BSHS Monographs **publishes work of lasting scholarly value that might not otherwise be made available, and aids the dissemination of innovative projects advancing scholarship or education in the field.**

13. Chang, Hasok and Jackson, Catherine (eds.). 2007. *An Element of Controversy: The Life of Chlorine in Science, Medicine, Technology and War.*
ISBN: 978-0-906450-01-7.

12. Thackray, John C. (ed.). 2003. *To See the Fellows Fight: Eye Witness Accounts of Meetings of the Geological Society of London and Its Club, 1822-1868*. 2003.
ISBN: 0-906450-14-4.

11. Field, JV and James, Frank AJL. 1997. *Science in Art.*
ISBN 0-906450-13-6.

10. Lester, Joe and Bowler, Peter. *E. Ray Lankester and the Making of Modern British Biology.* 1995.
ISBN 978-0-906450-11-6.

09. Crosland, Maurice. 1994. *In the Shadow of Lavoisier:*
ISBN 0-906450-10-1.

08. Shortland, Michael (ed.). 1993. *Science and Nature.*
ISBN 0-906450-08-X.

07. Sheets-Pyenson, Susan. 1992. *Index to the Scientific Correspondence of J. W. Dawson.*
ISBN 978-0-906450-07-9.

06. Morris, PJT, and Russell, CA; Smith, JG (ed.). 1988. *Archives of the British Chemical Industry, 1750-1914: A Handlist.*
ISBN 0-0906450-06-3.

05. Rees, Graham. 1984. *Francis Bacon's Natural Philosophy: A New Source.*
ISBN 0-906450-04-7.

04. Hunter, Michael. 1994. *The Royal Society and Its Fellows, 1660-1700.* 2nd edition.
ISBN 978-0-906450-09-3.

03. Wynne, Brian. 1982. *Rationality and Ritual: The Windscale Inquiry and Nuclear Decisions in Britain.*
ISBN 0-906450-02-0

02. Outram, Dorinda (ed.). 2009. *The Letters of Georges Cuvier.* reprint of 1980 edition.
ISBN 0-906450-05-5.

01. Jordanova, L. and Porter, Roy (eds.). 1997. *Images of the Earth:* 2nd edition.
ISBN 0-906450-12-8.

For e-prints and ordering information, visit the BSHS Monographs Website:
www.bshs.org.uk/monographs

An Element of Controversy

The Life of Chlorine in Science, Medicine, Technology and War

Edited by Hasok Chang and Catherine Jackson

from research by undergraduate students at
University College London

British Society for the History of Science

2007

ISBN 978-0-906450-01-7

Cover design by Joe Cain.

Front cover illustration: Blueprint for a chlorine chamber for the cure of respiratory diseases. Reproduced by permission of Edward G. Miner Library, Rocherster, New York.

Back cover illustration: Chlorine gas, courtesy of the Department of Chemistry, University College London. Photo by Gretchen Siglar.

Contents

8

Ethics, Public Relations, and the Origins of the Geneva Protocol

Abbi Hobbs, Catherine Jefferson, Nicholas Coppeard and Chris Pitt

1. Introduction

The Geneva Protocol was the first international treaty banning the use of all chemical and biological weapons. It was agreed on 17 June 1925, and it remains binding today. The development of gas warfare during the First World War (WWI) occupies a key role in the standard story of the origins of the Geneva Protocol. According to that story, gas warfare was clearly inhumane and unethical, and widespread public antagonism to the use of chemical weapons was instrumental in the adoption of the Geneva Protocol. In this chapter we will raise a number of questions about that common view.

First of all, we examine the question of who first broke the spirit and later the letter of the Hague Conventions of 1899 and 1907 during WWI. Then we consider the views of some key protagonists in the Allied forces' adoption of chemical weapons during the course of WWI. As we have seen in Chapter 7, Section 3, the British decision to retaliate in kind following the German use of chlorine at Ypres was only reached after a protracted debate at the highest levels of government. The decision to use gas, we have argued, was principally based on military considerations including troop morale, with legal and ethical factors playing only a subsidiary role. How were these concerns reflected in the beliefs and opinions of the military and scientific leaders involved in the deployment of chemical weapons? And what effect did first-hand experience have on their outlook?

Hasok Chang and Catherine Jackson, eds., An Element of Controversy: The Life of Chlorine in Science, Medicine, Technology and War *(British Society for the History of Science, 2007).*

In the aftermath of WWI, horror at the scale of destruction and loss of life has generally been considered to be highly influential in prompting international discussions on disarmament. How did this play out in the case of chemical weapons? We ask whether public opinion was, in itself, such a powerful impetus for the control of chemical weapons agreed in the Geneva Protocol of 1925. In comparison, how important was the role of the League of Nations, and how did the U.S. political and military establishment influence disarmament negotiations from their position outside the League of Nations? By considering contemporary attitudes to chemical weapons in Britain and the U.S. and by examining international attempts to control their future use, we show that the origins of the Geneva Protocol are by no means as straightforward as often imagined. Expert opinion about the morality of chemical weapons was extremely divided, and the public received conflicting messages as a result. Even at the governmental level, there was little agreement about the best means of controlling chemical weapons.

2. Who first violated the Hague Conventions?

Before discussing the morality or legality of chemical warfare in detail, one point needs to be cleared up: we need to get away from a simplistic demonization of Germany. Standard secondary texts on the history of WWI attribute the initiation of chemical warfare to the Germans for their use of chlorine gas at Ypres in April 1915. Such accounts frequently insinuate or even state that Germany was guilty of breaking the 1907 Hague Convention, which both the Allied forces and Germany had ratified. However, the question of who first broke the Hague Convention warrants a more subtle examination. The Convention was an attempt to limit the development and use of new and horrific forms of warfare, aimed at preventing unnecessary suffering. But it had failed to specify sufficiently precise definitions of the types of the prohibited forms of warfare, leaving a great deal of room for interpretation. As a result, we need to distinguish the question of who first broke the *spirit* of the Convention, and who first broke the actual *letter* of it.

Following the 1874 Brussels Conference, the first Hague Convention of 1899 was convened by Tsar Nicholas II in an attempt to make future warfare more humane. The terms of this Convention were redefined and expanded in the second Hague Convention of 1907. At the

outbreak of war in 1914, all European belligerents except Italy had ratified this version of the Convention.[1] The spirit of the Hague Convention was a humanitarian one, as encapsulated in Article XXIII, which prohibited the use of weapons "calculated to cause unnecessary suffering".[2] While this article embodied the ethos of the Convention, it lacked any precision — both "necessity" and "suffering" were terms very much open to interpretation. In the context of actual war, these terms became quite meaningless, as any act of war entailed some degree of "suffering", but could almost always be justified by its perpetrator as "necessary". This makes it difficult to be definite about who first broke the spirit of the Hague Convention, but the German gas attack at Ypres in April 1915 constituted a clear infringement.

If we consider the letter of the Convention, the most specific prohibition of chemical weapons was the following: "The contracting Powers agree to abstain from the use of projectiles the sole object of which is the diffusion of asphyxiating or deleterious gases".[3] Unfortunately the terms of even this statement are open to interpretation, particularly in relation to the terms "deleterious" and "asphyxiating". For example, it could be argued that this agreement precluded the use of tear gas or irritant projectile weapons, such as those used by the French as early as August 1914. Such weapons were, however, used to harass rather than kill the enemy and we propose a more reasonable interpretation of this clause as prohibiting the use of projectile weapons, the sole purpose of which is to liberate toxic or potentially lethal gases. As we shall see, the first projectiles used solely for liberating such gases were fired by the British at Loos in September 1915.

At the outbreak of war in 1914, although there was an increasing awareness of the potential of chemical weaponry, the only country actually to possess any was France.[4] Two French chemists, Kling and Florentin of the municipal laboratory of the City of Paris, had investigated lachrymatory agents for their potential to aid police in subduing

---

[1] Haber (1986), p. 19.
[2] Best (1983), p. 161.
[3] Scott (1920), p. 266, gives the text of the Convention. "Poison and poisoned weapons" were also prohibited, but as a separate clause existed specifically dealing with toxic gases, this agreement was taken to pertain to the deliberate poisoning of food or water; see Trumpener (1975), p. 468.
[4] Haber (1986), p. 21.

civilian rioters. The result of their research was the tear gas ethyl bromo-acetate. The police did not adopt this tear gas, but supplies of cartridges and hand grenades filled with it were prepared for the French military at the outbreak of war. These 26mm cartridges (*cartouches suffocantes*), which could be fired from a special rifle, were first used against the Germans in August 1914. The grenades (*engins suffocantes*) may have also been brought into play at this point, but there is no conclusive evidence of their use in battle until March 1915.[5] As stocks of these grenades were used up the French command placed an order for fresh supplies, which were manufactured with an upgraded filling (chloro-acetone). The employment of these chemical agents could be seen as an infringement of both the letter and the spirit of the Hague Convention, but that seems extreme in light of the fact that the tear gas was initially developed for civilian use and was a rather mild weapon. Indeed, a confidential French circular issued on 21 February 1915 classified the effects of their tear-gas weapons as "irritant . . . [but] at least in small doses . . . [not actually] deleterious", suggesting that the French certainly did not consider that they were breaking the Convention.[6]

Meanwhile, following their setback at the Battle of the Marne in September, the Germans were also contemplating the use of chemical weapons as a response to "dwindling stocks of powder and shell, coupled with complaints about the ineffectiveness of high explosive shells".[7] The next chemical weapon to be introduced to the conflict was the Ni-shell, the first product of the German chemical weapons research programme, which was (ineffectively) used in the battle for Neuve Chapelle on 27 October 1914.[8] This projectile was constructed from a modified 105mm Howitzer shell, containing both high explosive and an irritant chemical (dianisidine chlorosulphonate). Unfortunately for the Germans, the shell was poorly designed — its dispersal area was so small and the irritant action so short-lived that Allied troops were unaware that such an agent

---

[5] See Spiers (1986), p. 14; also Spiers (1989), p. 69. It is suspected that they were used before this date, however, despite Colonel Hubrin's statement that the grenades were "not used" before the German forces unleashed their first chlorine weapons. See "Notice" of the French *Ministère de la Guerre*, quoted in Trumpener (1975), p. 462 (footnote 8).

