold, number was easily exceeded at the signing ceremony in Paris, the inaugural session of the Preparatory Commission was held shortly thereafter, on February 8, 1993, in The Hague, the Netherlands, and the seat of the future Organization. As mandated in the Paris Resolution, the Preparatory Commission immediately established a Provisional Technical Secretariat to assist its work, and to prepare for the eventual Secretariat of the Organization for the Prohibition of Chemical Weapons (OPCW). The Preparatory Commission stayed in existence from 1993 until shortly after the Convention entered into force on April 29, 1997. According to the terms of the Convention, the CWC would enter into force 180 days after the 65th country ratified the treaty. To prepare for the treaty's entry into force and the implementation of the verification regime, a Preparatory Commission was established in 1993. The work of the Preparatory Commission, as described in the Paris Resolution, was to prepare the 1st Session of the Conference of the States Parties after Entry into Force, to make all necessary practical preparations for the implementation, and to finalize the work and the necessary procedures and guidelines needed for its implementation. These activities can be broadly categorized as developing the operational procedures for the CW's Verification regime and other operations; drafting the program and budget of the OPCW; and establishing the infrastructure and internal functional rules for the OPCW Secretariat. The Preparatory Commission functioned primarily through two working groups, one of which was tasked with considering administrative and organizational matters, while the other was assigned the responsibility for issues relating to verification and technical cooperation and assistance. Other bodies were also created to assist the work of the Preparatory Commission on specific issues such as relations with the host Country and preparations for the First Session of the Conference of The States Parties (WHO, 2004).

The Preparatory Commission was successful in resolving a number of tasks within its mandate, the results of which were reflected in its Final Report. Among its major achievements were solutions to several substantive verification issues as well as the setting up of the OPCW Laboratory and Equipment Store, the development of a general training scheme for inspectors and the recruitment of inspector trainees, arrangements relating to the new OPCW headquarters building, and the development of draft documents such as the Headquarters Agreement, OPCW Staff and Financial Regulations, OPCW Health and Safety Policy and Regulations, OPCW Confidentiality Policy, and the OPCW Media and Public Affairs Policy. The Preparatory Commission was also responsible for the orderly transfer of its property, functions and recommendations to the OPCW. Despite its considerable efforts, however, the Preparatory Commission was unable to reach an agreement on a number of issues deriving from the Paris Resolution. These issues were therefore carried over to the OPCW as 'unresolved issues'. Many of these issues have been resolved since then, but others are still under discussion by the Member States of the OPCW (Thakur, 1999; Thakur & Ere, 2006).

Hungary was the 65th country to ratify the Convention, in late 1996, and on April 29, 1997, the CWC entered into force with 87 States Parties—becoming binding international law. An additional 22 countries had ratified the treaty in the 180 days between Hungary’s ratification and entry into force. With the entry into force of the Convention, the OPCW immediately began its work to implement the Convention. Both, the Convention and its implementing body, are intended to adapt not only to shifts in the international environment and the changing needs of State Parties, but also to respond to the rapid pace of scientific and technological developments. Every five years, the Convention foresees that the State Parties should undertake a review of the implementation process. These review conferences serve as fora for the assessment and evaluation of the CWC’s implementation, and the identification of areas where change is needed. A particular focus is given to the verification regime and the changing context within which it is implemented as well as scientific and technological advances in chemistry, engineering and biotechnology. The first review conference was held from April 28 to May 9, 2003. The second review conference was held from April 7 to 18, 2008.

5. CONCLUSION

In conclusion, we can affirm that the use of chemical agents in history and present times has been a matter of several discussions and it resulted not only in the death of millions of people but also provoked new conflicts and huge historical events. The criticisms regarding the use of offensive chemical agents have also resulted in positive effects. The instauration of the CWC together with the born of the OPCW are two important milestones achieved by the international community that have improved the safety and security of people and the worldwide political and economical stability.

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