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WHAT'S WRONG WITH GAS WARFARE?

By

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USAWC RESEARCH ELEMENT
(Research Paper)

What's Wrong With Gas Warfare?

by

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8 April 1966

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SUMMARY

A new weapon is introduced during wartime because it is expected to be more effective than available means. Germany initiated gas warfare at the Second Battle of Ypres on 22 April 1915 because her advance across France had been halted and machine guns prevented direct attack of entrenched positions. Germany gained complete tactical surprise with gas, and if the resulting gap in the Allied lines had been exploited fully, the history of the world might have been changed.

Although defense quickly caught up with offense and gas became an accepted weapon for the remainder of the war, the image of the first gas attack has remained in the public mind as an emotional response to the term "gas warfare." The horror associated with Ypres in the attack of defenseless soldiers with deadly chlorine gas magnified an innate fear of suffocation and a distrust of the unknown which are common to all people. Choking to death on the battlefield was a new and frightening experience, and the attendant propaganda against Germany established the character of gas warfare as an evil, cruel, and indecent means of war.

This image has persisted to the present, with memories of Ypres refreshed and strengthened through the ensuing five decades by Italian and Japanese use of gas in war, sensational journalism, Communist propaganda, and the attitude of world leaders, notably President Franklin Roosevelt. The recent world-wide furor over chemical operations in Vietnam demonstrates that gas warfare will not be accepted again as a rational means of war without fundamental changes in public attitudes.

This research paper proposes actions which can and should be taken to gain public understanding and support for gas warfare. Revised concepts on the employment of gas weapons are outlined which should improve their combat effectiveness; a new national policy on gas warfare is presented that has the advantages of renouncing, in part, mass destruction of life and property, reducing resentment of American power, and supporting the strategy of controlled response. The proposed concepts and policy also answer moral questions on gas warfare by satisfying the principles of the "just war" doctrine. The paper concludes with suggestions for an effective public information program that will explain the role of gas warfare, counter the memory of Ypres and the effects of propaganda, and convince the American public of the necessity for preparedness.

CHAPTER 1

INTRODUCTION

On 23 March 1965 the initial two-man space flight by US astronauts had been completed, and this accomplishment made headlines throughout the free world. Sharing these headlines was a dispatch from Saigon stating that US-supplied nausea gas was being used by South Vietnamese forces against the Viet Cong. Secretary of Defense Robert S. McNamara explained immediately that harmless tear gas was being employed where Viet Cong guerrillas mingle with Vietnamese civilians. In spite of this explanation and the information that the chemical agents were the same as those used widely by many countries for riot control purposes, there were charges of "gas warfare" and violation of the Geneva Protocol of 1925 which prohibits the use of "asphyxiating, poisonous or other gases."[1] These accusations came not only from Russia but also from Great Britain and members of the US Congress. "Protests that the gas was utterly harmless were drowned in the fatuous world-wide din of indignation."[2]

Two days later, 25 March, another space achievement captured the headlines when a Ranger spacecraft televised pictures from the moon. The charges and denials of "gas warfare" were still on the front pages. The storm of controversy and the deluge of propaganda

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[1]Joseph B. Kelly, "Gas Warfare in International Law," Military Law Review, Jul. 1960, p. 28.

[2]"Tears or Death?" Time, Vol. 86, 17 Sep. 1965, p. 51.

continued for weeks, and in the opinion of some, gave "comfort to our enemies, dismayed our friends and outraged many of our own citizens."[3]

"It is a curious commentary that this action should have provided so many hysterical headlines."[4] What caused such a violent reaction to the use of harmless gases for humane purposes? The furor was "a prime example of the hasty and hysteric quality that sometimes infects world opinion,"[5] and was the result of a misunderstanding, a case of interpreting the use of riot control agents as gas warfare, and an exercise in semantics that even Secretary of State Dean Rusk found difficult to explain.[6] Therefore it is essential at the outset of this paper to distinguish clearly between the employment of riot control agents and gas warfare.

The choice of the term "gas warfare" in the title of this paper was deliberate, because it has popular understanding: it recalls the vision of soldiers choking to death during the first gas attack of World War I. There is rather widespread avoidance of the term among the military, and over the years "gas warfare" has softened to "chemical warfare" and finally to "chemical operations." For this reason, no current dictionary of terms for the armed forces includes a definition for gas warfare.

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[3]Editorial, "Gas," Washington Post, 26 Mar. 1965, p. A24.

[4]W.M. Hollyhock, "Weapons Against the Mind," Survival, Vol. 7, Jul. 1965, p. 169.

[5]Time Essay, "The U.S. & World Opinion," Time, Vol. 85, 28 May 1965, p. 30.

[6]"Exerpts from Transcript of Rusk News Parley on Use of Gas in Vietnam," New York Times, 25 Mar. 1965, p. 13.

This fear of a label was deplored recently in the religious publication Commonweal: "If we are to be prevented from doing what is more humane because the action has the connotation of being less humane, then humanity has been defeated by words."[7] A similar caution was voiced by Congressman Samuel S. Stratton on 23 March 1965 on the floor of the US House of Representatives: "Let us not be frightened with labels. Let us recognize the facts."[8]

Historically "chemical warfare" has been an all-inclusive term for the employment of any chemical agent, including defoliants, herbicides, smokes, incendiaries, training and riot control agents, flame, and war gases. While the recent confusion was between riot control agents and war gases, all chemical agents are included for completeness in the definitions that follow.

Riot control agents and war gases can be grouped according to effect into two general categories: lethal or incapacitating. The lethal agents include the nerve agents and some World War I gases, notably phosgene. The incapacitating agents include those that produce a long-term effect (e.g., the vesicant, HD or mustard), an intermediate-term effect (e.g., the psychochemical, BZ), and a short-term effect (e.g., riot control agents, CS, CN, and DM). From these categories two definitions can be derived:

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[7]Julian Pleasants, "Gas Warfare, Is It Justifiable as Minimum Force?" Commonweal, Vol. 82, 7 May 1965, p. 212.

[8]As quoted in "Using Vomit Gas in Vietnam is Actually a Humane Form of Warfare," Congressional Record, Vol. 111, 23 Mar. 1965, p. 5515.

Chemical Operations--A collective term embodying the employment of chemical products to create a military advantage. Chemical products include defoliants, herbicides, smokes, flame, incendiaries, and training and riot control agents.

Gas Warfare-- Employment of war gases, requiring Presidential approval. War gases include any toxic substance (liquid, solid, or vapor) that produces death or more than transitory incapacitation among exposed personnel.

An important distinction between chemical operations and gas warfare is that the former is a normal and accepted means of war, whereas the latter, because of political implications, requires a decision of the highest authority before initiation. This distinction should satisfy those critics of the use of riot control agents in Vietnam who feared such use would automatically lead to gas warfare. While this fear may have been based on the historical fact that Germany used retaliation for French employment of tear gas as her reason for the introduction of chlorine in World War I, the Presidential decision for US forces to conduct gas warfare can be expected only after very serious consideration of the consequences.

Accepting these definitions and excluding chemical operations from further consideration, we come to the thrust of the qestion asked by this paper: What's wrong with gas warfare? Most authorities agree that the beginning of public antipathy towards gas warfare can be traced to the use of chlorine by the Germans in the first World War. The lingering memories have been refreshed from time to time during the ensuing 50 years, and hostility has frozen into a permanent

attitude. It is similar to the reaction of Pavlov's dog: audiences have been conditioned by what they hear and read about gas warfare to feel repugnance and revulsion when the bell rings.[9]

This paper is an effort to survey the events from 1915 to 1965 that have produced the stigma attached to gas warfare and to propose what can be done about popular preconceptions. The history of gas weapons in war and international attempts to outlaw their use will be examined for their effect on public opinion. The information made available to the public on gas warfare by military experts, fiction writers, propagandists, and press releases will be reviewed for its impact on public attitudes. Finally, the concepts and policies on gas warfare will be evaluated to determine ways to improve preparedness and enhance acceptance of gas as a weapon system important to the national security of the United States.

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[9]Paul W. Blackstock, "Gas Warfare," Worldview, Vol. 8, Jun. 1965, p. 10.

CHAPTER 2

THE USE OF GAS IN WAR AND ATTEMPTS TO OUTLAW ITS USE

Poisoning of enemy water sources and asphyxiation of enemy soldiers were techniques of warfare in ancient times; the methods were crude but the effects were deadly. With the rise of technology after the industrial revolution, there was apprehension among some world leaders that the primitive weapons of gas warfare might become sophisticated through the application of science and tempt a nation to attack defenseless people.

The fear of gas warfare has been expressed in several international treaties that attempted to outlaw the use of gas in war. This chapter will examine these treaties, their failure to prevent gas warfare, and the reaction of the public to the employment of gas.

THE HAGUE CONFERENCE

The first international agreement to ban gas warfare took place at The Hague in 1899; the resolution adopted was "to abstain from the use of projectiles the sole object of which is the diffusion of asphyxiating or deleterious gases."[1] The resolution was adopted because most of the conferees considered that certain types of weapons were intrinsically immoral and that these weapons should be prohibited in war, and the emotional belief that death from suffocation was worse

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[1] Joseph B. Kelly, "Gas Warfare in International Law," Military Law Review, Jul. 1960, p. 23.

than death from bullets. The United States did not ratify the resolution, primarily because it was doubted that an international agreement would dissuade a nation from the use of gas during a war.[2]

GERMANY BREAKS THE LAW

The skepticism expressed by the United States at the Hague Conference was justified when Germany used asphyxiating gas against French and Canadian troops at the Second Battle of Ypres on 22 April 1915. Germany was within the letter of the law since projectiles were not used: cylinders generated the gas and the wind carried the cloud over the enemy trenches. It was, however, a clear violation of the spirit of the law.

Germany's official reason for using gas was retaliation in kind for French use of rifle and hand grenades filled with ethylbromoacetate against German soldiers in 1914.[3] These were called "stupefying gas" (tear gas) grenades, even though ethylbromoacetate is over twice as toxic as chlorine, the gas used by the Germans in 1915. The Germans had tried using tear gas in fighting the Russians on the Eastern Front: on 31 January 1915, the Germans fired about 18,000 tear gas shells near Bolimov, Poland, but the effects were limited by cold weather and lack of skill in chemical operations. The Russians did not inform her Western Allies of the use of tear gas and this may have encouraged the Germans to initiate gas warfare.[4]

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[2] Ibid., p. 22.
[3] J.H. Rothschild, Tomorrow's Weapons, p. 14.
[4] Hanson W. Baldwin, World War I, An Outline History, p. 49.