[6] Trumpener (1975), p. 462.

[7] Spiers (1986), pp. 14–15.

[8] Trumpener (1975), p. 465.

had been deployed at all.[9] The Ni-shell did not contravene the Hague Convention for two reasons. First, the chemical agent was not its sole payload; the shell also contained high explosives. Second, the fact that the Allied troops had no idea that they were being shelled with irritants suggests that the chemical agent delivered by these projectiles was neither deleterious nor asphyxiating. The British chemist Harold Hartley reported that "this shell was abandoned after [Field-Marshal Erich von] Falkenhayn's son had won a bet of a case of champagne by remaining unprotected in the cloud for several minutes".[10]

On 31 January 1915 Germany introduced a new irritant weapon, the *T-stoff* shell. These were larger than the Ni-shell, being 150mm Howitzer shells specially adapted to contain 1.5 kilos of high explosive and a liquid tear-gas core (a mixture of aromatic bromides, including xylyl bromide, xylylene bromide and benzyl bromide). This shell was initially fired against the Russians at Bolimów, but this failed when the cold temperatures on the Eastern Front prevented the liquid from vapourizing. By March the problem was rectified by the addition of bromoacetone to the *T-stoff*'s tear-gas filling, aiding the vapourization of the agent. This so-called *B-stoff* shell was first utilized against the French at Nieuport. Despite their somewhat improved effectiveness, these projectiles also did not break the Hague Convention, as they contained high explosives as well as the chemical agent.

At this point, therefore, the Hague Convention had not been broken by any of the belligerents, at least in its letter. This was to change on 22 April 1915, when the Germans first released a cloud of chlorine gas from about 5,500 cylinders (codenamed F-batteries) over a four-mile front in the vicinity of Langemarck, near Ypres (see Chapter 7, Section 2.1 for further details on this event). The first cloud attack was quickly followed up by a smaller discharge on Canadian troops at Saint-Julien on 24 April. Over the coming weeks, the Germans discharged chlorine on four further occasions.

The Allied reaction was outrage. In a telegram to Sir John French, the Commander of the British Expeditionary Force, dated 24 April, the

---

[9] Sir Harold Hartley, "German Chemical Warfare Organisation and Policy", p. 2. TNA: PRO WO 33/1072. In this and subsequent citations to materials held at the UK Public Record Office (PRO, now part of The National Archives), Kew, London, we make references using the Archive's official classification system.
[10] Ibid.

British War Minister Lord Kitchener wrote: "The use of asphyxiating gases is contrary to the rules of war . . . . These methods show to what depths of infamy our enemies will go in order to supplement their want of courage in facing our troops".[11] However, Prime Minister Herbert Asquith rightly explained to King George V: "As the gases are apparently stored in and drawn from cylinders, and not 'projectiles', the employment of them is not perhaps an infraction of the literal terms of the Hague Convention".[12] Nevertheless, the Germans were clearly perceived to have given up all rights to a fair and lawful war, and the British War Office was entreated to allow the troops respond in kind.[13] As we have seen in Chapter 7, Section 3, the British retaliation with chlorine was slow in coming and, meanwhile, in August 1915 the Germans introduced their new *K-stoff* shell containing monochloromethyl chloroformate, which was considered by Sir Harold Hartley to have been designed "with the idea of providing a toxic filling".[14] In this emotionally charged climate, a "chemical arms race developed, in the rush of which there was no time to worry about ethics",[15] and so the terms of the Hague Convention came to be ignored by the Allies in their desire to command equally frightful weaponry.

On 25 September, the British Special Gas Brigade, a newly formed elite corps, released the first Allied chlorine gas cloud upon the German forces at Loos.[16] This counterattack, co-ordinated by Charles H. Foulkes, largely relied on the cylinder method for the dispersion of chlorine gas. However, the attack was also fortified by the use of the newly developed 4-inch Stokes mortar. The use of this weapon marks a most significant event, for with its use Britain became the first signatory nation to contravene the literal terms of the Hague Convention. The Stokes mortar was explicitly intended to deliver chemical projectiles over a range of 1,000

---

[11] Correspondence between Sir John French at the Front and Lord Kitchener in the War Office, 23–24 April 1915. TNA: PRO WO 142/241.
[12] Asquith to George V, reporting details of the meeting of the Cabinet on 26 April 1915. TNA: PRO CAB 37/127/40.
[13] Correspondence between Sir John French at the Front and Lord Kitchener in the War Office, 23–24 April 1915. TNA: PRO WO 142/241.
[14] Sir Harold Hartley, "German Chemical Warfare Organisation and Policy", p. 5. TNA: PRO WO 33/1072.
[15] Harris and Paxman (2002), p. 21.
[16] See Chapter 7, Section 3.3 for more discussion of the British use of gas at the Battle of Loos.

yards; it was a weapon unarguably ruled out by the Convention. Yet strangely this military innovation has received astonishingly little attention in the historical literature. The accounts of this weapon are at best brief, but conclusive. For example, Edward Spiers notes that the Stokes mortar "was the first weapon specifically intended to deliver a chemical projectile . . . . It was mobile, comparatively silent to operate, and could establish very heavy concentrations of gas over a target in the minimum of time".[17] From this point on, the use of gas projectiles of ever increasing potency became a central aspect of the war.

In identifying Britain as the first nation to use chemical weapons explicitly forbidden by international convention, we are not suggesting that this action was not justifiable. L. F. Haber argues:

> The [Hague] agreements were negotiated and signed at a time when statesmen were supposed to have moral standards, and it was generally accepted that such declarations of principles (agreed to without duress) would be respected by all belligerents in a future war. The events of August–September 1914 dented these illusions; the German use of chlorine the following spring shattered them, and set a precedent.[18]

The German chemical warfare programme thus both inspired and provoked the British into retaliating with illegal weaponry, thereby opening the door to a virtually unlimited chemical warfare. The humanitarian ethos of the Hague Convention had been long forgotten.

3. Various opinions concerning chemical weapons

In this section we explore ethical questions concerning the use of chemical weapons through the views of four key figures in WWI: Peyton Conway March, American General and the founder of the U.S. Chemical Warfare Service; J. B. S. Haldane, the British physiologist; Charles Howard Foulkes, the leader of the British gas warfare service; and Sir John French, Commander of British Expeditionary Force during the early stages of WWI. Our aim here is not to consider the ethics of war itself, but to examine the political and ethical debates about what was permissible in the choice of targets, the amounts of force used, and the types of damage inflicted. The four figures we have chosen represent a spectrum of belief, but they are not intended to make a fully repre-

[17] Spiers (1986), p. 24.
[18] Haber (1986), p. 290.

sentative or comprehensive sample. Our intention is to illustrate how people's views were affected by some widely accepted principles, even though they may not have realized it. All four figures were guided explicitly or implicitly by moral principles arising from custom and tradition. But even when the principles were shared, personal experience and character traits strongly influenced the conclusions reached by the individuals. Our case studies illustrate the personal nature of ethical views, which are shown not to be the result of logical deduction from underlying principles, but shaped by differences in interpretation.

3.1. Peyton Conway March (1864–1955)

General Peyton March, American artillery commander and staff officer, was the creator of several new technical branches of the U.S. Army including the Air Corps, the Motor Transport Corps, the Tank Corps, and the Chemical Warfare Service (CWS). Surprisingly little has been written about March. The only biography of him, by Edward Coffman, characterizes March as "tough, incisive", a man who "curried no favours and suffered the consequences", and who was also rather lacking in insight.[19] Despite the active role he played in chemical warfare, he was led to condemn chemical weapons after an experience in France where he "saw 195 small children brought in from about 10 miles from the rear of the trenches who were suffering from gas in their lungs, innocent little children who had nothing to do with this game at all".[20] He reasoned: "war is cruel at best, but the use of an instrument of death which, once launched, cannot be controlled, and which may decimate non-combatants — women and children — reduces civilization to savagery".[21] March was so distressed by what he had seen that he suspended anti-gas training in 1919 and advocated the abolition of the CWS.[22]

If images and words affected public opinion of gas warfare, first-hand experience exerted a powerful influence on soldiers. Dislike of chemical weapons was widespread on both sides of the conflict, and many of the reasons for this were practical. The equipment was cumbersome and hard to aim; gas frequently blew back on one's own troops; and the new weapons only invited retaliation in kind. One assistant chief of

[19] Coffman (1966), p. 2.
[20] Bourne (2001), p. 195.
[21] Quoted in Russell (2001), p. 40.
[22] Spiers (1999), p. 167.

staff commanding U.S. troops in France refused to use gas unless the gas officer would state in writing that it could not possibly result in the casualty of a single American soldier.[23] But some soldiers also hated gas for ethical reasons. Their general conception of themselves as warriors fighting for the people did not sit well with a weapon that by its very nature could not be controlled enough to guarantee civilian security. March was just such a soldier, the epitome of the "just war" doctrine.

The CWS had been created, with March's help, as a temporary wartime organization. The executive order from President Woodrow Wilson establishing the service in 1918 also ordered its termination six months after the end of hostilities.[24] March and Newton D. Baker, the Secretary of War, were ready to put this order into effect. General Amos Fries, the postwar director of the CWS, whom we shall meet again in Chapter 9, was astonished by March's negative view of chemical warfare. Fries found it inconceivable that "a military man will advocate abolishing a service that is at one and the same time the most powerful and the most humane method of warfare ever invented."[25] Fries declared that this must be due to the fact that March thought it would detract from the prowess of infantry, cavalry and artillery, which historically had always been the backbone of the army. March protested that his objections were based on ethical grounds, that gas endangered entire communities, and that chemical warfare was cruel and inhumane.[26]

At the end of the War, March and Baker formulated a bill for the reorganization of the Army based upon principles approved by the President. But the bill was returned from the War Plans Division in a form that March found completely objectionable. He thought that it would militarize the country to an extent unacceptable in a time of peace, and that it did not conform to the fundamental Constitutional principles. March therefore rejected the bill and wrote an alternative of his own, which he offered up for discussion in Congress. March recollected this discussion and its outcome as follows:

---

[23] Russell (2001), p. 40.
[24] The provisions of the Overman Act allowed the creation of new bureaux and arms of the Army that were not included in the National Defence Act of 1916. See March (1932), p. 330.
[25] Russell (2001), pp. 53–54.
[26] Ibid., p. 54.