Professor Fritz Haber of the Kaiser Wilhelm Physical Institute in Berlin had been experimenting with poison gases since 1914. Few people considered gas to be a decisive or even a very effective weapon because of the disappointing experiences with stupefying gas. However, the German High Command allowed Haber to prepare, plan, and direct the gas attack at Ypres in the hope that the advance, halted in September 1914, might be renewed.[5]

The first use of asphyxiating gas as a prime weapon of war had unexpected success, even though the Allies had received warnings of the impending attack.[6] The artillery bombardment of Ypres began at 5:00 P.M., followed immediately by the appearance of "two curious greenish-yellow clouds on the ground on either side of Langemarck, in front of the German line. These clouds spread laterally, joined up, and, moving before a light wind, became a bluish-white mist."[7] The French Colonial troops and the Canadian forces in the path of the gas were completely unprepared and unprotected, although one sensible Canadian "told everyone within earshot to urinate on their handkerchiefs and hold them against their faces."[8] The military effects of the gas attack were devastating: Allied troops fled, leaving a gap of 8000

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[5]Curt Wachtel, Chemical Warfare, p. 32.

[6]J.E. Edmonds and G.C. Wynne, Official History of the War; Military Operations: France and Belgium, 1915, Vol. 1, pp. 163-165.

[7]Ibid., p. 177.

[8]Richard Suskind, Do You Want to Live Forever!, p. 115.

yards in the line; 15,000 casualties were produced, including 5000 dead; 6000 Allied soldiers were captured; and 51 artillery pieces and 70 machine guns were lost.[9] It could have been worse, but the Germans did not exploit the advantage and the Allies filled the gap in the lines during the same night.

REACTION TO GERMAN USE OF GAS

Because of stringent censorship regulations, the confusion and terror generated at Ypres could not be disclosed to the press; while the military situation remained in doubt, nothing could be published. For the week following the gas attack, the public was virtually uninformed about the incident. There were no newspaper reporters with the French and Canadian forces that had been subjected to the attack. The French refused to allow correspondents with the army, and the British had appointed an "Eye Witness," Major Ernest D. Swinton, as their official reporter.[10] In the winter of 1914-1915 many American newspapermen gave up trying to report the war and went home; some joined the Red Cross in order to see something of the war.

Eye Witness Swinton reported the gas attack five days after it happened, but he was deliberately vague to prevent panic:

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[9]Wachtel, op. cit., p. 63.

[10]Emmet Crozier, American Reporters on the Western Front 1914-1915, p. 71.

27th April

> Since the last summary there has been a sudden development in the situation on our front and very heavy fighting has taken place to the north and northeast of Ypres, which can be said to have assumed the importance of a second battle for that town. With the aid of a method of warfare up to now never employed by nations sufficiently civilized to consider themselves bound by international agreements solemnly ratified by themselves, and favored by the atmospheric conditions, the Germans have put into effect an attack which they had evidently contemplated and prepared for some time... Its peculiar and novel nature, however, was a surprise which was largely responsible for the measure of success achieved.[11]

Dr. John S. Haldane, an authority on respiration, was sent to France immediately after the gas attack to examine some of the Canadian casualties. Dr. Haldane's report was made public two days after Swinton's dispatch:

> These men were lying struggling for breath, and blue in the face....There was nothing to account for the blueness and their struggle for air but one fact, and that was that they were suffering from acute bronchitis....One of the men died shortly after our arrival. A postmortem examination showed that death was due to irritant gas....These symptoms and other facts so far ascertained point to the use by the German troops of chlorine or bromide for the purpose of asphyxiation.[12]

The Swinton and Haldane reports produced a public reaction of righteous indignation that an outlawed method of warfare was used. The newspapers reflected the outrage of the people: "We must

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[11]Ernest Swinton, as quoted by Emmet Crozier, ibid., p. 101.

[12]Logan Marshall, Horrors and Atrocities of the Great War, p. 290.

expect the Germans to fight like savages who have acquired a knowledge of chemistry."[13]

> This atrocious method of warfare...this diabolical contrivance....The willful and systematic attempt to choke and poison our soldiers can have but one effect upon the British peoples and upon all non-German peoples of the earth. It will deepen our indignation and our resolution and it will fill all races with a horror of the German name.[14]

The condemnation of Germany for abrogating the Hague agreement was correct and rational. However, the Allies, perhaps with the hope that world opinion might cause Germany to stop using gas, but certainly because they were unable to immediately use gas themselves, retaliated with another weapon: propaganda. It could be that one of the reasons the propaganda was so vehement was professional jealousy: the French had been working on a war gas but were not ready to use it at the time of the German experiment.[15] The impact of Allied propaganda will be discussed in Chapter 3.

Gas was used again at Ypres two days later but some improvised respirators were available to Allied troops. On 1 May 1915, 10 days after the first use of gas, the British were able to stop a German infantry attack that was preceded by the release of chlorine.[16] By the time US forces entered World War I, gas had been in use for two

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[13] Daily Express (London), 27 Apr. 1915, as quoted by Arthur Ponsonby, Falsehood in War-Time, p. 146.

[14] The Times (London), 29 Apr. 1915, as quoted by Ponsonby, ibid.

[15] H.C. Peterson, Propaganda for War, The Campaign Against American Neutrality, 1914-1917, p. 63.

[16] Edmonds and Wynne, op. cit., p. 288.

years and was an accepted means of warfare. The first gas attack against American troops occurred near Seicheprey on the night of 25 February 1918. The reaction of US soldiers was one of anger rather than horror as, for example, Major Boyce of the 3rd Division wrote:

> If anyone wants to know how a gas mask feels, let him seize his nose with a pair of fire tongs, bury his face in a hot feather pillow, then seize a gas pipe with his teeth and breathe through it for a few hours while he performs routine duties. It is safe but, like the deadly poison which forced its invention, it is not sane.[17]

INTERNATIONAL TREATIES BETWEEN THE WARS

Gas was used by both sides for the last three years of World War I and was responsible for thousands of military casualties (27.3 percent of the total sustained by the American Expeditionary Force[18]). However, the large-scale gas attacks also caused casualties among French civilians, usually when the clouds produced by a large number of cylinders drifted to the rear.[19] General March, for example, told after the war of seeing

> over 100 French women and children who had been living in their homes in rear of and near the front, and who were gassed. The sufferings of these children, particularly, were horrible and produced a profound effect on me.[20]

These casualties were the accidental by-product of gas warfare, but the fear that gas might be used intentionally on civilian population centers was a vital consideration of international treaties after the first World War, as it had been of concern at the Hague Conference in 1899.

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[17] As quoted by Suskind, op. cit., p. 114.

[18] H.L. Gilchrist, A Comparative Study of World War Casualties from Gas and Other Weapons, p. 17.

[19] Dorothy K. Clark, Effectiveness of Chemical Weapons in WWI, p. 60.

[20] Peyton C. March, The Nation at War, p. 333.

The Versailles Treaty

The peace treaty ending World War I was five months in the making; when the treaty was signed on 23 June 1919, it contained an article (Article 171) on the use of poison gas.[21] The importance of Article 171 is the broad statement on prohibition of gas warfare as compared to the Hague resolution which restricted only the use of gas projectiles, and the fact that the United States accepted the provisions of the treaty, although the restraints applied only to Germany.

The Washington Naval Conference

President Harding called the Washington Naval Conference in 1921-1922 to cut down on armaments; Article V of the resulting treaty among the United States, France, England, and Japan contained a provision against gas warfare.[22] The conference declarations were ratified by the President on 9 June 1923, but the treaty was to become effective only upon ratification by all the conferring nations. France failed to ratify because of restrictions on submarine warfare, and the treaty did not come into force.

The Geneva Protocol

The attempts to limit armaments at Geneva in 1925 included the most significant international effort to outlaw gas. The Protocol

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[21] Kelly, op. cit., p. 24.
[22] Ibid., p. 26.

wording was essentially that adopted at the Washington Naval Conference, and it has been ratified by more than 40 nations, including Italy.[23] The United States delegates signed the Geneva Protocol because they were of the impression that our position was unchanged from that expressed three years earlier at the Washington Naval Conference. This assumption proved wrong, however, when the treaty was sent to the US Senate for approval. The debate in the Senate was led by Senator Heflin for and Senator Wadsworth against ratification. Senator Wadsworth said:

> We have the information now complete, based upon facts that are incontrovertible, which indicates very, very clearly that, compared with other weapons used in warfare, gas is the least cruel, not only in effect at the time of its use but in the aftereffects.[24]

Senator Wadsworth's argument was based on the 1920 report of the Surgeon General of the Army that showed the low ratio of deaths to total casualties from gas. He was supported in his views by telegrams from the American Legion, the Veterans of Foreign Wars, and the Association of Military Surgeons. Overwhelmed by the opponents of the treaty, Senator Heflin denounced those who testified "how delightful gas is."[25] Thus, in the short space of three years the US national policy on prohibition of gas warfare changed completely, and the United States did not ratify the Geneva Protocol.

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[23] Ibid., p. 28.

[24] Quoted in US Congress, Senate, Committee on Foreign Relations, Chemical-Biological-Radiological (CBR) Warfare and its Disarmament Aspects, p. 26.

[25] Quoted by Kelly, op. cit., p. 34.

ITALY BREAKS THE LAW

The use of gas by Italy on unprotected Ethiopians in the Abyssinian War of 1935-1936 aroused hostile public sentiment towards gas warfare once again. Italy had ratified the Geneva Protocol of 1925 but justified the use of gas "as a reprisal for other gross violations of international law committed by Ethiopia, there being nothing in the Geneva Protocol that required gas be employed only as retaliation in kind."[26]

Mass communication media had improved greatly in the 20 years since the use of chlorine at Ypres, and the world soon knew that noncombatants as well as unprotected soldiers were being attacked with gas in Ethiopia. In June 1936 the Emperor of Ethiopia addressed the assembly of the League of Nations:

> It is my duty to inform the governments assembled in Geneva of the deadly peril which threatens them by describing to them the fate which has been suffered by Ethiopia. It is not only upon warriors that the Italian government has made war, it has, above all, attacked populations far removed from hostilities....Special sprayers were installed on aircraft so that they could vaporize over vast areas of territory a fine death-dealing rain.... It was thus that from the end of January 1936 soldiers, women, cattle, rivers, lakes, and pastures were drenched continually with this deadly rain....That was its chief weapon of warfare.[27]

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[26]League of Nations, Official Journal, as quoted by Kelly, op.cit., p. 41.

[27]As Quoted by J.F.C. Fuller, The First of the League Wars, pp. 79-80.

REACTION TO ITALIAN USE OF GAS

When gas was employed from aircraft, against helpless Ethiopian civilians and soldiers, the fears implied by the international treaties were justified in full. One evaluation of the impact of the Italo-Ethiopian War on public opinion in the United States indicated that the image of gas warfare had suffered seriously:

> Newspapers in the United States frequently carried photographs of Ethiopian men, women, and children victimized by mustard gas bombs dropped from planes. The popular conviction that chemical weapons are inhumane and inadmissible was greatly strengthened.[28]

Contrarily, another evaluation indicated public apathy to the use of gas in Ethiopia:

> We were distressed by the poison gas attacks of the Italians on the Ethiopians...but we were becoming less distressed, and gradually we came to accept these things as a part of what is known as "civilized warfare."[29]

While these two views are widely different, they illustrate that public opinion was not united against gas warfare at this time since the United States was not bound by international treaty to oppose its use and no national policy had been formulated. They indicate also that the American people were not particularly interested in the war since the United States was not involved. This attitude is apparent today in the uproar over the use of tear

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[28] Foreign Policy Research Institute, University of Pennsylvania, The Psychopolitical Implications of Biological and Chemical Warfare, p. 12.