> We all wanted to do what was best for the country, and none of us was influenced by any other motive. One important thing I got through this conference was the abolition of the use of poison gas in war. We had the use of gas forced on us in the war by the action of Germany, and in self-protection had to organise the CWS. And no soldier can say that he prefers to be killed by being torn to pieces by a shell rather than to be gassed. But the use of poison gas, carried wherever the wind listeth, kills the birds of the air, and may kill women and children in rear of the firing line . . . . So in my bill for the reorganisation of the Army I abolished the CWS. I recognized the possibility of the use of gas by some other country, however, and provided for such an eventuality by organizing a section in the Engineer Corps which should be devoted to the study of the composition of such gases and to the invention of suitable safety appliances for the protection of our soldiers, such as gas masks, in case an enemy power should make use of gas . . . . The use of poison gas in war was not only repugnant to the Administration, but was in opposition to the best sense of the civilized world. [27]

When the Five-Power Naval Conference met in Washington in 1921–22 (which will be described in more detail in Section 4.3 below), the representatives of Britain, France, Italy, Japan, and the U.S. agreed to a resolution to abolish the use of poison gas. The resolution was unanimously adopted by the conference on 1 Feb 1922, and on March 22 was ratified by the U.S. Senate.[28] But Congress did not keep to the ratification, and in the reorganization of the Army the CWS was re-instated, with responsibility for U.S. plans for fighting with chemical weapons, in addition to scientific research into offensive and defensive gas warfare. An outraged March declared:

> Dropping a bomb full of high explosive upon a city is bad enough, but at least non-combatants in such cases can be assured a measure of safety by taking refuge in cellars and dugouts. But the same bomb, filled with poison gas, which seeps down through crevices and interstices to the depths where innocent people are undercover, and destroys the lives of women and children, presents a picture of ruthless barbarity repugnant to the conscience of the civilised world. [29]

For March, the crux of the argument against chemical weapons was that they did not guarantee non-combatant immunity, which is the first of two tenets of *jus in bello*, or the principles of fighting a war justly:

---

[27] March (1932), pp. 333–335.
[28] Ibid.
[29] Ibid., p. 335.

> The requirements of *non-combatant immunity*: civilians, as non-combatants, must not be attacked or killed. The fighting must be directed solely against the armed forces of the enemy.
>
> The requirements of *proportionality*, applied now to means rather than to ends: the means adopted in fighting the war must not be so harmful and destructive as to outweigh the good to be achieved.[30]

A number of moral philosophers have examined the principle of non-combatant immunity. Richard Norman raises two problems with this principle: first, it assumes that combatants are guilty; second, the assumption that non-combatant immunity should be honoured above all else is open to question.[31] But Thomas Nagel justifies the principle, in a way that March would have approved of: one should only aim hostility or aggression at the subject, and whatever one does intentionally to the subject should be done with the intention that he receive it as the subject, i.e., it should manifest an attitude to *him* rather than the situation. The same reasoning can be seen in Marshall Cohen's argument about one-on-one fire. If you fire a machine gun at someone who is throwing a hand grenade at your emplacement, you establish a direct "I–thou" relationship with that person. You could attack his wife and children who are standing nearby, and your actions would most likely make him stop, but since they are not threatening your life you would be treating them as a means to an end. Weapons of mass annihilation are indiscriminate, and therefore disqualified as legitimate instruments for the expression of hostile relations.[32]

3.2. John Denton Pinkstone French (1852–1925)

Sir John French, Commander of the British Expeditionary Force in France in the early phase of the war, was almost as outspoken in his hatred of chemical warfare as March. But his main concern was the soldier, rather than the non-combatant. As we have discussed in Chapter 7, Section 3, French telegraphed his account of the first gas attack at Ypres to the War Office on 23 April, requesting a supply of suitable

---

[30] Norman (1995), pp. 118–119. Generally the combatant/non-combatant distinction is seen to be the same as the distinction between members of the armed forces and the innocent civilian population and this principle is embodied in modern international law, including the Hague and Geneva Conventions.
[31] Ibid., pp. 159–160.
[32] Nagel (1988), pp. 67–68.

respirators and an authorization for immediate retaliation. It might seem a moral contradiction that one who was principally against gas warfare should urge for retaliation in kind. According to French's diary, his main concern at that time was to preserve the morale of his troops:

> It is reported to me that there is a strong feeling amongst the troops that we should employ some form of reprisal against these gas attacks. Our failure to do so sooner is causing dissatisfaction and will have a bad effect on the morale of the troops.[33]

French was known as a courageous and concerned leader of men, whose formative military experience was gained in charge of the cavalry during the Boer War. According to his biographer Cecil Chisholm, French was "essentially English", although he "never accepted social life in this country on its face value".[34] He esteemed the professional, and despised the "drawing-room" soldier. Edgar Wallace described him as follows:

> A man of singular charm, he was beloved by his men, for French had no side, was keenly interested in the welfare of his squadron, and did not know the meaning of the word fear . . . . [He] never asked his men to do that which he himself was not prepared to do, to go to any place, into any danger, where he himself was not ready to lead.[35]

According to Friedrich Bernhardi, French was an ardent supporter of the cavalry, whose experience in Africa had left him with a highly pragmatic outlook on warfare:

> One reaches the bedrock of French's curiously sane conception of war when one asks him to define war. In dealing with those gentlemen who tell us that the Boer War was fought under such abnormal conditions that it is useless as groundwork for conclusions as to future wars, he uttered a memorable retort. "All wars are abnormal", he observed, "because there is no such thing as normal war." There we have one of the axioms both of his theory and of his practice. There can be no fixed conditions, and so there can be no final theories as to the conduct of warfare. Theory is simply a means to an end. And the successful general is he who most ably adapts the general body of theory suitable for all cases to the particular campaign on which he is engaged.[36]

---

[33] French (1931), p. 296.
[34] Chisholm (1915), p. 122, and pp. 128–129.
[35] Wallace (1914), p. 3.
[36] Bernhardi (1906), quoted in Chisholm (1915), pp. 108–109.

French was prepared to advocate the use of chemical weapons if he believed it to be in the best interests of his own men. However, he denounced the Germans for introducing the "mean and dastardly practice" of gas warfare, complaining that man was no longer pitted against man "but against material".[37] French's first-hand experience led to a moral abhorrence of chemical warfare, as is clear from an article which he wrote for the Manchester *Guardian*:

> The effect of this poison is not merely disabling, or even painlessly fatal, as suggested in the German press. Those of its victims who do not succumb on the field and who can be brought into hospital suffer acutely, and, in a large proportion of cases, die a painful and lingering death. Those who survive are in little better case, as the injury to their lungs appears to be of a permanent character, and reduces them to a condition which points to their being invalids for life.[38]

The indiscriminate nature of gas injuries was deeply offensive to French's appreciation of the skills of the professional soldiers. His views on this matter were widely shared.[39] Gas warfare was not gentlemanly or chivalrous. Although conceptions of chivalrous behaviour inevitably changed over time, for French it was essentially like the knightly rules, which held that battle was carried out by men of honour and face to face.[40] Thus French regarded as abominable a weapon that eliminated a chance of survival even for the most skilled and courageous soldier. He abhorred the idea that a great soldier should become a victim destined for the slaughter, and that all his training and courage should not even come into reckoning.

French's personal convictions, deeply rooted in his views on soldiering and the role of a good military leader, produced a paradoxical mixture of attitudes toward chemical warfare. Although he deplored the indiscriminate nature of gas warfare, he did not shy away from urging retaliation in kind, because he understood the need to use necessary force in achieving military objectives. Fighting a just war after Ypres meant using chemical weapons so that his own troops were not disadvantaged, and French did not hesitate to support his men in that way, despite his

---

[37] Spiers (1999), p. 166.
[38] French (1915).
[39] See, for example, Crutwell (1936), pp. 152–154.
[40] See the entry on "Forbidden Weapons" in Wells (1996).

revulsion at the fatalistic new weapon that robbed soldiering of its dimension of skill.

3.3. John Burdon Sanderson Haldane (1892–1964)

J. B. S. Haldane is a compelling character, committed to socialism and the social responsibility of science. His concerns mirrored those of French: both men considered the humaneness of weapons to be of paramount importance; however, they reached opposite conclusions on the question of gas warfare. Haldane's experience of chemical warfare was no less comprehensive than French's, albeit mostly from the perspective of the scientist. Haldane was a key figure in British chemical weapons research; he also witnessed and suffered its effects.[41] Like March, he was concerned with just war, and he regarded the principle of proportionality to be the most important. Unlike March (or French), he found chemical weapons to be less ethically objectionable than conventional weapons. How did Haldane arrive at his positive view of chemical warfare?

Haldane, together with his father J. S. Haldane and Professor Douglas, was involved in very early British experiments into the effects of chlorine gas on people.[42] In May 1915, about a month after Ypres, working in a small room in a converted school, they pumped known quantities of chlorine gas into a glass-fronted cabinet like a miniature greenhouse. Haldane reported the outcome:

> We had to compare the effects on ourselves of various quantities, with and without respirators . . . . It stung the eyes and produced a tendency to gasp and cough when breathed. For this reason trained physiologists had to be employed. An ordinary soldier would probably restrain his tendency to gasp, cough and throw himself about if he were working a machine gun in a battle, but could not do so in a laboratory experiment with nothing to take his mind off his own feelings. An experienced physiologist has more self-control. It was also necessary to see if one could run or work hard in the respirators, so we had a wheel of some kind to turn by hand in the gas chamber, not to mention doing fifty-yard sprints in respirators outside. As each of us got sufficiently affected by gas to render his lungs duly irritable, another would take his place. None of us was much the worse for the gas, or in any real

[41] Haldane recounted his experience at Ypres in his essay *Daedalus* (1925a).
[42] See Chapter 10, Section 2 for the broader context of this work.

> danger, as we knew where to stop, but some had to go to bed for a few days, and I was very short of breath and incapable of running for a month or so.[43]

Haldane's 1925 book *Callinicus*[44] expressed his conviction that chemical warfare was more humane than conventional warfare, supported by official medical histories of the war.[45] Haldane felt it was his duty to educate the public about possible future uses of gas, choosing to do this directly rather than by influencing politicians. He believed that the Hague Convention was wrong to ban gas-filled projectiles, which were "the most humane weapon ever invented", while allowing the use of cylinders, which was "an exceedingly cruel practice".[46] Haldane also described what he considered the best way to prevent the escalation of chemical warfare: the use of gases that would stupefy enemy soldiers, rather than kill them. He believed that there were two straightforward rules that would ensure that all future wars were humane: first, no goggles or other eye protection should be worn; second, only lachrymatory (tear-inducing) compounds should be used. Haldane admitted it was certainly "unlikely that such rules will ever be adopted, but I do contend that to forbid the use of such substances is a piece of sentimentalism as cruel as it is ridiculous."[47]

Ronald Clark, in his biography of Haldane, describes how he "trod lightly but perceptibly on the toes of politicians, military authorities, officials, pacifists, journalists and newspaper proprietors".[48] He saw the avoidance of unwarranted emotion as part of his duty to prepare the public for possible future uses of gas. In a public lecture Haldane explained to his audience that one of the gases suggested to the War Office during the war was produced by heating cayenne pepper. It did not kill and therefore, Haldane claimed, the authorities turned it down. But from his point of view it was certainly useful enough. Producing a spirit lamp and a spoonful of pepper, he held the spoon over the lamp and without warning suddenly vaporized the pepper; within a few seconds almost the entire audience was coughing and rubbing their smarting eyes.

---

[43] Clark (1984), p. 40.
[44] The title was a reference to Callinicus of Heliopolis, the inventor of "Greek fire", a burning liquid used by Byzantine Greeks in naval battles.
[45] Haldane (1925b), p. viii.
[46] Ibid., p. 7.
[47] Ibid., p. 20.
[48] Clark (1984), p. 71.

But Haldane was unconcerned. "If that upsets you", he remarked, "how would you like a deluge of poison gas from an air fleet in real war?"[49]

Haldane was deeply concerned by the apparent ignorance of both military and political leaders. Speaking about the views expressed by politicians at the Washington Conference for arms reduction (discussed in Section 4.3 below), he declared:

> Their ideas of gas warfare were apparently drawn from descriptions of the great German cloud-gas attacks of 1915, which killed at least 1 in 4 of their casualties, and were written up on a large scale for recruiting and political purposes . . . . To this ignorance, however, there was joined one of the most hideous forms of sentimentalism which has ever supported evil upon earth — the attachment of the professional soldier to cruel and obsolete killing machines.[50]

He also recognized that the common aversion to chemical and biological warfare stemmed in part from its unpredictability and sheer novelty. As he explained:

> Fighting with lances or guns, one can calculate, or one thinks one can calculate, one's chances. But with gas or rays or microbes one has an altogether different state of affairs. Poisonous gas had a great moral effect, just because it was new and incomprehensible.[51]

In Haldane's view, the Army resisted the adoption of the most humane weapon because chemical warfare was not "sporting" (this view is borne out by our examination of French's position in Section 3.2). He also resented the fact that gas warfare was not developed until after the Germans had proved its effectiveness, taking this as an indication of the backwardness of British military thinking.

The core of Haldane's unpopular argument was that gas was not fundamentally different from other weapons ethically, and that its effects were in fact more humane. He summed up the experiences that led to these beliefs as follows:

> Apart, however, from the extreme terror and agitation produced by the gassing of uneducated people, I regard the type of wound produced by the average shell as, on the whole, more distressing than the pneumonia caused by chlorine or phosgene. Besides being wounded, I have been asphyxiated to the point of unconsciousness. The pain and

---

[49] Ibid.
[50] Haldane (1925b), p. 27.
[51] Ibid., p. 81.

> discomfort arising from the other experiences were utterly negligible compared with those produced by a good septic shell wound. [52]

To the crucial question of whether chemical weapons differ in kind or only in degree from conventional weapons, Haldane's answer was clear: "If it is right for me to fight my enemy with a sword, it is right for me to fight him with mustard gas: if the one is wrong, so is the other."[53] Yet Haldane's claim warrants further clarification. It is hard to imagine him substituting mustard gas with torture, for instance. It was not that he considered all weapons to be equally corrupt or permissible, but that in this particular instance, he did not conceive how gas could be thought of as less humane than conventional weaponry:

> Perhaps the greatest tragedy of our age is the misapplication of science. It is notorious that the principal result of many increases in human power and knowledge has been either an improvement in methods of destroying human life and property, or an accentuation of economic inequality. This is largely the fault of the confused thinking of 'advanced' politicians. I refer to mental processes such as that which led to our forgoing the use of 'mustard gas', the most humane weapon ever invented, since of the casualties it caused, 2.6% died and 1/4 % was permanently incapacitated. No one at Washington ever suggested abandoning H. E. [high explosives] and shrapnel, which kill or maim about half their casualties.[54]

Perhaps Haldane's thinking is best viewed in the context of the utilitarian principle of promoting the greatest good for the greatest number. Chemical weapons were humanitarian in that it could be non-lethal and thus achieve victory in battle without causing unnecessary deaths. This is the reason why Haldane spent his life striving for their acceptance by politicians and the military.

3.4. Charles Howard Foulkes (1875–1969)

Major Charles Foulkes was Gas Advisor in charge of the Special Brigade for most of WWI, becoming Brigadier-General in command of the British Expeditionary Forces Gas Services by its end. After the war Foulkes wrote a book charting the history of the Special Brigade, which was eventually published under the title *Gas!* (after *Frightfulness* and

---

[52] Ibid., p. 21.
[53] Ibid., p. 82. Christopher (1994, p. 201) identifies this crucial question.
[54] Haldane (1927), p. 190.

Retaliation were rejected by his publisher).[55] It is difficult to determine Foulkes's moral position on gas warfare, since he seems to have been more concerned with highlighting the fact the Germans used it first and persuading the public of the vile nature of the enemy. Following British retaliation, Foulkes became an outspoken supporter of gas warfare, motivated by a deep love of his chosen profession rather than strong moral convictions. Donald Richter explains:

> Foulkes had little patience with sentimentality or moral hand wringing concerning the ethics of particular weapons. In a speech in late 1916 the commander of the Special Brigade brushed aside the view that gas warfare was a new type of warfare which was subject to moral debate. "We are not concerned with the ethics of the use of gas in civilised warfare."[56]

Indeed it seems that neither Foulkes nor most of his "Specials" had any moral qualms about their gas mission. If they admitted it was atrocious, it was only to say that it was "less atrocious" than other forms of warfare. One of the Specials, Gale, declared: "we feel no humanitarian scruples on the subject."[57] Foulkes continued to advocate the use of gas after the war. In a series of lectures he noted its potential usefulness especially against the Afghan rebels, where it would kill or severely incapacitate those up to 15 miles around. He disposed of the morality issue in an off-hand manner, saying that gas was now "openly accepted" and recognized as a fair weapon. Tribesmen were not bound by the Hague Convention and "our commanders consider the tribesmen as vermin only fit for extermination, and the troops regard them as bloodthirsty, treacherous savages".[58]

Foulkes appears to have been unconcerned by the Hague Convention in any case. According to Richter, "the Machiavellian Foulkes, of course, deprecated all international pledges on the subject as patently

---

[55] Papers of Maj. Gen. Charles Howard Foulkes, CB, CMG, DSO (1875–1969), Liddell Hart Centre for Military Archives, King's College London (hereafter "Foulkes Papers"), 9/5. It is ambiguous whether the publisher requested that "Frightfulness" be substituted with "Retaliation", or that the latter also be substituted. We agree with Harris and Paxman (2002, p.34), who interpret it as the latter; they also say that the request came from the War Office.

[56] Richter (1992), p. 219.

[57] Ibid.

[58] Ibid., pp. 220–221.

worthless".[59] Foulkes's own writings give plenty of support for this view. In his book *Gas!*, he pointed out that during the whole period of the war, no enemy or neutral state protested officially to the German government against the use of gas weapons. Like Fritz Haber, he was happy to conclude "that all the enemy governments preferred to adopt, as well, the new chemical methods of warfare rather than protest against their introduction".[60] Later, in an article in *The Times* titled "Violation of the Treaties", Foulkes made his opinions even clearer:

> The German armies had been trained and equipped for a short war of movement, and when their attack failed against the weak British line during the first battle of Ypres — an attack pressed with the utmost vigour and supported by overwhelming numbers of men and guns, as well as by the presence of the Kaiser in person — they resorted to the gas cloud in disregard of all moral considerations, solely because it promised a military advantage. And in order to make some pretence of placating world opinion and their own gullible public they alleged that this action was forced on them as a measure of retaliation for the prior use of gas by the British and French . . . . In each case, of course, the decision to use gas and the preparations long preceded the incidents, which provided the excuse. These two examples give abundant support to the opinion I expressed in my book on the gas war . . . on the danger and the folly and the futility of forbidding by international agreement the use of any particular weapon in future warfare.[61]

But Foulkes's assertion that the Germans "resorted to the gas cloud in disregard of all moral considerations" begs the question of which moral considerations he thought they had violated. Foulkes's use of such evocative language was also not without precedent. An account of the German cloud gas attacks found among his personal papers stated:

> Although the use of asphyxiating or poisonous gases had often been proposed as a weapon, which would certainly give good results if applied to modern battle conditions, civilised nations had always refused to consider the proposal. The Germans, however, appear to have had no such scruples, and for several months deliberatively carried out elaborate experiments with various gases.[62]

It appears that Foulkes considered the first use of gas to have been immoral and uncivilized, before he arrived at his declared position in

---

[59] Ibid., p. 230.
[60] Foulkes (1934), p. 28.
[61] *The Times*, 11 July 1936; in the Foulkes Papers, 9/10.