[29] Thomas A. Bailey, The Man in the Street, p. 177.

gas in Vietnam as contrasted with the indifference to the suspicion that Egypt is using gas in Yemen:

> One attack is alleged to have been made against the village of Al-Kawma in northwestern Yemen on June 8, 1963, resulting in six deaths and 21 serious injuries. Another attack is alleged to have taken place January 28 against a village in the Harush area of Khaulan, where 21 persons, according to the Royalists, were blinded by gas.[30]

JAPAN BREAKS THE LAW

Japan ratified the Hague declarations of 1899, but did not sign the Geneva Protcol of 1925. There are no reports that Japan used gas in her war with Russia in 1904-1905 or with Germany during World War I. There are indications, however, that Japan used gas during the period 1937-1943 against Chinese troops who had no protective equipment.[31] In fact, the most extensive use of gas since the first World War is said to have occurred in October 1941 when the Japanese were reported to have used mustard and lewisite on Chinese at Ichang.[32]

REACTION TO JAPANESE USE OF GAS

The United States entered World War II with deep emotional feelings against Japan. The American reaction to the knowledge that

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[30]John W. Finney, "Cairo Believed to be Using Gas," New York Times, 23 Mar. 1965, p. 3.

[31]Rothschild, op.cit., p. 16.

[32]Kelly, op.cit., p. 13.

Japan was using gas in China came from President Roosevelt on 5 June 1942:

> I desire to make it unmistakably clear that if Japan persists in this inhuman form of warfare against China or against any of the United Nations, such action will be regarded by this government as though taken against the United States and retaliation in kind and in full measure will be meted out.[33]

This threat of retaliation was modified on 8 June 1943 to a national policy of "no first use" when the President said:

> I have been loath to believe that any nation, even our present enemies, could or would be willing to loose upon mankind such terrible and inhuman weapons....Use of such weapons has been outlawed by the general opinion of civilized mankind....I state categorically that we shall under no circumstances resort to the use of such weapons unless they are first used by our enemies....Any use of gas by any Axis power, therefore, will immediately be followed by the fullest possible retaliation upon munition centers, seaports, and other military objectives throughout the whole extent of the territory of such Axis country.[34]

The effect of the President's no-first-use announcement was evident in answers to a Gallop Poll in September 1944. Dr. Gallop asked if the American people would approve using gas on Japanese

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[33]As quoted by L.P. Brophy and G.J.B. Fisher, United States Army in World War II, Vol. 6, Pt. 7, Vol. 1, p. 63.

[34]As quoted in US Congress, Senate, Committee on Foreign Relations, op.cit., p. 43.

and German cities if such attacks would shorten the war. Seventy-six percent opposed using gas on German civilian centers and 71 percent were against using it on the Japanese. In March and May 1945 the question was asked whether the US armed forces should use gas on Japanese soldiers. In March, 63 percent were opposed; in May, 65 percent were opposed. Both groups were asked for their reasons: the largest percentage of those opposed would have been in favor of using gas only if the Japanese used it first. In June 1945 the question was changed to approval or disapproval of the use of gas on the Japanese, if by doing so American lives would be saved. The results showed 40 percent favoring use and 49 percent opposing.[35]

The national policy statement would have limited US retaliation to military targets and implied the concern that gas might be used on cities. However, the complete loss of sanctuary for civilians came to pass in World War II. Even the asphyxiation of unprotected civilians, which the policy statement was aimed at preventing, was produced by means other than gas. For example, the incendiary bombs dropped on Hamburg, Germany in July and August 1943 produced such high temperatures and consumed so much oxygen that large numbers of German civilians trapped in shelters were suffocated to death.[36] If there was a protest, it was lost in the all-consuming moral crusade of total war.

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[35]Hadley Cantril, ed., Public Opinion 1935-1946, p. 249.
[36]P.J. Noel-Baker, The Arms Race, p. 340.

The possibility of the United States initiating gas warfare during World War II was raised in a War Department study after President Roosevelt's death:

> While the study concluded that gas would be helpful, it pointed out that the United States would have to consider the effect on world opinion of using gas, for President Roosevelt had publicly condemned gas warfare.[37]

The successful development of the atomic bomb and its employment on Japan eliminated any need for discussion of gas and the effect of its use on public opinion. However, the acceptance of the nuclear weapon as a means of warfare illustrates an inconsistency in the public attitude towards the weapons of war. The two atomic bombs used on Japan resulted in the death and maiming of hundreds of thousands of civilians. These effects are enormous in magnitude of horror compared to the accidental gassing of civilians in World War I and the limited number of civilian gas casualties in Ethiopia.

GAS WARFARE SINCE 1945

The United States has used military force or a show of strength in several situations over the past 20 years, but has not resorted to

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[37]Brophy and Fisher, op. cit., p. 87.

gas warfare. (Communist propaganda charges that the US employed war gases in Korea and in Vietnam will be discussed in Chapter 3.) Meanwhile, attempts to outlaw gas warfare have been carried on by the United Nations.

In 1946 at the first session of the General Assembly of the United Nations all members pledged to eliminate weapons of mass destruction from their national armaments. Since world attention was on nuclear weapons at that time, mass destruction weapons were inferred to be synonymous with nuclear weapons. However, in 1948 the Security Council approved a definition of mass destruction weapons which included lethal chemical weapons. Subsequently, on several occasions, the General Assembly directed the Disarmament Commission to prepare a plan for elimination of all mass destruction weapons.[38]

The major reason that the Commission has been unsuccessful to date is the problem of assuring that nations comply with disarmament. This problem was recognized as early as 1923 in a book about gas warfare in World War I. The author, Major Lefebure, presented a convincing argument that nations possessing a large industrial base in chemicals can obtain new gases through research, produce and stock these agents in the form of intermediate compounds, and be prepared for large-scale gas warfare without detection.[39] The logic of this reasoning is as true today as in 1923.

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[38]Kelly, op. cit., p. 30.
[39]Victor Lefebure, The Riddle of the Rhine, pp. 242-263.

Thus, international attempts to outlaw gas warfare have failed so far in this century to overcome the temptations of nations at war. The practice of these nations in choosing to initiate gas warfare has been consistent: the enemy has been unprepared and unprotected in each instance. The horror of Ypres and the terror in Ethiopia and China have produced an image of gas warfare as a treacherous and insidious means to torture a helpless enemy. This image has predominated in the public mind over the results of the routine and accepted use of gas during three years of World War I, and can be attributed to the impact of first impressions from history and to the types of information made available to the public on gas warfare. The latter aspect is covered in the next chapter.

CHAPTER 3

PUBLIC INFORMATION

The history of gas warfare and the failures of international agreements to ban gas weapons, as presented in the previous chapter, have provided the basis for generation of much secondary information on gas warfare which has had a profound effect on public attitudes.

The information for public consumption has come from a variety of sources: military men have written extensively on gas warfare, both pro and con; fiction writers have added an aura of mystery and horror to gas warfare because of its novelty and peculiar characteristics; and the propagandists have distorted information on the use of gas and its potential to their own purposes. On the other hand, there seems to be a reluctance on the part of US government officials to discuss gas warfare, apparently because of the fear that the information might be misinterpreted or misrepresented to the embarrassment of the United States, so that a secrecy surrounds the subject, almost to the extent of over-protection. As a result of confusion in the available information and official silence on the subject, the public cannot judge gas warfare intelligently. This chapter will survey some of the information on gas warfare in the public domain for its impact on public attitudes.

MILITARY EXPERTS

Since World War I military men have held conflicting views on the operational value of gas weapons, and these expert opinions have added to the confusion in the public mind.

Many in the military were opposed to gas warfare because of their experiences during World War I in which they found the munitions to be less effective than they had anticipated or the means of defense to be too much of a burden. Others were deeply impressed by the sight of French civilian gas casualties, as in the case of General March, cited in Chapter 2.

Some military men were affected indirectly by John Singer Sargent's painting, Gassed, which was completed in 1918 and exhibited in 1919. Sargent had been commissioned to paint a scene illustrating the cooperation between British and American soldiers. While he accomplished this, he also painted a picture of British soldiers, blindfolded, being led to a clearing station after exposure to mustard. The ground is littered with temporarily blinded soldiers.[1] The realism, the lighting, and the color combine to present a tragic impression of gas warfare.

This is not to say that the proponents of gas were silent during these first years after the war. Lt Colonel (later Major General) Amos A. Fries, former Chief of the Chemical Warfare Service in France, presented reasons why the United States should not give up gas.[2] His

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[1]Evan Charteris, John Sargent, p. 215.

[2]Amos A. Fries, "Gas in Attack and Gas in Defense," National Service Magazine, Jun.-Jul. 1919, pp. 2 and 7.

views were essentially the same as the rationale expressed by the United States in not ratifying the Hague declarations of 1899.

Fries lost his argument when the United States ratified the agreement of the Washington Naval Conference in 1923, but he was joined in the debate by several authors who denounced the agreement. One stated that the ideas of the Washington Naval Conference "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."[3]

Colonel (later Major General) J.F.C. Fuller, writing in 1923, predicted gas would be the major weapon of a future war, and commented on the efforts to outlaw gas warfare: "The evil name then given to gas has, in the popular imagination, clung to it ever since, for the people do not reason, because what their eyes have read their lips repeat."[4]

Some military authors tried to counter the sensational journalism that appeared after World War I by presenting facts on the true capabilities of gas.[5] The major publication in this area came out in 1928 when Colonel (later Major General) H.L. Gilchrist conducted a study comparing World War I casualties produced by gas and by other

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[3]J.B.S. Haldane, Callinicus, A Defence of Chemical Warfare, p. 28.
[4]J.F.C. Fuller, The Reformation of War, p. 121.
[5]James E. Mills, Chemical Warfare, Limitations and Future Possibilities, p. 13.

weapons. This study is quoted widely today in the argument that gas is more humane than other means of war. Gilchrist showed that in the American Expeditionary Forces, the deaths from gas (including those who later died in hospitals) were less than one half of one percent of the total battle deaths; US soldiers had 12 times the chance for living if wounded by gas than if wounded by other weapons.[6] Gilchrist included information on the residual effects of gas on the wounded. It was found that "tuberculosis is not a prominent residuum of the effects of any of the gases," and "that the most frequent pulmonary residuum is a bronchitis of varying degrees of severity."[7] In addition, the permanent disability produced by gas (loss of sight) was less than four-tenths of one percent of the permanent disabilities produced by other weapons.[8]

Recent military experts who have tried to educate the public in the possibilities of gas warfare and the humaneness of gas relative to nuclear weapons are retired British and American Army officers, such as Captain B.H. Liddell Hart and Brigadier General J.H. Rothschild. Liddell Hart devotes a chapter of his book, Deterrent or Defense, to a convincing discussion of why gas warfare is the preferred alternative to a nuclear war in Europe.[9] Rothschild

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[6] H.L. Gilchrist, A Comparative Study of World War Casualties from Gas and Other Weapons, pp. 17-18.

[7] Ibid., p. 41.

[8] Ibid., p. 49.

[9] B.H. Liddell Hart, Deterrent or Defense, pp. 82-88.

wrote a major article for Harper's Magazine in which he proposed the rejection of the no-first-use policy stated by President Roosevelt in 1943, and advocated the free and full public discussion of gas warfare.[10] General Rothschild stated later that the letters he received about this article indicated that the people who protested the use of gas "were in reality protesting against war itself."[11]

FICTION WRITERS

Such appeals to reason have not deterred some novelists who saw gas as a new and mysterious form of warfare, or others who used gas as an example for pacifist views.

Some of these writers stressed the dangers of continued development of gas munitions. One example is the book, published in 1921 and entitled The Next War, which contained an imaginative description of a future gas war and a plea for disarmament.[12] This book may have influenced the deliberations of the Washington Naval Conference. General Pershing participated in the Conference as the chairman of a subcommittee on land warfare. His group recommended that "chemical warfare should be abolished among nations as abhorrent to civilization."[13]

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[10] J.H. Rothschild, "Germs and Gas, The Weapon Nobody Dares Talk About," Harper's Magazine, Vol. 218, Jun. 1959, p. 34.

[11] J.H. Rothschild, Tomorrow's Weapons, p. 1.

[12] Will Irwin, The Next War, pp. 54-65 and 149-155.

[13] L.P. Brophy and G.J.B. Fisher, United States Army in World War II, Vol. 6, Pt. 7, Vol. 1, pp. 19-20.

All Quiet on the Western Front is an example of a pacifist book in which the horror of war is portrayed and gas is cited (along with tanks) as a weapon that adds terror to natural fears:

> These first minutes with the mask decide between life and death: is it tightly woven? I remember the awful sights in the hospital: the gas patients who in day-long suffocation cough their burnt lungs up in clots....The gas still creeps over the ground and sinks into all hollows. Like a big, soft jelly-fish it floats into our shell-hole and lolls there obscenely.[14]

H.G. Wells ignored the facts on gas casualties given earlier by Gilchrist and wrote:

> Steadily but surely it /mustard/ killed every living substance with which it came in contact....It is doubtful if any of those affected by it were ever completely cured. Its maximum effect was rapid torture and death; its minimum prolonged misery and an abbreviated life.[15]

This book, written in 1933 and the basis for a terrifying motion picture, predicted future war gases that "killed instantly, and cruel and creeping poisons that implacably rotted the brain."[16]

Later, an author used satire to counter the novelists who presented

> lurid descriptions of their approaching extermination.... The unsuspecting layman naturally swallows it whole and gets the shivers. He reads of swarms of aeroplanes drenching a sleeping city with the "Dew of Death"... a new but unspecified "super gas"...entirely imaginary, but they do want to get their manuscript accepted for the feature page of the Daily Drivel or the Weekly Wail. In order to do that, they must pile on the horrors thick.[17]

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[14]Erich Remarque, All Quiet on the Western Front, pp. 68-69.
[15]Herbert G. Wells, The Shape of Things to Come, p. 171.
[16]Ibid., p. 172.
[17]James Kendall, Breathe Freely! The Truth About Poison Gas, pp. 11-12.

PROPAGANDA

Propaganda on the German use of gas in 1915 influenced the public to believe to some degree the fiction, cited above, that was published after the war. The descriptions of witnesses to the first gas attack at Ypres were given wide distribution by England among the Western countries; the more lurid the account the better:

> Then there staggered into our midst French soldiers, blinded, coughing, chests heaving, faces an ugly purple color--lips speechless with agony, and behind them, in the gas-choked trenches, we learned that they had left hundreds of dead and dying comrades....It was the most fiendish, wicked thing I have ever seen.[18]

> There were about twenty of the worst cases in the ward, on mattresses, all more or less in sitting position, strapped up against the walls. Their faces, arms, and hands were of a shiny, gray-black color. With their mouths open and leaden-glazed eyes, all were swaying slightly backward and forward trying to get breath....the groaning and the noise of the efforts for breath was awful....The effect the gas has is to fill the lungs with a watery frothy matter, which gradually increases and rises until it fills the whole lungs and comes to the mouth--then they die. It is suffocation, slow drowning, taking in most cases one or two days. It is without doubt the most awful form of scientific torture....The Germans have given out that it is a rapid, painless death--the liars.[19]

These reports on the first gas attack fit into an overall British propaganda campaign to exploit stories of German atrocities

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[18]Reverend O.S. Watkins, Methodist Recorder (London), as quoted by A.A. Fries and C.J. West, Chemical Warfare, p. 13.

[19]Logan Marshall, Horrors and Atrocities of the Great War, p. 287.

and to gain a favorable American public opinion.[20] While most of these stories, such as the crucifixion of the Canadian soldier,[21] seem incredible today, they must be viewed in the emotional backdrop of the sinking of the Lusitania (which occurred about two weeks after the gas attack at Ypres), and the publication of the report by Lord Brice on German crimes in Belgium. (Lord Brice had been the British Ambassador to the United States before the war and his prestige put skepticism out of the question.)[22] Germany had been cut off from the American people early in the war when the British Navy cut the cable between Germany and the United States. This factor, the common language, and British skill in propaganda contributed to the success of the campaign against American neutrality.

The British propaganda theme in World War I was that Germany had abandoned the tradition of fair play and honor in war. The propaganda was effective to this end, but it also magnified an instinctive revulsion to gas. People were accustomed to soldiers bleeding to death in war, but this was the first instance of soldiers choking to death. Consequently, the public was convinced that the Germans were inhuman and that gas warfare was horrible.

The hypocricy of the propaganda soon became evident. The talk of "inhuman warfare" eased up because the prevailing wind favored the Allies and they found gas to be a useful weapon. American newspapers noted this change in attitude:

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[20]Harold Lavine and James Wechsler, War Propaganda and the United States, p. 17.

[21]Arthur Ponsonby, Falsehood in War-Time, p. 91.

[22]Lavine and Wechsler, op.cit., pp. 25-26.

> Who does not remember the fierce indignation in Great Britain at the news that the Germans had sunk to such unspeakable depths as to use poison gases? The British censors gladly passes the most horrifying details as to the suffering caused by this new method of torture. Soon the London censor forbade further reference of any kind to the use of gas, which meant, of course, that England was going to do a little poisoning on her own account. Today the use of gas by the British is hailed not only without shame, but with joyous satisfaction.[23]

Since the end of World War II the Communists have used the subject of gas warfare on a number of occasions to discredit the West and the United States in particular. The tear gas used to control rioting in the prisoner of war camps in Korea were described as "poisonous gases" by the Communist press. The artillery duels between Chinese Nationalist and Chinese Communist forces over Matsu and Quemoy in 1958 were said to include "chemical shells supplied by the United States."[24]

A vigorous, world-wide propaganda campaign was begun by the Communists on 5 March 1951 when Peking radio charged that gas had been used by UN forces in Korea on three dates: 23 and 26 February and 3 March. The next day the Moscow Literary Gazette picked up the gas warfare theme, and Pravda joined in by publishing a Chinese account of an American gas attack.[25] The theme was changed to germ warfare in May 1951 and the campaign was intensified. Gas warfare was affected adversely during this propaganda campaign because of its association in the public mind with germ warfare.

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[23]New York Evening Post, 30 Jun. 1916, as quoted by Ponsonby, op. cit., p. 151.

[24]W.W. McIntyre, "Chemical-Biological Warfare," Editorial Research Reports, Vol. 2, 12 Oct. 1959, pp. 771-772.

[25]J.C. Clews, Communist Propaganda Techniques, p. 186.

In contrast to the intensive campaign on germ warfare in Korea, the Communist propaganda on the use of herbicides to defoliate vegetation in South Vietnam has been relatively mild and primarily for Asian consumption. Hanoi radio charged that US forces were conducting gas warfare in Vietnam and that the defoliation operations in the Ca Mau Peninsula in September and October 1962 caused "hundreds of persons to lose their sight or suffer other troubles, and resulting in the death of many animals."[26] North Vietnam received sporadic help in its propaganda efforts, and in the spring of 1963 both Moscow and Peking used the theme that US forces were using Asians as victims for testing new weapons.[27]

PRESS RELEASES

For several years after World War II gas warfare was not "good copy" for newspapers and magazines. The world had eyes and ears for the atomic bomb because, like gas after World War I, it was mysterious, awesome, and horrible. People were apathetic about gas warfare since the nuclear weapon had apparently made gas obsolete.

Secrecy was a contributory factor to the silence because US forces had discovered in 1945 that the Germans had made a startling advance in gas warfare by development of the nerve gases.[28] Public information on these new war gases was slow in coming. One of the

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[26]Quoted by Stanley D. Fair, "No Place to Hide," Army, Vol. 14, Sep. 1963, p. 55.
[27]Clews, op. cit., p. 146.
[28]J.H. Rothschild, Tomorrow's Weapons, p. 32.

first reports published appeared in a Service journal in January 1950.[29] In April of that year the Chief Chemical Officer announced that the United States was developing nerve agents.[30] In July 1950 a national news magazine published information on the effects of nerve gas.[31] Evidently the war in Korea had captured the public interest since no letters to the editor appeared in subsequent issues of the magazine. The most complete information on the nerve agents published to that date was released by the Federal Civil Defense Administration in December 1950.[32] In 1953 a national family magazine presented a cover article on nerve gas. The author was the first of many in a well-meaning scare campaign to alert the American people to the potential of gas. "One plane could drop enough to kill everyone in 100 square miles," the article warned, "a weapon that could prove deadlier than an A-bomb."[33]

The Department of Defense has shunned publicity on the lethal aspects of gas warfare since hearings before a House Science Committee in 1959. An example of the reluctance to release information on the nerve gases was an Associated Press story on the operation of the

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[29]Charles E. Loucks, "The Chemical Division European Command," Armed Forces Chemical Journal, Vol. 3, Jan. 1950, p. 7.

[30]Paul W. Blackstock, "Gas Warfare," Worldview, Vol. 8, Jun. 1965, p. 9.

[31]"Nerve Gas," Life, Vol. 29, 17 Jul. 1950, p. 67.

[32]Federal Civil Defense Administration, Health Services and Special Weapons Defense, pp. 29-34 and 214-218.

[33]Cornelius Ryan, "A New Weapon of Chilling Terror, G-Gas, We Have It--So Does Russia," Collier's, Vol. 132, 27 Nov. 1953, p. 89.