which "we are not concerned with the ethics of the use of gas in civilised warfare". In Foulkes's view the "appearance of gas on the battlefield . . . has changed the whole character of warfare", and he considered it impossible that "its continued use can be prevented by agreement". Foulkes gave his reasons for that opinion as follows: "The stark truth is that the application of science and discovery to warfare cannot be restricted . . . . No nation fighting for its existence will deny itself the free use of aviation and chemicals." Instead, Foulkes argued, "it seems far more profitable to make whatever progress is possible towards the abolition of war itself".[63]

Foulkes dismissed the question of whether chemical weapons had any place in a just war. Instead, a chief concern for him was the avoidance of public panic surrounding the use of gas. He explained:

> By taking the public into its confidence and explaining the real nature of the menace, without minimising it and without exaggeration, and by inviting them to co-operate in their own defence, THE CHIEF DANGER, THAT OF PANIC, would be averted. Personally I am convinced that not only would fewer casualties result from the use of gas than from high explosive bombs, but that they would also be of a far less severe nature.
>
> I fully believe that when confidence has been established after their first experience of it, people exposed to a gas bombardment will exclaim, as our soldiers often did in France, 'Thank God, it's not H.E. [high explosive]!' [64]

Like Haldane, Foulkes believed that gas, in sufficient quantities, correctly delivered, could be decisive in battle. But unlike Haldane, Foulkes did not wish to restrict chemical warfare to the use of lachrymatory compounds. Foulkes made a number of recommendations about the future of gas warfare, including:

> (1) Take steps to ensure that no further public mention is made of gas retaliation . . . .
>
> (4) The attack to be made (a) by cloud, and (b) by projectiles: the latter to be large, so as to produce appreciable effects; long-range, to safe guard our own men; and filled with the deadliest gases available.[65]

---

[62] Foulkes Papers, 6/8.
[63] Foulkes (1934), pp. 344–366.
[64] *The Times*, 10 December 1936; in the Foulkes Papers, 9/10.
[65] Foulkes (1934), p. 39.

As his acceptance of the use of chemical agents in war was not shared by everyone, Foulkes sought to convince people, both in Britain and abroad, of the effectiveness and usefulness of chemical warfare. His first task was "a simple one — namely, to remove the impression that the presence of gas cylinders in a trench was a source of great danger".[66] Foulkes arranged demonstrations of "every form of 'frightfulness' (by which name the Special Brigade was known in the army) which we were capable of undertaking in a spectacular manner".[67] While some military exponents of gas warfare were apologetic for considering "chemical warfare to be the warfare of the future", Foulkes was proud of his beliefs, and continued to champion chemical weapons long after the main discussion had died down.[68]

Instrumental rationality can provide a reasonable philosophical framework for understanding Foulkes's position. An action is judged to be instrumentally rational provided that is an effective and economical means to a given end. Foulkes's ultimate aim was victory in war, which demanded utilizing any new weapon that he perceived to be effective for that aim. His conclusion in favour of developing and using chemical weapons was therefore entirely rational in view of his objective.

3.5. Summary

We have examined four major figures, whose beliefs range from being completely against to emphatically for chemical warfare. While March's objections rested on the central distinction between combatant and non-combatant, French did not believe that the use of gas in war was desirable even when only soldiers were affected. On the other hand, Foulkes, the soldier with perhaps the most extensive first-hand experience of gas warfare in Britain, was deeply committed not only to the necessity of using gas, but also to its superiority to conventional weapons. The scientist Haldane reached similar conclusions to Foulkes's, although his reasoning differed in important respects. Taken as a whole, these case studies show that battlefield reactions to gas were not universally hostile,

---

[66] Ibid., p. 184.
[67] Ibid., p. 187. The King and Queen attended a series of demonstrations at Herfault; photographs taken at these events are in the Foulkes Papers. However, Foulkes was refused permission to publish any but one of these photographs, as it was deemed unwise for the monarch to be associated with gas warfare. See Foulkes Papers, 9/7.
[68] Foulkes Papers, 6/51.

reminding us that we should take care not to impose our own views of what is morally and ethically acceptable on historical figures, who existed in different circumstances and faced challenges that we can only imagine.

4. The origins of the Geneva Protocol

The Geneva Protocol of 1925 (not to be confused with the Geneva Conventions of 1949 or their additional Protocols[69]) is a treaty prohibiting the use of chemical and bacteriological agents in war. It is the oldest surviving international treaty aimed at the control of chemical and biological warfare. As Julian Perry Robinson notes, "the immediate origins of the Geneva Protocol lay in the Great War of 1914–18".[70] However, it would be erroneous to infer that the Protocol was an inevitable reaction against the use of gas in WWI. First of all, it had antecedents, namely the Hague Conventions of 1899 and 1907, which banned the use of asphyxiating and deleterious gases in war. Thus the Geneva Protocol was not an unprecedented and singular endeavour to outlaw gas warfare arising from its horrors in WWI. Also, the novelty of a weapon does not necessarily condemn it to prohibition, so it is not immediately obvious why objections to chemical warfare (CW) persisted.[71] Why was the Geneva Protocol formulated and agreed upon when it was? Our analysis of the events leading to the establishment of the Protocol suggests that it was not a direct and straightforward consequence of WWI. We suggest that the significance of public opinion has been overemphasized in popular accounts, and that the politics surrounding the League of Nations was of pivotal importance.

4.1. Public opinion in the aftermath of WWI

It is generally considered that the response of the British press to the German use of chlorine at Ypres on 22 April 1915 was one of horror and moral outrage, portraying it as an illegitimate and inhumane act.[72] For example, *The Times* on 29 April published a commentary condemn-

[69] See the entry on "Geneva Protocol, June 17, 1925" in Wells (1996), pp. 160–165.
[70] Robinson (1993), p. 39.
[71] See Price (1995), p. 73. He argues that most novel technologies of warfare eventually become conventionalized, but CW has retained a lasting stigma.
[72] For example, see SIPRI (1971a), p. 231. In Chapter 7, Section 2.2, however, we have already noted that the picture was more complex.

ing Germany's "deliberate resort to this atrocious method of warfare . . . this diabolical contrivance":

> There is manifestly no limit to their contempt for the laws and for the usages of civilised warfare. . . . The wilful and systematic attempt to choke and poison our soldiers can have but one effect upon the British people and upon all the non-German peoples of the earth. It will deepen our indignation and our resolution, and it will fill all races with a new horror of the German name.[73]

A few months later, in a report titled "The Inhuman Enemy", *The Times* asserted: "The use of poisonous gases by the Germans involving as it does far-reaching suffering, promises to present one of the blackest pages in the world's history."[74]

Moral outrage at the nature of the new weapon, however, was not the only component in the press reaction. The *Daily Mirror*, for example, mentioned the contravention of the Hague Convention, but emphasized the "knavish tricks" of the "Huns".[75] A later report suggested that the use of chemical weapons revealed the enemy's cowardice: "The Germans are still putting their faith in poison gas and burning liquids. They dare not trust themselves, apparently, in a straight fight."[76] Rather than mobilizing moral arguments, the *Daily Mirror* wished to contrast the cowardice of the Germans with the superior bravery and gallantry of British troops. Instead of encouraging outright, bitter "Germanophobia" these reports seemed to wish to promote a sense of British solidarity and a feeling of confidence that British troops could deal with whatever new forms of warfare were pitted against them. In this context, gas was portrayed as just another type of weapon that the British must overcome.

If it is difficult to find uniformity in the attitudes of the newspapers, that is only a small indication of the difficulty in identifying and characterizing the opinion of the population at large, and how it might have shifted by the end of the war. A complete answer to the question lies well beyond our investigation. By the close of the war some 113,000 tons of chemicals had been used, causing at least 1.3 million gas casualties, including 91,000 fatalities.[77] Robert Harris and Jeremy Paxman claim that

---

[73] *The Times*, 29 April 1915, p. 9.
[74] *The Times*, 14 June 1915, p. 6.
[75] *Daily Mirror*, 29 April 1915, p. 3.
[76] *Daily Mirror*, 26 June 1915, p. 5.
[77] Harris and Paxman (2002), pp. 32–33.

fear of gas was still rife forty years later, and "virtually every-one in the country knew someone who had been gassed in the First World War".[78] But does this collective memory of gas warfare reflect the reality in the early 1920s when the Geneva Protocol was formulated? Not all wartime literature concerning the use of gas focused on moral and ethical questions. Public opinion was not necessarily homogeneously hostile, and probably encompassed a range of views.

It has been argued that by 1919 members of the general public may have adopted any of a number of views about CW — from gas as a terror weapon, to gas as just another weapon.[79] Public response would have depended on what was recalled from wartime publications, leading to a wide variety of possible assessments. During the later years of the war, as the use of gas gathered momentum on both sides, published material concerning CW was largely restricted to propaganda about who had first used it. It has also been suggested that public opinion was first mobilized *after* the war, stimulated by fears of powerful new poisons and airborne gas bombs.[80] According to this argument public opinion at the end of the war was fragmentary and indifferent, and only came to be mobilized against CW later. However, a letter to the editor entitled "A Weapon to be Abolished" from a group of respected members of the medical profession published on 29 November 1918 in *The Times* suggests that attempts to mobilize public opinion began somewhat earlier:

> The use of gas is self-condemned for the following reasons: — It is an uncontrollable weapon, whose effects cannot be limited to combatants. It is an 'unclean' weapon, condemning its victims to death by long drawn-out torture. It opens the door to infinite possibilities of causing suffering and death, for its further development may well lead to the devising of an agent which will blot out towns, and even nations . . . . Surely in the coming Comity of Nations [League of Nations] it ought to be decided to abolish for ever such a malignant weapon.[81]

This statement indicates that even before the Treaty of Versailles came into effect, pleas for CW prohibition were being expressed in the public arena and the threats to civilians in future wars were being discussed.

---

[78] Ibid., p. 109.
[79] SIPRI (1971a), p. 234.
[80] Ibid., p. 240.
[81] *The Times*, 29 November 1918, p. 6.