Newport, Indiana, chemical plant. The reporter who was given access to the installation prepared a story on the manufacture of nerve gases. The news release was refused clearance by the Department of Defense but appeared on the front page of the Washington Post anyhow.[34] This type of public relations stimulates speculation and invites suspicion that the Department of Defense is trying to hide something. If no press release was desired, the reporter should not have been allowed in the plant. On the other hand, a release by the Department of Defense would have been factual and less dramatic.

In lieu of information on lethal war gases, publicity has centered on incapacitating agents in order to improve the image of humaneness for gas warfare. The first indication of work on incapacitating agents was contained in remarks by Congressman Robert Sikes about the Army Chemical Corps in 1949.[35] Later these agents were described as "secret weapons which destroy the enemy's will to fight."[36] The work on incapacitants was brought into the American living room in 1958 when a short film was shown on television, depicting the effect of a chemical on the instinctive behavior of a cat towards a mouse.[37] Information was also released on the "psychochemical" agents, including the newest agent, BZ, and their effect on humans.[38]

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[34]James K. Polk, "U.S. Assembly Line Turns Out Deadly Nerve Gas for Military," Washington Post, 22 Apr. 1964, p. A1.

35 "Let the Record Speak! Remarks of Hon. Robert Sikes, U.S. House of Representatives," Armed Forces Chemical Journal, Vol. 3, Oct. 1949, p. 22.

[36]"Chemical Corps to be Revamped; Has 'Will-Sapping' Secret Weapon," Army-Navy-Air Force Register, 12 Nov. 1955, p. 1.

[37]"Army Seeking Gas to Put Foe Asleep," New York Times, 4 Dec. 1958, p. 23.

[38]E.M. Gershater, "Psychochemicals," Army, Vol. 12, Aug. 1961, p. 48.

Development of the psychochemicals has been deemphasized recently because the effects on man are "not predictable and might lead a befuddled enemy to make a rash move with nuclear weapons."[39]

"The emotional outburst in this country and abroad when the word 'gas' came wafting over the news tickers from embattled Vietnam,"[40] seemed to indicate that the campaign to educate the public on the humaneness of incapacitating chemicals had failed. The uproar began on 21 March 1965 with a fragmentary report in the briefing of news correspondents in Saigon.[41] Later, second thoughts on this use of minimum force in Vietnam produced support for employment of tear gas as a normal instrument of war.[42] Support came because US public officials refused to panic at the initial reaction of world opinion, but calmly and repeatedly explained the reasons for use of tear gas.

Public acceptance and support for gas warfare can be achieved by a similar display of moral courage, but only if the explanation of national objectives is accompanied by a sound information program. Since public opinion in the United States "controls to some extent

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[39]Bruce H. Frisch, "The Peril of Non-nuclear Weapons," Science Digest, Vol. 57, March 1965, p. 9.

[40]Jack Raymond, "Gas as a Weapon," Army, Vol. 15, May 1965, p. 32.

[41]"The Truth About 'Gas Warfare' in Vietnam," U.S. News & World Report, Vol. 58, 5 Apr. 1965, p. 48.

[42]Support for routine use of tear gas in Vietnam is contained in numerous references, including:

a. Editorial, "Using Tear Gas in Vietnam," New York Times, 11 Sep. 1965, p. 26.
b. Martha Cole, "Jungle Use of Mild Gas Advocated," Washington Post, 19 Sep. 1965, p. A7.
c. Gene Famigietti, "Vietnam Gas Use Widely Accepted," Army Times, 29 Sep. 1965, p. 11.
d. Louis R. Stockstill, "Let's Get Tear Gas Back Into Action," Journal of the Armed Forces, 9 Oct. 1965, p. 11.

the attitudes and the viewpoint of the Department of Defense,"[43] the American people must be informed about gas warfare.

> If we have an informed opinion we are likely to have sound policy; conversely, if our opinion is uninformed or badly informed, we are likely to have unsound policy--even disastrous policy.[44]

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[43] Dr. Howard A. Wilcox, Deputy Director of Research and Engineering, Office of the Secretary of Defense, as quoted in "U.S. Aide Cautions on Chemical War," New York Times, 3 Dec. 1959, p. 10.

[44] Lester Markel, "What We Don't Know Will Hurt Us," New York Times Magazine, 9 Apr. 1961, p. 9.

CHAPTER 4

WHAT NEEDS TO BE DONE

The previous two chapters of this paper have discussed the factors that have influenced public opinion over the past 50 years on gas warfare. This final chapter will present proposals on measures which can and should be taken to counter public antipathy towards gas warfare and to achieve public understanding and support for war gases as a means of defense important to the national security of the United States. These measures include revised concepts for employment of war gases, a new national policy on gas warfare, and finally, a public information program that will explain the role of gas warfare and the necessity for preparedness.

CONCEPTS

The heritage of the history of gas warfare is condemnation on moral grounds: war gases are "inhumane" because their use in wars has been against helpless people. A recent analysis of the moral questions posed by gas warfare measured the use of war gases against the principles of the "just war" doctrine. These principles include "the immunity of noncombatants, the proportionality of response, and the control of means to redress grievances suffered."[1] While the

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[1]Richard J. Krickus, "On the Morality of Chemical/Biological War," Journal of Conflict Resolution, Vol. 9, Jun. 1965, p. 200.

analyst came to no conclusions on the morality of gas warfare, the following discussion will show that different employment concepts and a revised national policy on gas warfare can satisfy the "just war" principles.

Techniques for employment of war gases have not changed appreciably since World War I: volatile war gases are to be used for surprise effect (i.e., to establish a concentration in the target area before the enemy can mask); and to obtain casualties through poor discipline or defensive equipment by covering large areas and by massive dosages.[2] While these techniques remain valid, they should be limited to the attack of military targets that are far removed from civilian population centers. Examples of such targets are the Japanese island strongholds of World War II, Tarawa and Iwo Jima, and guerrilla areas in Vietnam where the insurgents are isolated and relatively invulnerable to bombing with high explosives. The reasons that current techniques for employment of gas will have infrequent application in modern warfare are:

(1) Unless the target is under close observation or there is excellent intelligence, the protective posture (availability of masks and special clothing) of the enemy will be unknown. The expected results for planning subsequent operations will be in doubt.

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[2]US Dept of the Army, Field Manual 3-10, p. 12.

(2) A sophisticated enemy has modern defensive equipment and can be protected in seconds, if not already protected at the time of the attack. Attempts to "beat" enemy personnel to their masks require large expenditure of war gases and corresponding concentration of delivery means. The risk involved in the exposure of delivery systems to enemy countermeasures is not worth the questionable results.

(3) The variability of surface winds preclude assurance as to where the gas cloud will travel. The military value of downwind drift of the cloud can be negated by automatic gas alarms and good communications. It is highly probable that many civilian casualties will be produced unintentionally because they are unlikely to have masks, ventilated shelters, alarms, and antidotes.

Since military targets in most areas of the world will be near civilian population centers, the primary application of volatile war gases must be as an integrated means of firepower. Volatile war gases should be integrated with high explosive ordnance to the extent that they are used simultaneously. The burst of the high explosive ordnance and gas shells or bombs will be completed instantaneously, destroying or damaging gas protective equipment. Subsequently the gas will spread over the area, achieving an effectiveness greater than if either HE or gas was used alone. The number of gas shells or bombs in the mixed ordnance should be kept small enough so that

lethal effects of the cloud will not extend beyond the target area. Gas used prior to high explosives will be dispersed by the HE detonations and thereby made ineffective. Gas can be used immediately after high explosives, but there must be no delay in the gas attack to permit the enemy to react (use defensive equipment) and lessen his difficult defense problem of simultaneously protecting himself against two widely different threats.

The simultaneous sequence of fires should be carried one step further for large-caliber direct-fire weapons used to attack fortifications and armored vehicles (e.g., recoiless rifles). For gas warfare these weapons should have a gas capsule as an integral part of the munition warhead. This composite munition would utilize its piercing capability to make a hole for the gas to follow through and enter the enclosure. The combined effects of such a munition would greatly increase the "probability of kill" and provide gas an anti-armor role.

Current concepts for the use of non-volatile war gases indicate that they are to be used to contaminate terrain, equipment, and materiel, and to produce casualties or the threat of casualties by their presence.[3] The use of non-volatile war gases to contaminate terrain (except in isolated areas or against an unsophisticated enemy) should be reconsidered. Modern armed forces are highly mobile: helicopters can airlift soldiers over gas obstacles, and trucks and

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[3] Ibid.

armored vehicles can pass through chemical contamination, decontaminating when convenient. Even the soldier on foot has special clothing for protection, making contaminated terrain only a nuisance. On the other hand, the lack of protection available to civilians makes the use of non-volatile war gases to contaminate terrain a horrible threat to life. Therefore, the contamination must be limited to the enemy soldier and his equipment. As with the volatile war gases, the non-volatile gases should be integrated with other weapons and employed simultaneously, so that the choice between the war gases is determined by whether or not a residual effect is desired.

A suitable role for non-volatile war gases is their use in mine fields, where the purpose is not to contaminate terrain but to present a hazard to clearance and to contaminate the other (HE) mines. Another use for non-volatile war gases is as an alternate filling for the capsule in the composite direct-fire munition described above. If the enemy wears a mask inside armored vehicles, the non-volatile war gas can circumvent the mask, producing a casualty through the skin, or, at least, contaminate the interior of the vehicle. Perhaps the major use for non-volatile war gases should be in counter-battery fires in conjunction with HE munitions. Gas will increase the area coverage of the mixed munitions by the spread of the cloud and thereby improve the probability that the counter-

battery fires have been effective. In addition, the non-volatile war gas can contaminate and thus temporarily neutralize artillery and associated equipment, even if it is undamaged by high explosives.

The concept of using volatile and non-volatile war gases for harassing and interdictory fires should be abandoned. The technique involves

> the occasional firing of a small number of rounds in conjunction with high explosive concentrations /to/ cause the enemy to mask and take other protective measures that will impair his efficiency and weaken his morale.[4]

Degradation of combat effectiveness through prolonged wear of gas protective equipment is an important objective in gas warfare, but there must be more of a threat than mere harassment as the alternative to wearing protection. In addition, the concept indicates the use of half-way measures contrary to the principle of taking full advantage of combat power. Moreover, at times harassing and interdictory fires are used on suspected enemy areas as opposed to acquired targets, and civilian casualties may be produced unnecessarily.

The revised concepts for use of volatile and non-volatile war gases may appear to some as a compromise to the "just war" principle of the immunity of noncombatants that reduces the effectiveness of

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[4] Ibid., p. 11.

gas warfare. On the contrary, this paper acknowledges that our potential enemies have modern protective equipment and that our methods of employing war gases must be modified to defeat gas defenses with the effects of other weapons. The consequence that these concepts also attempt to preserve the immunity of noncombatants is a worthwhile bonus.

In addition to the general categories of volatile and non-volatile war gases, the United States has the intermediate-term incapacitating agent, such as BZ. Concepts have been advanced for the direct attack of cities; the proponents see nothing wrong with this use of incapacitating war gas since the people would suffer no permanent aftereffects. It is of interest to consider another perspective:

> The horror we feel in face of such possibilities is not lessened by the fact that the destruction of lives is not aimed at. The distinction between actual killing or not killing, or the relative "humaneness" of such applications of power, is not the issue; but rather obliteration of the distinction between counter-<u>forces</u> and counter-<u>people</u> warfare.[5]

The deliberate attack of noncombatants with any weapon of war violates their immunity. The use of mustard on Ethiopian civilians does not differ in principle from direct attack of cities with a war gas of lesser effect. While there may be isolated instances which justify the attack of a city with incapacitating war gases, the

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[5]Paul Ramsey, <u>War and the Christian Conscience; How Shall Modern War be Conducted Justly?</u>, pp. 228-229.

greatest use for intermediate-term incapacitants will be the same as for riot control agents, with choice depending on the duration of effects required. These applications include: attack of enemy prisoner of war camps, retrieval of hostages, capture of military or political prisoners, counter-guerrilla situations, and assistance in street fighting.

POLICY

The concept of restricting the use of gas to attack of military targets, as presented above, satisfies the "just war" principle of the immunity of noncombatants. These restrictions also agree with the implication in the national policy statement announced by President Roosevelt in 1943 in that retaliation was to be limited to military targets (see Chapter 2). Therefore, it is appropriate to reexamine our national policy on gas warfare to determine if the remaining principles of the "just war" doctrine can be satisfied.

In the 22 years since President Roosevelt's announcement, policy on gas warfare has been mentioned infrequently. In 1959 Major General W.M. Creasy, former Chief Chemical Officer, said that we should have a clearly-stated policy on gas weapons "that put them in exactly the same category" as other weapons; "use these things as we see fit, when we think it is in the best interests of the United States and their allies."[6] This would have been a radical change from the

[6]As quoted in "U.S. Must State Policy on Chemical Warfare," Army-Navy-Air Force Register, 29 Aug. 1959, p. 12.

no-first-use policy and if adopted might have cost the United States the loss of moral leadership of the world. The uproar over the use of tear gas in Vietnam indicates clearly that world opinion at present would oppose the use of war gases as a normal weapon of war.

Later in 1959 Congressman Robert Kastenmeier introduced a resolution in the House to reaffirm the no-first-use policy of 1943. At a press conference in January 1960 President Eisenhower was asked to comment on the resolution, and he answered: "So far as my instinct is concerned, /it/ is to not start such a thing as that /gas warfare/ first."[7] Thus, it appeared that President Eisenhower supported the policy of President Roosevelt. Three months later, however, both the Defense and State Departments opposed the resolution to reaffirm Roosevelt's policy, in letters to the Chairman of the House Foreign Affairs Committee. The State Department letter of 11 April 1960 said in part:

> We must recognize our responsibilities toward our own and the free world's security. These responsibilities involve, among other things, the maintenance of an adequate defensive posture across the entire weapons spectrum, which will allow us to defend against acts of aggression in such a manner as the President may direct. Accordingly, the Department believes that the resolution should not be adopted.[8]

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[7]Quoted in "Transcript of the President's News Conference on Foreign and Domestic Matters," New York Times, 14 Jan. 1960, p. 14.

[8]Quoted in US Congress, Senate, Committee on Foreign Relations, Chemical-Biological-Radiological (CBR) Warfare and its Disarmament Aspects, p. 22.

The resolution was not brought to a vote, but it is not clear if this meant that there was no need to repeat our intentions (the no-first-use policy) or that our policy had changed to one that permitted the President to direct the use of gas when he saw fit. The subject was not publicized again until March 1965 when Secretary of State Dean Rusk explained the use of riot control agents in Vietnam:

> We are not engaged in gas warfare. It is against our policy to do so, as it is against the policies of most other governments that I know about.[9]

This statement does not clarify the national policy on gas warfare, and could be interpreted in at least three ways:

(1) The US is abiding by the Geneva Protocol of 1925 which binds the actions of more than 40 nations (a policy of retaliation).

(2) The US is abiding by the no-first-use policy announced by President Roosevelt in 1943.

(3) The US is abiding by its 1946 pledge to the United Nations to eliminate mass destruction weapons (defined in the UN to include lethal chemical weapons).

Concerning the first two possibilities, it is most difficult to detect any difference between the no-first-use policy and one of retaliation, unless, like the Italian Government rationale in 1936 (see Chapter 2), the United States sees nothing in the Geneva Protocol that requires that gas be employed as retaliation in kind. In other

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[9] Quoted in "Secretary Rusk Discusses Use of Tear Gas in Vietnam," Department of State Bulletin, Vol. 52, 12 Apr. 1965, p. 529.

words, gas could be used in retaliation as a defensive response to other serious provocations. For example, alternatives to defeat in a vital area such as Europe could be withdrawal or nuclear war. On the other hand, gas might provide the necessary difference in combat power to stabilize a grave situation and permit the time essential for communication and negotiation at the highest levels of the governments concerned.

As to the third possibility, the 1946 pledge to the United Nations was to eliminate atomic weapons and all other major weapons adaptable to mass destruction from national armaments.[10] While this agreement concerns disarmament, Secretary Rusk's statement can be construed to be consistent with the pledge: "We are not engaged in gas warfare;" or, to put it another way: "We are not using weapons of mass destruction (i.e., lethal chemical weapons).

Regardless of these or other interpretations of statements made by public officials over the past 22 years, it is obvious that the US policy on gas warfare is not clear. Public understanding and support of the use of war gases, if such use becomes necessary, cannot be expected until the ambiguity is removed.

A proposal for the US national policy on gas warfare is presented below. It takes into account that the Geneva Protocol is accepted by many nations of the world, that the commitment to the UN to disarm

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[10]Joseph B. Kelly, "Gas Warfare in International Law," Military Law Review, Jul. 1960, p. 30.

is not binding until international agreements are enforceable, and that it is necessary for the United States to be prepared for gas warfare to meet the requirements of "our own and the free world's security" (the theme of the State Department letter of 11 April 1960, cited above).

PROPOSED POLICY OF THE UNITED STATES
ON GAS WARFARE

> The United States endorses the condemnation of gas warfare as set forth in the Geneva Protocol of 1925 as representing an arms control measure of general acceptance. To this end the United States, as a member of the United Nations, pledged in 1946 to eliminate lethal war gases as well as nuclear weapons from its national armaments. However, until international disarmament efforts produce realistic guarantees of limitations on the practice of nations, the United States must be prepared to defend itself and its allies against acts of aggression. Therefore, the United States reserves to itself the option to initiate gas warfare, upon the decision only of the President, when such use is appropriate.

This proposal recognizes the class distinction of gas warfare by requiring Presidential authority for use and satisfies the "just war" principle of "control of means." It also meets the "just war" requirement of "proportionality of response" since it permits the President the selection of gas when it is suitable for the situation. The announcement of such a policy would be a unilateral action supporting the security of the United States from international threats. Such a revised and explicit policy would represent renunciation, in part, of the principle of mass destruction of property and human life; reduce resentment of US power since it

proposes an alternative to the unlimited use of power (nuclear weapons); and would support the strategy of controlled response.

PUBLIC INFORMATION PROGRAM

A new national policy on gas warfare such as the one presented above can provide the necessary guidance for the people as to the importance of gas weapons and their role. The formulation of policy must precede or accompany any attempt to educate the public on gas warfare since "public knowledge of facts is not understanding until it can be set in the framework of policy and goals."[11]

Public resistance to a new policy may occur because of false impressions about gas warfare. Since the American people have considerable influence on adoption of policy, they must be provided objective information on gas warfare. As "Elihu Root...wrote... when policy on foreign affairs is largely dominated by the people, the danger lies in mistaken beliefs and emotions."[12]

The issue of gas warfare is emotional and political. In this respect it is similar to many issues facing our government today; communism and race relations are examples. Government officials have led the way with free and open discussions on these controversial subjects and should do the same with gas warfare. This leadership is essential, as Major General W.M. Creasy warned a House Science Committee in 1959:

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[11]"Public Understanding--The Ultimate Weapon?" The General Electric Defense Quarterly, Vol. 3, Oct.-Dec. 1960, p. 33.

[12]William Albig, Modern Public Opinion, p. 12.

> I do not believe the American people are going to read any information on a subject when the American government says this is too horrible to use and we are not going to use it.[13]

The first step in a public information program is to go after the roots of public hostility towards gas warfare: World War I propaganda. The effects of the Allied propaganda did not evaporate with the gas clouds of World War I "for that half-century-old vision of the blue-faced men at Ypres choking to death, has left an indelible impression upon the mind of the world."[14] As late as 1953 the horrors of the first gas attack were brought out in the memoirs of a war correspondent who served with the Red Cross at Ypres:

> This horror was too monstrous to believe at first... the savagery of it, of the sight of men choking to death with yellow froth, lying on the floor and out in the fields, made me rage with an anger which no later cruelty of man...ever quite rekindled; for then we still thought all men were human.[15]

The tragedy of the first gas attack should be admitted in any program of public information: the soldiers were helpless; those who did not panic and run suffered a slow and painful death. On the other hand, it should be pointed out that protection against chlorine was simple and was achieved before the second gas attack took place two days later. Ypres was an isolated incident. The first use of gas in a future war might produce the same sort of initial surprise, but it

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[13]Quoted in US Congress, House, Committee on Science and Astronautics, Chemical, Biological and Radiological Warfare Agents, p. 22.

[14]Hanson W. Baldwin, "After Fifty Years the Cry of Ypres Still Echoes--'GAS!'," New York Times Magazine, 18 Apr. 1965, p. 50.

[15]Geoffrey W. Young, The Grace of Forgetting, p. 233.

will be short-lived. Except for Ypres, World War I was characterized by the alternation between the introduction of new war gases and the development of the necessary defense. It is for this reason that gas was judged not to be a decisive weapon in World War I.[16] It is for this reason also that public clamor died away during the war: defense caught up to offense.

People have an innate fear of suffocation which they associate with the image of Ypres and with executions and suicides by gas. A way of counteracting this association is certainly not to claim humaneness for gas on the basis that this is the way some criminals are executed, as some proponents of gas warfare have done. This argument convinces people that gas warfare is horrible since it implies that soldiers fighting for their country might suffer a criminal's death. Instead, the ghost of Ypres should be countered with the facts of the present. The modern nerve gases are lethal when absorbed in sufficient quantity but, unlike chlorine, involve no suffering.[17] "The person who does not die will recover completely, after a few days at most, with no apparent aftereffects."[18]

The current US defensive capability must be stressed. We have a protective mask that is effective against all known war gases, special clothing for body protection, alarms and detectors, filtering systems,

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[16] J.E. Edmonds and R. Maxwell-Hyslop, Official History of the War; Military Operations; France and Belgium, 1918, Vol. 5, p. 606.

[17] J.H. Rothschild, Tomorrow's Weapons, p. 3.

[18] Ibid., p. 34.

and medical adjuncts. Our soldiers are trained and have confidence in their protective equipment; we must not fear the use of gas on our servicemen.