During the Versailles peace negotiations, the question of German CW capability was addressed. It was agreed that Germany should be forbidden to manufacture chemical weapons, under Article 171 of the Treaty of Peace with Germany, concluded at Versailles on 28 June 1919: "The use of asphyxiating, poisonous or other gases and all analogous liquids, materials or devices being prohibited, their manufacture and importation are strictly forbidden in Germany."[82] In addition, it was feared that in the event of future conflict Germany would quickly be able to re-establish its CW capabilities, since it had a strong chemical industry. Britain therefore proposed that an article should be included in the treaty obligating Germany to disclose details of the manufacturing process they had used for the production of war materials. This, however, would have meant the loss of commercial secrecy for Germany, and the proposal was rejected by the U.S. President Woodrow Wilson, who suspected that military negotiations were being exploited for economic ends.[83]

The vigorous British campaign on the issue of German chemical industry failed to move President Wilson, but it had the effect of bringing the issue into the pubic domain. Arguments focused on the importance of a strong chemical industry to the development of CW capabilities in a future war. These arguments continued to circulate as part of a publicity campaign for the dyestuffs industry, which was pushing for protective tariffs. For example, an article in the *Times* on 7 August 1920 lamented the virtual monopolization of the dyestuffs industry by Germany in recent years, and argued that our future safety was "only to be found in a strong home dye industry."[84] (This argument was not as preposterous as it might sound to the non-experts, as many of the materials and processes used in the dyestuffs industry did find direct applications in the production of CW agents during WWI.) Later that month Major Victor Lefebure, formerly of the Chemical Warfare Liaison unit, and likely the "Special Correspondent" who composed the above report, sent a letter to the editor of the *Times* explaining that it was impossible to prohibit CW. He argued that control could only be achieved through precaution, by establishing a dye industry, and that the "League of Nations must recognise this *point*

[82] SIPRI (1971b), p. 42.
[83] SIPRI (1971a), p. 235.
[84] *The Times*, 7 August 1920, p. 7.

faible, this impossibility of direct control, and encourage precautionary measures".[85]

In the meantime, alarmist reports about the "terrors of future warfare" were spreading in the press, warning of a new, "especially deadly" poison discovered in the U.S.[86] Thanks to the publicity campaigns of the U.S. Chemical Warfare Service (CWS), in particular those of its director Amos Fries (as discussed in detail in Chapter 9, Section 3.2), information spread widely about new poisons, their ease of production and their adaptability to aircraft delivery. The CWS campaign emphasized the need for greater CW preparedness, in a bid to perpetuate its own existence during peacetime. However, as the reports reached Britain, their main effect was to increase anxiety. In response, pro-CW lobbyists maintained that CW capabilities were necessary for national security and began to give support to the claim that CW was a relatively humane method of warfare. These views came under attack from scientific organizations, however, and in September 1921 the British Association for the Advancement of Science pressed for an international ban on CW.[87] These conflicting arguments were followed by calls for objective appraisals.

Adding to the public fears of CW was the spectre of aircraft delivery of chemical and even bacteriological weapons. The thought of any kind of aerial attack on innocent civilians elicited strong reactions, as we can gather from press reactions during the war. For example, while reports in the *Daily Mirror* in 1915 had been somewhat indifferent to the use of gas against combatants, the bombing of civilians in the Zeppelin raid on London caused moral outrage. The "murder of helpless non-combatants" and the death of an infant — an "innocent victim of frightfulness"—were unacceptable atrocities.[88] *The Times* also condemned the Zeppelin raid as an illegitimate attack and further suggested that the Germans would stop at nothing to fulfill their objective of killing as many people as possible.[89] The rise of the airplane later in the war created the belief that in future wars it would become very easy to use gas to attack large civilian populations, potentially whole cities. One of the pamphlets published by the Carnegie Endowment for International Peace explained:

---

[85] *The Times*, 16 August 1920, p. 6.
[86] *The Times*, 15 March 1921, p. 12.
[87] SIPRI (1971a), p. 242.
[88] *Daily Mirror*, 2 June 1915, p. 3.
[89] *The Times*, 2 June 1915, p. 7.

> If airplanes can and will sprinkle whole areas (cities or towns) with, one hopes, a slight concentration of mustard gas, whole populations will be reduced to the condition of real suffering, if not suffocation in subways, homes will be tenantless, and factories and all the appurtenances of civilization will be useless.[90]

This turned out to be an inaccurate prediction of what happened in following decades, but the fear was real at that time and played an influential part in the campaign to ban chemical weapons.

4.2. The League of Nations

If public sentiments on CW were not uniform and consistent, the view of the leaders of the League of Nations was. Disarmament in general was a major item on the League's agenda especially in its early days, with a desire to act immediately after the war while the horrors of battle were still fresh in people's minds. A clause for disarmament (Article 8) was written into the Covenant of the League, and this helped to keep the case for disarmament alive even after the shock of the war began to subside.[91] The Covenant had been drafted in 1919 during the peace negotiations, and the League came into official existence on 10 January 1920, when the Versailles Peace Treaty came into effect. The mission of the League was to promote international co-operation for resolving conflicts and keeping armaments in check to avoid any repetition of the kind of destruction experienced in WWI. The question of CW was considered from early on in the League's life. In May 1920, the League asked its Permanent Advisory Commission (PAC) on Military, Naval and Air Questions to examine the issue of CW "with a view to some agreement being reached".[92] On 20 October the PAC provided a report condemning the employment of gas against non-combatants but also arguing that gas was no more cruel than any other methods of warfare against combatants. The PAC report further argued that it would not be possible to prohibit the manufacture of chemicals or laboratory experiments with them. The question of international regulation was not addressed.

The Council of the League, adamant in their condemnation of the use of poison gas, decided to refer the matter to the Permanent Commis-

---

[90] Fradkin (1929), p. 146.
[91] See Miller (1928).
[92] SIPRI (1971b), p. 43.

sion, raising the question of penalties that should be imposed upon states making use of poison gas. The International Committee of the Red Cross also mobilized support for a CW ban, appealing to the member states of the League to agree on an absolute prohibition of poison gas in warfare. A policy of openness was suggested by Lord Cecil, representative of South Africa, in order to abolish secrecy about chemical weapons and appeal to scientists to disclose their research; the reasoning was that if all states had chemical weapons, they would refrain from use for fear of retaliation in kind.[93] The Assembly of the League referred the proposal to the Temporary Mixed Commission (TMC) on the Reduction of Armaments for examination in consultation with the PAC. In October 1921 the TMC delivered a report concluding that a policy of openness would be impractical, since complete disclosure could not be guaranteed and governments would continue to conduct secretive research. Further, they argued that disclosure could have the opposite effect of controlling CW since it would increase the distribution of chemical weapons. Lord Cecil then suggested that the effect of the new methods of warfare upon the civilian population as well as combatants should be explored through an authoritative collection of data and expert opinion.[94] The TMC appointed a special subcommittee to investigate the issue. After this, no further significant action on the matter was taken by the League for almost three years.

The stalling of the CW ban seems quite characteristic of the general difficulties that the League was having. The League spent quite a long time in political limbo after the U.S. Senate failed to ratify the treaty establishing it. As F. P. Walters has argued, "the immediate loss in power and influence of the Council and Assembly, due to the absence of the United States, was great". The tension caused by this rift between the League and the U.S. also had an effect on how well negotiations could be carried out between these two powers: "In later years the American Government joined fully and generously in the League's social and economic undertakings; but in the formative period there was not merely refusal to co-operate, but actual opposition."[95] In addition, disagreements between European countries, in particular a strong French opposition to many of its policies, dogged the League throughout this post-war period.

[93] Ibid.
[94] Ibid.
[95] Walters (1969), pp. 72–73.

The behaviour of its major signatories showed lack of respect for the League. At the Genoa conference of 1922, the British Prime Minister David Lloyd George attempted to emulate the success of the naval negotiations in the Washington Conference (discussed in the next section). However, French opposition and secret deals between Germany and Russia undermined the spirit of the Conference.[96] According to Walters, "the breakdown of the Genoa conference, followed soon by the fall of Lloyd George, had important consequences on the international situation. It brought an end to the active existence of the Supreme Council. Britain and France had now spent the last reserves of the authority derived from victory and of the power derived from unity".[97] Yet this episode actually encouraged the growth of the League, allowing the Assembly to negotiate for disarmament without interference from the Council, which "had in fact been a rival and an obstacle to the League".[98]

4.3. The Washington Conference and U.S. domestic politics

The first post-war international agreement banning chemical weapons was made not at the League of Nations, but at the Conference on the Limitation of Armaments, convened by the United States, which took place in Washington, D.C., from November 1921 to February 1922. Prior to that, moves for CW disarmament had referred to Germany specifically, which tends to undermine the retrospective idea that there was general moral abhorrence of these weapons. The Washington Conference was convened by the U.S. primarily in response to the arms race that was taking shape between the three main naval powers at the time, namely the U.S., Japan, and Britain. The U.S. was particularly worried about the aggressive nature of Japanese imperialism in the Pacific, where the Japanese sphere of influence had increased sufficiently to include several islands that were U.S. territories at the time.[99] However, naval armament was not the only concern of the Washington Conference. The invitation to the conference stated: "It may also be found advisable to formulate

---

[96] Ibid., pp. 164–165.
[97] Ibid., p. 167.
[98] Ibid., p. 168.
[99] Thomas and Thomas (1970), pp. 62–63. Buckley (1970, p.111) suggests that the U.S. only became pro-disarmament once it had gained the upper hand. President Warren Harding, Wilson's successor, "favoured a reduction in armaments only after the American government had completed its naval programme and could lead from strength in an international conference."

proposals by which, in the interest of humanity, the use of new agencies of warfare may be suitably controlled".[100] When Britain and France asked for further articulation of this point, the U.S. Secretary of State Charles Evans Hughes said it included submarines, airplanes and poison gas.[101]

The CW debate at the Washington Conference clearly exhibited the fault-lines in U.S. domestic politics. At this time there was a clear division between isolationist and internationalist factions, although neither side was particularly vocal on the topic of disarmament.[102] A decisive battle between them was fought when the Senate was considering the ratification of the League of Nations Covenant, with President Wilson leading the pro-League side and Henry Cabot Lodge leading the anti-League side. The Covenant was defeated in the Senate, not due to a majority of anti-League supporters, but as a result of clever manoeuvrings by Lodge, made worse by Wilson's stubbornness.[103] While the triumph of the isolationists on the issue of the League of Nations almost certainly hampered the U.S. disarmament movement, it did not bring it to a halt. Although Wilson was no longer President after 1921, those internationalists who advocated arms control did attempt to carry on Wilson's legacy.