The best counter to propaganda is to tell the truth. In getting the facts to the public it is important to differentiate between information which can and cannot be made available to the public. They should know in general what is going on, but the details must remain classified to protect national security. It is important also to differentiate between information which should and should not be made available to the public. Articles on gas warfare should pass the test of one criterion before release by the Department of Defense: does it contribute to public understanding of gas warfare, or does it add to the misconceptions of mystery and indecency?

The free and open discussion on nuclear warfare has resulted in the willingness of the responsible American to accept the nuclear weapon as an unpleasant fact, essential to his country's safety. The current secrecy surrounding gas warfare can create a lack of confidence in the capabilities of gas. Captain Liddell Hart told of British tanks developed during World War II that were fitted with special searchlights for blinding the enemy as well as for night firing. This invention was "kept so secret that the commanders in the field regarded them distrustfully and thus repeatedly hesitated to employ such unfamiliar instruments."[19]

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[19]B.H. Liddell Hart, Deterrent of Defense, pp. 86-87.

With public understanding of what is (and, perhaps more important, what is not) involved in gas warfare by explanation of revised use concepts, announcement of a new national policy, and publication of factual information on gas weapons, an attempt must be made to gain public support for preparedness. The terrible results of unpreparedness in World War I gave the Germans an important tactical advantage. It took five months for the Allies to retaliate with chlorine after the Germans first used it on 22 April 1915.[20] The Allies knew the composition of mustard within 48 hours after the Germans first employed it, "but it was almost 11 months before the first Allied mustard attack took place."[21]

Between the wars many officials tried to gain public support for preparedness. For example, in 1923 Field Marshal Ferdinand Foch wrote: "Chemical warfare must therefore enter into our future provisions and preparations, if we do not wish to experience some terrible surprises."[22] This warning was echoed in 1925 by Winston Churchill:

> As for poison gas and chemical warfare in all its forms, only the first chapter has been written of a terrible book. Certainly every one of these new avenues to destruction is being studied on both sides of the Rhine with all the science and patience of which may is capable.[23]

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[20]Curt Wachtel, Chemical Warfare, p. 64.

[21]Amos A. Fries, "Gas in Attack and Gas in Defense," National Service Magazine, Jun.-Jul. 1919, p. 22.

[22]Ferdinand Foch, in the Preface to The Riddle of the Rhine by Victor Lefebure, p. 8.

[23]Winston S. Churchill, The Second World War, Vol. 1, p. 42.

The truth of Churchill's words became apparent in 1945 when it was discovered that the Germans had developed the nerve gases. As to the preparedness of the United States:

> It is a publicly known fact that the Germans did have the nerve gases, /and that/they had issued orders to use them in Normandy, on D-Day. At that time we had only a vague inkling that such things existed. We did not have any protection against them, our masks would have been completely useless; and had they /the nerve gases/been used, it is my personal judgment we would not have gotten ashore. They were not used because by some mischance or meddling with Hitler's intelligence people he was informed we were in a position of retaliating overwhelmingly. Of course we were not.[24]

Hearings before a House Science Committee in 1959 marked the beginning of an effort by Defense officials to gain public support for preparedness. The press releases stressed Russian advances in gas warfare because they are the most technologically advanced Communist state and "because they seem to have a more realistic view of warfare than does the American public."[25] As a result, in October 1959 The American Legion adopted a resolution which supported US preparedness:

> The Soviet Union is known to have achieved an impressive military capability in CBR warfare... Now, therefore be it resolved that The American Legion lend its full support to building a United States capability in CBR weapons sufficient to deter or defeat Soviet CBR aggression; and be it further resolved that The American Legion make every effort to obtain increased public understanding and support of the necessity of CBR preparedness by the United States.[26]

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[24]Major General W.M. Creasy, as quoted in US Congress, House, Committee on Science and Astronautics, op. cit., p. 12.

[25]Dr. Howard A. Wilcox, Deputy Director of Research and Engineering, Office of the Secretary of Defense, as quoted in "U.S. Aide Cautions on Chemical War," New York Times, 3 Dec. 1959, p. 10.

[26]Quoted by Major General Marshall Stubbs in "The New Chemical-Biological-Radiological Perspective," Nonmilitary Defense, Chemical and Biological Defense in Perspecitve, Jul. 1960, p. 36.

One estimate of the Russian capability for gas warfare was stated a few years ago as:

> 106 chemical plants in operation, of which one half were either producing or capable of producing the latest war gases. His stocks greatly exceeded the combined stocks of the free nations...comprising fully 15% of the total of the Russian munitions.[27]

Another note on Soviet capability that is more disturbing than quantities of munitions is contained in a book written by a senior officer in Russian military intelligence:

> Near Moscow there is a special proving ground for chemical defense. I know a new gas has been invented which is colorless, tasteless, and without odor. The gas is avowed to be very effective and highly toxic. The secret of the gas is not known to me. It has been named "American"; why this name was chosen, I can only guess.[28]

Such a capability is alarming, especially if the new Russian gas represents a major advance in gas warfare as did the nerve agents in World War II, but what about intentions? Do the Russians intend to use their tremendous capability? Again, the most revealing document to be made public on this question is the book by the Russian officer, who was executed for allegedly spying for the United States:

> Soviet artillery units all are regularly equipped with chemical-warfare shells. They are at the gun sites, and our artillery is routinely trained in their use. And let there be no doubt: if hostilities should erupt, the Soviet Army would use chemical weapons against its opponents. The political decision has been made,

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[27]Cecil H. Coggins, "Is Russia Outstripping Us in Weapons of Mass Destruction?" Vital Speeches of the Day, Vol. 29, 15 Feb. 1963, p. 265.

[28]Oleg Penkovskiy, The Penkovskiy Papers, p. 249.

> and our strategic military planners have developed a doctrine which permits the commander in the field to decide whether to use chemical weapons, and when and where...There is no mention made of waiting until the enemy uses chemical weapons.[29]

The major implication of the Russian capability and intention to initiate gas warfare is on NATO and its capability to respond. The NATO nations adhere to the Geneva Protocol and they will look to the United States for the means with which to retaliate. The United States must be prepared to meet its mutual security commitments with a modern capability in gas warfare, sufficient for itself and for supply to its NATO allies.

The United States has the greatest chemical industrial base in the world, and by the intelligent and vigorous application of technology, the chemical industry could develop sophisticated war gases to deter or, if necessary, defeat the Russians in gas warfare. To achieve this level of preparedness, industrial leaders must be convinced that development of war gases is not immoral but essential to national security. Support of industrial leaders is a separate and additional goal of the public information program. The efforts of industry must change from passive cooperation through the "Industrial Liaison Program"[30] to active participation in research and development of exotic war gases.

There are other aspects of preparedness such as the general requirement to increase our tactical superiority over any enemy,

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[29] Ibid., pp. 249-250.

[30] Marshall Stubbs, Remarks to the Commonwealth Club of California, p. 13.

however, the words of General John J. Pershing's final report to the Secretary of War in 1919 suffice:

> Whether or not gas will be employed in future wars is a matter of conjecture, but the effect is so deadly to the unprepared that we can never afford to neglect the question.[31]

Stanley D. Fair

STANLEY D. FAIR
Lt Col, CmlC

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[31] Quoted by David M. Saunders, "The Biological/Chemical Warfare Challenge," U.S. Naval Institute Proceedings, Vol. 91, Sep. 1965, p. 51.

BIBLIOGRAPHY

1. Albig, William. Modern Public Opinion. New York: McGraw-Hill, 1956. (HM261 A451)

2. "Army Seeking Gas to Put Foe Asleep." New York Times, 4 Dec. 1958, p. 23.

3. Bailey, Thomas A. The Man in the Street. New York: Macmillan, 1948. (E183.7 B33)

4. Baldwin, Hanson W. "After Fifty Years the Cry of Ypres Still Echoes--'GAS!'." New York Times Magazine, 18 Apr. 1965, pp. 29, 40-50.

5. Baldwin, Hanson W. World War I, An Outline History. New York: Harper & Row, 1962. (D521 B3)

6. Blackstock, Paul W. "Gas Warfare." Worldview, Vol. 8, Jun. 1965, pp. 8-12.

7. Brophy, Leo B. and Fisher, George J.B. The Chemical Warfare Service: Organizing for War. United States Army in World War II: The Technical Services. Washington: US Dept of the Army, Historical Division, 1959. (D769 A533 v.6, pt. 7, v.1)

   (A useful reference on the activities of the Chemical Warfare Service prior to and during World War II.)

8. Cantril, Hadley, ed. Public Opinion 1935-1946. Princeton: Princeton University Press, 1951. (HM261 P8)

9. Charteris, Evan. John Sargent. New York: Scribner, 1927.

10. "Chemical Corps to be Revamped; Has 'Will-Sapping' Weapon." Army-Navy-Air Force Register, 12 Nov. 1955, pp. 1 and 23.

11. Churchill, Winston S. The Gathering Storm. Vol. 1 of History of the Second World War. Boston: Houghton Mifflin, 1948. (D743 C45)

12. Clark, Dorothy K. Effectiveness of Chemical Weapons in WWI. Bethesda: Johns Hopkins University, 1959. (ORO SP-88)

    (An excellent reference on the employment of gas during World War I.)

13. Clews, John C. Communist Propaganda Techniques. New York: Praeger, 1964. (DK270 C55)

(The author presents a detailed case history of the propaganda campaign on biological warfare conducted by the Communists during the Korean War.)

14. Coggins, Cecil H. "Is Russia Outstripping Us in Weapons of Mass Destruction?" Vital Speeches of the Day, Vol. 29, 15 Feb. 1963, pp. 263-266.

(This article contains recent information on the Russian capability for gas warfare.)

15. Cole, Martha. "Jungle Use of Mild Gas Advocated." Washington Post, 19 Sep. 1965, p. A7.

16. Crozier, Emmet. American Reporters on the Western Front 1914-1915. New York: Oxford University Press, 1959.

(This book explains why there were no immediate press accounts of the first gas attack at the Second Battle of Ypres on 22 April 1915.)

17. Edmonds, J.E. and Maxwell-Hyslop, R. Official History of the War; Military Operations; France and Belgium, 1918. London: His Majesty's Stationery Office, 1947. (D530 E45 v.5)

(Contains the official British evaluation of the role of gas warfare in World War I.)

18. Edmonds, J.E. and Wynne, G.C. Official History of the War; Military Operations; France and Belgium, 1915. London: Macmillan, 1927. (D530 E42 v.1)

(Excellent historical account of the military situation prior to, during, and after the first gas attack.)

19. "Excerpts from Transcript of Rusk News Parley on Use of Gas in Vietnam." New York Times, 25 Mar. 1965, p. 13.

20. Fair, Stanley D. "No Place to Hide." Army, Vol. 14, Sep. 1963, pp. 54-55.

21. Famigietti, Gene. "Vietnam Gas Use Widely Accepted." Army Times, 29 Sep. 1965, p. 11.

22. Federal Civil Defense Advministration. Health Services and Special Weapons Defense. Publication AG-11-1. Washington: US GPO, 1950.

(Earliest release of official information to the general public on nerve gases.)

23. Finney, John W. "Cairo Believed to be Using Gas." New York Times, 23 Mar. 1965, p. 3.

24. Foreign Policy Institute, University of Pennsylvania. The Psycho-political Implications of Biological and Chemical Warfare. Philadelphia: Institute for Cooperative Research, 5 Apr. 1961. (PU SUMMIT BCW PPI)

(A comprehensive study of public attitudes on biological and gas warfare.)

25. Fries, Amos A. "Gas in Attack and Gas in Defense." National Service Magazine, Jun-Jul. 1919 (reprint), 19 pages.

26. Fries, A.A. and West, C.J. Chemical Warfare. New York: McGraw-Hill, 1921.

27. Frisch, Bruce H. "The Peril of Non-nuclear Weapons." Science Digest, Vol. 57, Mar. 1965, pp. 8-13.

28. Fuller, J.F.C. The First of the League Wars. London: Eyre and Spottiswoode, 1936. (DT387.8 F8)

(An account of the Italo-Ethiopian War of 1935-36 and the decisive role of gas in that war.)

29. Fuller, J.F.C. The Reformation of War. New York: Dutton, 1923.

(A prediction that future wars will include gas, tanks, and planes as the major weapons.)

30. "Gas." Editorial. Washington Post, 26 Mar. 1965, p. A24.

31. Gershater, E.M. "Psychochemicals." Army, Vol. 12, Aug. 1961, pp. 47-49.

(Interesting details of human experiments with incapacitating chemical agents.

32. Gilchrist, H.L. A Comparative Study of World War Casualties from Gas and Other Weapons. Washington: US GPO, 1928. (UG447 U33)

(A detailed, carefully-documented tabulation of World War I casualties produced by war gases and a comparison with casualties produced by other weapons. Prepared by the medical officer who served with the Chemical Warfare Service of the A.E.F., and who later became Chief of the Chemical Warfare Service in the War Department. A source of valuable information that is widely quoted today.)

33. Haldane, J.B.S. Callinicus, A Defense of Chemical Warfare. London: Kegan Paul, Trench, Trubner, 1925. (UG447 H3)

34. Hollyhock, W.M. "Weapons Against the Mind." Survival, Vol. 7, Jul. 1965, pp. 166-169.

35. Irwin, Will. The Next War. New York: Dutton, 1921. (D523 I87)

(An imaginative presentation of a future gas war which may have had considerable influence on the US delegates to the Washington Naval Conference of 1921-22.)

36. Kelly, Joseph B. "Gas Warfare in International Law." DA Pamphlet 27-100-9, Military Law Review, Jul. 1960.

(An excellent analysis of the attempts to outlaw gas warfare by international agreements and the abrogation of these agreements by nations at war.)

37. Kendall, James. Breathe Freely! The Truth About Poison Gas. New York: Appleton-Century, 1938.

(Written as a rebuttal to the sensational journalism on gas warfare that appeared after World War I.)

38. Krickus, Richard J. "On the Morality of Chemical/Biological War." Journal of Conflict Resolution, Vol. 9, Jun. 1965, pp. 200-210.

(An analysis of the moral questions posed by gas warfare as measured against the principles of the "just war" doctrine.)

39. Lavine, Harold and Wechsler, James. War Propaganda and the United States. New Haven: Yale University Press, 1940. (D753 L3)

40. Lefebure, Victor. The Riddle of the Rhine. New York: The Chemical Foundation, 1923. (UG447 L4)

(Perhaps the best book ever written on gas warfare as it was conducted during World War I and from the standpoint of political, economic, and disarmament aspects.)

41. "Let the Record Speak! Remarks of Hon. Robert Sikes U.S. House of Representatives." Armed Forces Chemical Journal, Vol. 3, Oct. 1949, pp. 22-23.

42. Lidell Hart, B.H. Deterrent or Defense. New York: Praeger, 1960. (UA11 L5)

43. Loucks, Charles E. "The Chemical Division European Command." Armed Forces Chemical Journal, Vol. 3, Jan. 1950, pp. 6-8.

44. March, Peyton C. The Nation at War. New York: Doubleday, 1932. (D570 M35)

45. Markel, Lester. "What We Don't Know Will Hurt Us." New York Times Magazine, 9 Apr. 1961, pp. 9 and 115-118.

46. Marshall, Logan. Horrors and Atrocities of the Great War, Philadelphia: G.F. Lasher, 1915.

(Contains firsthand accounts of witnesses to the first gas attack. Its publication in 1915 contributed to the indignation of the American public towards gas warfare.)

47. McIntyre, William R. "Chemical-Biological Warfare." Editorial Research Reports, Vol. 2, 12 Oct. 1959, pp. 757-774. (H35 E3 1959 Vol. 2, Nr. 14)

48. Mills, James E. Chemical Warfare: Limitations and Future Possibilities. Edgewood Arsenal, Md.: Chemical Warfare School, 1929.

49. "Nerve Gas." Life, Vol. 29, 17 Jul. 1950, pp. 67-68.

50. Noel-Baker, Philip J. The Arms Race. New York: Oceana Publications, 1958. (JX1974 N6)

51. Penkovskiy, Oleg. The Penkovskiy Papers. New York: Doubleday, 1965. (DK266.3 P4)

(Contains important statements on Russian intention to initiate gas warfare in case of hostilities. The author, executed by the Russians for spying for the U.S., claims that the political decision to use gas has been made by the Soviet Union.)

52. Peterson, H.C. Propaganda for War, The Campaign Against American Neutrality, 1914-1917. Norman, Okla.: University of Oklahoma Press, 1939. (D619 P47)

53. Pleasants, Julian. "Gas Warfare, Is It Justifiable as Minimum Force?" Commonweal, Vol. 82, 7 May 1965, pp. 209-212.

54. Polk, James R. "U.S. Assembly Line Turns Out Deadly Nerve Gas for Military." Washington Post, 22 Apr. 1964, p. A1.

55. Ponsonby, Arthur. Falsehood in War-Time. New York: Dutton, 1928. (D639 P6P6)

(The author, Lord Ponsonby, attempted to find the truth, if any, in the atrocity stories of World War I, and found most to be propaganda.)

56. "Public Understanding--The Ultimate Weapon?" The General Electric Defense Quarterly, Vol. 3, Oct.-Dec. 1960, pp. 26-35.

57. Ramsey, Paul. War and the Christian Conscience; How Shall Modern War be Conducted Justly? Durham, N.C.: Duke University Press, 1961. (BR115 W2R3)

58. Raymond, Jack. "Gas as a Weapon." Army, Vol. 15, May 1965, pp. 32-33.

59. Remarque, Erich M. All Quiet on the Western Front. Boston: Little, Brown, 1929. (PZ3 R28A)

60. Rothschild, J.H. "Germs and Gas, The Weapons Nobody Dares Talk About." Harper's Magazine, Vol. 218, Jun. 1959, pp. 29-34.

(An excellent article on gas warfare that proposes renunciation of the no-first-use policy on gas weapons and a free and frank discussion on their use.)

61. Rothschild, J.H. Tomorrow's Weapons. New York: McGraw-Hill, 1964. (UG447 R6)

(Covers all aspects of gas and germ warfare, including information on agents, use in modern warfare, and disarmament possibilities.)

62. Ryan, Cornelius. "A New Weapon of Chilling Terror, G-Gas, We Have It--So Does Russia." Collier's, Vol. 132, 27 Nov. 1953, pp. 88-95.

63. Saunders, David M. "The Biological/Chemical Warfare Challenge." U.S. Naval Institute Proceedings, Vol. 91, Sep. 1965, pp. 44-51.

64. "Secretary Rusk Discusses Use of Tear Gas in Viet-Nam." Department of State Bulletin, Vol. 52, 12 Apr. 1965, pp. 528-532.

(Contains an inference to the national policy of the United States on gas warfare.)

65. Stockstill, Louis R. "Let's Get Tear Gas Back Into Action." Journal of the Armed Forces, 9 Oct. 1965, p. 11.

66. Stubbs, Marshall. Remarks to the Commonwealth Club of California. San Francisco: 21 Jul. 1961. (UG 447 S7816)

67. Stubbs, Marshall. "The New Chemical-Biological-Radiological Perspective." Nonmilitary Defense, Chemical and Biological Defenses in Perspective. No. 26 of Advances in Chemistry Series. Washington: American Chemical Society, 1960. (UA927 S9 1960)

68. Suskind, Richard. Do You Want to Live Forever! New York: Bantam Books, 1964. (D545 B4S8)

69., "Tears or Death?" Time, Vol. 86, 17 Sep. 1965, p. 51.

70. "The Truth About 'Gas Warfare' in Vietnam." U.S. News & World Report, Vol. 58, 5 Apr. 1965, pp. 48-49.

71. "The U.S. & World Opinion." Time Essay. Time, Vol. 85, 28 May 1965, pp. 30-31.

72. "Transcript of the President's News Conference on Foreign and Domestic Matters." New York Times, 14 Jan. 1960, p. 14.

(Contains an inference to the national policy of the United States on gas warfare.)

73. "U.S. Aide Cautions on Chemical War." New York Times, 3 Dec. 1959, p. 10.

74. US Congress. House. Committee on Science and Astronautics. Chemical, Biological and Radiological Warfare Agents. 86th Congress, 1st Session. Washington: US GPO, 1959. (UG447 U63 1959a)

(Contains an important statement by Major General W.M. Creasy, former Chief Chemical Officer, on U.S. inability to defend against the German nerve gases during World War II.)

75. US Congress. Senate. Committee on Foreign Relations. Chemical-Biological-Radiological (CBR) Warfare and Its Disarmament Aspects. 86th Congress, 2nd Session. Washington: US GPO, 1960. (UG447 U632 1960)

76. US Dept of the Army. Field Manual 3-10: Chemical and Bilogical Weapons Employment. Washington: 20 Feb. 1962.

77. "Using Tear Gas inVietnam." Editorial. New York Times, 11 Sep. 1965, p. 26.

78. "Using Vomit Gas inVietnam is Actually a Humane Form of Warfare." Congressional Record, Vol. 111, 23 Mar. 1965, pp. 5514-5515.

79. "U.S. Must State Policy on Chemical Warfare." Army-Navy-Air Force Register, 29 Aug. 1959, p. 12.

80. Wachtel, Curt. Chemical Warfare. Brooklyn, N.Y.: Chemical Publishing Co., 1941 (UG447 W3)

(An interesting account of gas warfare as seen from the German viewpoint in World War I.)

81. Wells, Herbert G. The Shape of Things to Come. London: Hutchinson, 1933.

(A science fiction story of the future when world peace is controlled by incapacitating gas and air power.)

82. Young, Geoffrey W. The Grace of Forgetting. London: Country Life Limited, 1953.

(The memoirs of a war correspondent who served with the Red Cross at Ypres during World War I and saw the first gas attack.)