There was no united front against CW among the American politicians involved in the Washington Conference. The American delegation initially did not have any suggestions as to what to do about them, and so the view of the General Board of the Navy was sought. The advice from the Board was that "it would be sound policy to prohibit gas warfare in every form and against every objective . . . . [T]he Board . . . condemned a practice which it felt caused too much human suffering. The Board was sure it was expressing the opinion of the average American. Besides, poison gas could not sink battle ships."[104] Meanwhile, Secretary Hughes had appointed an Advisory Committee to the U.S. Delegation to the Washington Conference, which also urged for the total prohibition of CW. This recommendation seemed to reflect the views of the U.S. population at large. A national public opinion poll conducted by the

---

[100] From the original invitation to the Washington Conference, cited in Hughes (1924), p. 7.
[101] Buckley (1970), p. 40.
[102] See "World Affairs: The Senate and Ratification 1919–1921", http://www.u-s-history.com/pages/h1338.html (most recently accessed on 12 June 2007).
[103] Walters (1969), p. 71.

Advisory Committee found that of those sampled, 366,975 were in favour of a complete ban on CW, while only 19 were in favour of retaining restricted use.[105] This particular survey may be somewhat suspect, but there was indeed a campaign for a CW ban, whose champions included even leading military men such as General Peyton March (as discussed in Section 3.1) and General John Pershing, who had been the commander-in-chief of the American Expeditionary Force in Europe in WWI, and was a member the American Advisory Committee during the Washington Conference. The Advisory Committee's report stated that the U.S. delegates "would not be doing their duty in expressing the conscience of the American people were they to fail on insisting on the total abolition of Chemical warfare". Yet the American members of the Conference's Subcommittee on Poison Gas strongly disagreed with these opinions. In fact one member, the chemist Edgar F. Smith, described gas as a "perfect weapon".[106]

The final report by the Subcommittee of Poison Gas neither condemned nor endorsed gas warfare, and concluded that it was not possible to limit the use of CW against combatants, but that the use of gases against non-combatants should be limited as far as practically possible.[107] When Hughes made his crucial speech to the Conference, he left out the last three paragraphs of the Subcommittee's report. These paragraphs stated that American members of the Subcommittee thought gas was a more humane weapon than any other. T. H. Buckley comments:

> To the public he displayed a front against gas warfare, even though he knew his Subcommittee subordinates disagreed. To this day few people realize that immediately after the World War, American Representatives at an international conference came out in favour of gas warfare. Hughes must have realized that if this fact became public the criticism might prove enormous.

In other words, Hughes went against expert advice because of his perception of what the public would think. After this report by Hughes, another American delegate, Elihu Root, proposed a resolution calling on

---

[104] Buckley (1970), p. 123.
[105] McElroy (1991), p. 145.
[106] Buckley (1970), pp. 123–124.
[107] SIPRI (1971a), p. 243.

the prohibition of gas warfare. This resolution passed unanimously, and formed a basis for future prohibitions of the same type.[108]

On 6 February 1922, due to the diplomatic efforts of the American delegation, the Washington Naval Treaty was signed by the U.S., Britain, France, Italy and Japan. Article V prohibited the use of "asphyxiating, poisonous or other gases and all analogous liquids, materials or devices", as "justly condemned by the general opinion of the civilized world."[109] The CW ban resolved in the Washington Treaty, however, ran into problems soon afterwards.[110] First of all, the wording of the article referring to poison gas was rather ambiguous. It did not ban all chemical weapons, but only specific types of chemical warfare. The section containing the prohibition of gas was a resolution rather than a treaty, implying moral rather than legal obligations on the part of the signatories. These factors undermined the authority of the resolution, and in any case it never became binding since France refused to ratify the treaty because of a clause on submarines. Nonetheless, the Washington Conference did constitute an important milestone in attempts to prohibit CW.

4.4. The Geneva Protocol

In September 1924, the League of Nations published the report of the special subcommittee of the TMC, which we have mentioned earlier. The report, based on contributions from chemists and bacteriologists, argued that aircraft delivery of gases was not technically impossible, and even considered the possibility of bacteriological warfare. It concluded: "All nations should realise to the full the terrible nature of the danger which threatens them."[111] With visions of widespread use of gas in any future war, the TMC report paved the way for the Geneva Protocol. A draft convention drawn up by the TMC relating to the control of international trade in arms, munitions and implements of war was submitted to both member and non-member governments. The Conference for the Supervision of the International Trade in Arms and Ammunition and in Implements of War convened in Geneva on 4 May 1925.

At the conference the U.S. representative immediately placed on the agenda the restriction in trade of chemicals with potential CW

---

[108] Buckley (1970), pp. 124–125.
[109] Bailey (1972), p. 126.
[110] These difficulties are explained in Thomas and Thomas (1970), pp. 65–67.
[111] McElroy (1991), p. 145.

applications, suggesting that all international trade in toxic weapons should be prohibited. However, the proposal was rejected on the grounds that it would discriminate against states unable to manufacture chemical weapons of their own. As the Brazilian representative pointed out, it would create an unfair gap between producing and non-producing states, especially as CW was an effective means of defence for weak countries. Alternative suggestions were discussed and it was finally agreed to sign a protocol appended to the final convention, outlawing the *use* of chemical weapons. It was drafted similarly to Article V of the Washington Treaty discussed above, with the additional prohibition of the use of bacteriological weapons proposed by the Polish representative. The Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases and of Bacteriological Methods of Warfare was signed on 17 June 1925. (See Appendix for the text of the Protocol.)

The Protocol contained no provisions for verification, enforcement or penalties. Many countries including Britain and France ratified it between 1925 and 1930, but only with the qualification that it would cease to be binding if an enemy failed to respect it. Thus, since the Protocol banned the use of chemical and biological weapons and not the weapons themselves, it came to be seen as essentially no more than a "no-first-use" agreement. Also, the U.S., despite having played a large role in the 1925 deliberations, failed to ratify the Protocol because it disagreed with the prohibition on the use of tear gases in war. The Chemical Warfare Service (CWS), pointing out that tear gases were even employed in peacetime against the civilian population, made vigorous lobbying efforts against ratification. The U.S. did not ratify the Protocol until 1975, when it also approved a separate treaty on biological weapons (the 1972 Biological and Toxin Weapons Convention).

How should we understand the Geneva Protocol? Was it just an ineffectual treaty induced by public feeling? Or was it a victory for the League of Nations? It has been suggested that the signing of the Protocol was "the high-water mark of the hostility of public opinion towards CW",[112] and that the Protocol was "the culmination of five years' hard work . . . the high-water mark of the first period of the League's life."[113] To claim that the Protocol was a categorical success for the League would

[112] SIPRI (1971a), p. 247.
[113] Zimmern (1969), p. 357.

be misleading, since it did not ban the weapons themselves, only their use. The League made continued efforts in this direction, but with no further success. Still, the Protocol did go some way in achieving the aims of the League. From its conception the League had sought to reach an international agreement on CW. An international law prohibiting the use of chemical (and bacteriological) weapons now existed. This law resulted from the resolve of the League as much as the hostility of public opinion, and without the League's commitment international public concern might not have been effective in achieving even this limited success.

We have already discussed the diversity of public opinion at the end of WWI, when the League first began to consider the question of CW. It would therefore be a mistake to assume that a hostile public reaction to CW was solely responsible in creating the need for a Protocol. Undoubtedly, what Richard Price calls the "stigma of lasting moral opprobrium" contributed to anti-gas feeling, and the failure of the Hague Convention to prevent the use of gas in the Great War revealed the need for improved regulation.[114] The persistent illnesses of gas casualties kept the horror of gas alive into peacetime, reinforcing the sentiments of many military men (such as French and March) who felt that gas was a dishonourable weapon.[115] Nevertheless, a range of contrary opinions existed. The act of gassing the enemy was glorified by some. Some military men (such as Foulkes and Fries) actively campaigned for the use of gas, arguing that it was an effective and legitimate method of warfare.[116] As we have seen, gas was also considered by some (such as Haldane) to be more humane than conventional weapons, with non-lethal, incapacitating agents and antidotes offering the prospect of the most humane form of warfare possible.

Public opinion appears to have crystallized around 1924 following the publication of the TMC report, which reinforced the need for a Protocol by appending concerns for international public relations to the League's concerns for international order. The Geneva Protocol was the League's attempt to deal with these concerns and was not merely an idealistic exercise: "The Geneva Protocol is not a sudden outburst of League idealism; it is an attempt to meet a grave and increasing practical danger, viz., the insecurity of European peace and, resulting therefrom,

---

[114] Price (1995), p. 74.
[115] Haber (1986), p. 258.
[116] For example, see Foulkes (1934), chapters 10 and 11.

the rise of a new competition in armaments."[117] Even after the Protocol was signed, the League actively sought to mobilize public understanding in support of its own objectives. For example, a pamphlet was produced by Henry Wilson Harris of the League of Nations Union addressing to the public the question of *The Meaning of the Protocol*. Harris claimed that, five months after it was signed, "nine people out of ten in this country [England] are still uncertain what the Protocol really means."[118] This pamphlet attested to the League's continuing commitment to promoting public understanding and engagement with questions of warfare policy.

But if public feelings did not dictate the League's policy, what did? What made CW prohibition so important in the League's agenda? Throughout this period many politicians appear to have been on an unrelenting drive to ban chemical weapons, and this was a powerful force behind the League's efforts. Even though chemical weapons were not universally considered to be more horrific than conventional weapons, it was certainly politically incorrect (in today's idiom) to advocate their use. It is useful to examine the extent to which chemical weapons had become "politicized", even before chlorine was first released at Ypres. The Hague convention of 1907 had declared that it was forbidden to use gas weapons.[119] According to Price, the introduction of gas warfare in 1915 was a political as well as a moral issue: "To the extent that gas weapons were singled out and politicised above and beyond other new weapons, it was not solely because they were perceived as more cruel than other weapons but because it was understood that their use was a violation of the Hague declaration."[120] In this context, the League's mission emerges as an attempt to assert the authority of the international community so flagrantly flouted and damaged by the contravention of the Hague Convention. Rather than expressing public opposition to CW, the Geneva Protocol represented an institutionalized antagonism towards an unusually politicized form of warfare.

---

[117] *Some Questions on the Geneva Protocol* (1925), p. 2. TNA: PRO 30/69/1273.
[118] Harris (1925), p. 1.
[119] Bailey (1972), p. 125.
[120] Price (1995), p. 90.

5. Summary

Contrary to common belief, our investigation of the response of the general public to gas warfare has revealed a series of complicated ethical dilemmas. Gas was dreadful, but so were many other weapons. Even those most intimately involved in fighting with chemicals did not agree about how to balance the various cruelties of war. A wide variety of views have been revealed in our investigation of both the press reactions to chemical warfare during and after WWI and the opinions of some key leaders in the Allied CW efforts on the ethics of chemical warfare. However, one overriding theme is the extent of continuity of both public and military perceptions of gas warfare as merely one component of an increasingly terrifying and uncivilized modern armoury that also included high explosives, tanks and airplanes. Moral resistance to the use of chemical weapons most strongly existed in a context where the development of a range of military technologies had the potential to expose civilians to unprecedented levels of risk. Although the specific fear of civilian gas casualties was not realized as anticipated by the opponents of gas warfare, the exposure of civilian populations to direct attacks did indeed become a defining feature of 20th-century warfare.

Far from reflecting straightforward moral revulsion to the use of gas, the Geneva Protocol was motivated by primarily political factors. The motives for chemical disarmament were complicated. Gas warfare was not explicitly mentioned in Article 8 of the Covenant of the League, which dealt with disarmament. It was mentioned in the Treaty of Versailles, but only in reference to Germany. The danger of chemical weapons was certainly known to the authors of these documents, but the experience of WWI did not lead to an immediate attempt to ban them. Attempts at CW control prior to the Geneva Protocol only ever took place under the larger umbrella of general disarmament. Either the anti-CW lobby was not strong enough to propose specific chemical disarmament, or there simply was not as much high-level interest in restricting chemical weapons as there was for disarmament generally. Despite much talk of chemical disarmament, therefore, action was only taken in the context of more general conferences. In the Washington Conference, the prohibition of gas warfare was placed under the more general category of “new methods of war”, which also contained submarines and airplanes. It seems that the desire to strengthen an international political system was a stronger impulse behind the Geneva Protocol than a straightforward and

specific moral condemnation of CW. The breakdown of the Hague Conventions of 1899 and 1907 left the international community unable to control CW development and use, and one of the first objectives of the Geneva conference was to restore international control of that situation.

Appendix[121]

Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases, and of Bacteriological Methods of Warfare.

Geneva, June 17, 1925

PROTOCOL

The undersigned Plenipotentiaries, in the name of their respective Governments:

Whereas the use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices, has been justly condemned by the general opinion of the civilised world; and

Whereas the prohibition of such use has been declared in Treaties to which the majority of Powers of the world are Parties; and

To the end that this prohibition shall be universally accepted as a part of International Law, binding alike conscience and the practice of nations;

DECLARE:

That the High Contracting Parties, so far as they are not already Parties to Treaties prohibiting such use, accept this prohibition, agree to extend this prohibition to the use of bacteriological methods of warfare and agree to be bound as between themselves according to the terms of this declaration.

[121] Original document available from the Sussex Harvard Information Bank, SPRU (Science and Technology Policy Research), University of Sussex.

Bibliography

Bailey, S. D. 1972. *Prohibitions and Restraints in War.* London: Oxford University Press.

Bernhardi, Friedrich Adam Julius von. 1906. *Cavalry in Future Wars*, translated by C. S. Goldman, with an introduction by Lieut. General Sir John French. London: John Murray.

Best, Geoffrey. 1983. *Humanity in Warfare: The Modern History of the International Law of Armed Conflicts*. London: Methuen & Co.

Bourke, J. 1999. *An Intimate History of Killing.* London: Granta Books.

Bourne, J. M. 2001. *Who's Who in World War One.* Routledge: London and New York.

Buckley, T. H. 1970. *The United States and the Washington Conference, 1921–1922*. Knoxville: University of Tennessee Press.

Chisholm, Cecil. 1915. *Sir John French: An Authentic Biography*, with an introduction by Sir Evelyn Wood, V.C., and a portrait by J. R. L. French. London: Herbert Jenkins.

Christopher, Paul. 1994. *The Ethics of War and Peace: An Introduction to Legal and Moral Issues*. Englewood Cliffs, N.J.: Prentice-Hall.

Clark, Ronald. 1984. *J. B. S.: The Life and Work of J. B. S. Haldane*. Oxford: Oxford University Press.

Coffman, Edward M. 1966. *The Hilt of the Sword: The Career of Peyton C. March*. London: University of Wisconsin Press.

Crutwell, C. R. M. F. 1936. *A History of the Great War, 1914–1918,* 2nd ed. Oxford: Clarendon Press.

De Madariga, Salvador. 1929. *Disarmament*. London: Oxford University Press.

Foulkes, Charles H. 1934. *Gas! The Story of the Special Brigade*. Edinburgh: Blackwood.

Fradkin, Elvira T. K. 1929. *Chemical Warfare — Its Possibilities and Probabilities.* Worcester, Mass.: The Carnegie Endowment for International Peace.

French, Edward Gerald. 1931. *The Life of Field-Marshal Sir John French, First Earl of Ypres.* London: Cassell & Co.

French, John Denton Pinkstone. 1915. "Moral Aspects of Asphyxiation." *Literary Digest*, 12 June 1915: 1393. Reprinted from the Manchester *Guardian*.

Haber, Ludwig Fritz. 1986. *The Poisonous Cloud: Chemical Warfare in the First World War.* Oxford: Clarendon Press.

"The Hague Convention". http://www.lib.byu.edu/~rdh/wwi/hague.html (most recently accessed on 12 June 2007).

Haldane, J. B. S. 1925a. *Daedalus, or, Science and the Future (A Paper Read to the Heretics, Cambridge, on February 4th, 1923)*. London: Kegan Paul, Trench, Trubner.

———. 1925b. *Callinicus: A Defence of Chemical Warfare*, 2nd ed. London: Kegan Paul, Trench, Trubner.

———. 1927. *Possible Worlds and Other Essays*. London: Chatto & Windus.

Harris, H. W. 1925. *The Meaning of the Protocol.* A copy can be found at the National Archives (formerly Public Record Office) 30/69/1273.

Harris, Robert, and Jeremy Paxman. 2002. *A Higher Form of Killing: The Secret Story of Gas and Germ Warfare*, updated ed. London: Arrow.

Hughes, Charles E. 1924. *Foreign Relations*. Chicago: Allied Printing Trades Council.

March, Peyton C. 1932. *The Nation at War*. New York: Doubleday, Doran and Co.

McElroy, R. J. 1991. "The Geneva Protocol of 1925." In M. Krepon and D. Caldwell, eds., *The Politics of Arms Control Treaty Ratification* (New York: St Martin's Press), pp. 125–166.

Miller, David Hunter. 1925. *The Geneva Protocol*. New York: The Macmillan Company.

———. 1928. *The Drafting of the Covenant.* London: G. P. Putnam's Sons.

Nagel, Thomas. 1988. "War and Massacre." In Samuel Scheffler, ed., *Consequentialism and its Critics.* New York: Oxford University Press.

Norman, Richard. 1995. *Ethics, Killing and War*. Cambridge: Cambridge University Press.

Price, Richard. 1995. "A Genealogy of the Chemical Weapons Taboo." *International Organisation* 49:73–103.

Richter, Donald. 1992. *Chemical Soldiers: British Gas Warfare in World War 1*. Lawrence, Kansas: University of Kansas Press.

Robinson, J. P. Perry. 1993. "Origins of the Chemical Weapons Convention." In Beniot Morel and Kyle Olson, eds., *Shadows and Substance: The Chemical Weapons Convention*. Oxford: Westview Press.

Russell, Edmund. 2001. *War and Nature: Fighting Humans and Insects with Chemicals from World War I to Silent Spring.* Cambridge: Cambridge University Press.

Scott, James Brown, ed. 1920. *The Proceedings of The Hague Peace Conferences — The Conference of 1899*. Oxford: Oxford University Press.

———. 1921. *The Proceedings of The Hague Peace Conferences — The Conference of 1907*, vol. 3. Oxford: Oxford University Press.

SIPRI (Stockholm International Peace Research Institute). 1971a. *The Problem of Chemical and Biological Warfare. Vol. 1: The Rise of CB Weapons.* Stockholm: Almqvist & Wiksell.

———. 1971b. *The Problem of Chemical and Biological Warfare. Vol. 4: CB Disarmament Negotiations, 1920–1970.* Stockholm: Almqvist & Wiksell.

Spiers, Edward. 1986. *Chemical Warfare*. London: Macmillan.

———. 1989. *Chemical Weaponry*. London: Macmillan.

———. 1999. "Chemical Warfare in the First World War." In Brian Bond, et al., *'Look to Your Front': Studies in the First World War by the British Commission for Military History* (Staplehurst: Spellmount), pp. 163–178.

Thomas, A. J., and Ann Vann Wynen Thomas. 1970. *Legal Limits of the Uses of Chemical and Biological Weapons*. Dallas: Southern Methodist University Press.

Trumpener, Ulrich. 1975. "The Road to Ypres: The Beginnings of Gas Warfare In World War I." *Journal of Modern History* 47: 460–480.

Wallace, Richard Horatio Edgar. 1914. *Britain's Great Men*. London: George Newnes.

Walters, Francis Paul. 1969. *A History of the League of Nations*. London: Oxford University Press.

Wells, Donald A., ed. 1996. *An Encyclopedia of War and Ethics*. Westport, Conn.: Greenwood Press.

Zimmern, Alfred. 1969. *The League of Nations and the Rule of Law, 1918–1935*. New York: Russell and Russell.