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THE MILITARY UTILITY OF CHEMICAL WEAPONS IN CURRENT WARFARE

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The utility of chemical weapons in current warfare usually is a very contentious issue. As a rule, one might state that at least two different types of opinion are discernable:

- There are those who attribute high utility to chemical weapons due to their versality and due to many advantages chemical weapons are said to offer in comparison to other types of weapons.

- Representatives of the second school of thinking argue that, although there are some clear relative advantages resulting from the use of chemical weapons, the employment of chemical weapons may be only expected under rather special circumstances, since the success of their employment is to a large degree dependent on metereological and topographical conditions.

It is not the purpose of this paper to take to the defense of one or the other of these two types of thinking. One should rather attempt to offer a way of arriving at a somewhat more differentiated understanding of the problem. In this respect, it seems to be useful to start first with a conceptual distinction between CW-effectiveness and utility[1] . In order to be of military utility, chemical weapons will have to be effective. However, even if chemical weapons are in a physical sense effective, this does not necessarily imply that their military utility is proven. The utility of a certain weapon has to be assessed, first, with a view to its role within the framwork of military doctrine, and, secondly, whether or not strategic considerations would militate either against or in favour of their use. Both military doctrine and

1 C.f. Valerie Adams, Chemical Warfare, Chemical Disarmament, London: McMillan 1989

strategic considerations differ from country to country - thus a general theory of the utilty of chemical weapons is hardly imaginable. Besides that, there are various types of warfare that have to be considered, since each of them might result in different incentives or disincentives to use chemical weapons. At least the following types of warfare will be put under investigation here: modern combined land-warfare; less sophisticated infantry- and artillery dominated warfare as may be found in many Third World international conflicts; civil and anti-guerilla warfare; intervention warfare where militarily and technologically superior armed forces of a developed country and armed forces of an underdeveloped and technologically inferior state encounter one another; and "strategic warfare" during which the belligerent nations would try to terminate the war in their favour by striking their enemy's strategic heartland.

In what follows, the effectiveness of chemical weapons will first be dealt with in terms of physical properties and effects. As a second step, their utility will be addressed with respect to various warfare scenarios and by applying both doctrinal and strategic considerations.

The effectiveness of chemical weapons

Due to the versality of today's chemistry, chemical weapons offer a broad spectrum of possible militarily relevant effects both on human beings (ranging from harrassment to incapacitating or to killing) and on plants and animals. Even substances "killing" engines are known. Chemical weapons also offer advantages over conventional weapons due to their special physical properties which would allow them to penetrate fortifications or similar structures which would otherwise

present a difficult target for high-explosive (HE) munition. Chemical weapons are area weapons capable of denying or impeding access to large strands of territory, airfields, logistic installations etc. By the same token, chemical weapons can be used as weapons of mass-destruction, for example if highly toxic agents are employed against civilian targets. Their effect on such "soft" targets may approach that of nuclear weapons. The effectiveness of chemical weapons, however, is limited by various factors that, as will be seen later, have an impact on how the utility of chemical weapons is assessed.

First of all, many chemical warfare agents have differing effects under differing weather conditions. Temperature, temperature gradients, wind, humidity and precipitation usually alter the effects of chemical agents, and each kind of agent usually reacts differently to various weather conditions. High temperatures, for instance, increase the rate of evaporation of liquid chemical agents, thus reducing the persistency of Sarin (GB) or Mustard gas (HD). Low temperatures offer less opportunities for the use of CW agents. Unstable atmospheres, like the "lapse temperature gradient", tend to create vertical and turbulent air currents which decrease the effectiveness of chemical agents. High winds increase the rate of evaporation of liquid chemical agents and push chemical clouds more rapidly than low winds. Sometimes wind can enhance, sometimes limit the effectiveness of chemical agents. According to a US handbook, nonpersistent chemical attacks over large areas are most effective in winds not exceeding 15 knots, against small areas nonpersistent chemical attacks with rockets or shells are most effective in winds not exceeding 5 knots [2]. The effects of

2 US Army Field Manual FM 3-10 ("Employment of Chemical and Biological Agents"), March 1966, p. 11

humidity and precipitation differ among the various agents. High humidity, for instance, does not influence the effectiveness of Sarin (GB), but increases the effectiveness of Mustard gas. Heavy rain washes away area contaminating liquid agents, such as VX [3] . Terrain features, vegetation and even the condition of soil also have an impact on the effect of chemical weapons. These factors are reflected in calculations on the likely munition requirements under different weather and terrain conditions. According to a US textbook, chemical munition requirements for the same tactical task may vary by a factor of ten, under some circumstances even by a factor of twenty[4] .

Another factor that limits the effectiveness of chemical weapons is chemical defense. As soon as troops are equipped with appropriate chemical defense masks and suits, and when they are well trained in chemical defense, the effectiveness of modern CW agents - even of highly toxic nerve agents - in terms of casualties comes close to zero (tables 1 and 2). Their main purpose then could only be to force the opposing side to don their NBC-masks and suits. This would, in effect, result in downgrading of their activities, since defensive suits and masks are cumbersome to wear, especially under warm or hot weather conditions. However, in terms of logistics the advantage of using chemical weapons in lieu of conventional HE may soon be lost. According to calculations by the US Army "chemical weapons are individually more lethal than conventional munitions. However, the chemical expenditure rates necessary to produce a significant effect on a well-trained and well-equipped enemy may approach those of

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3 Ibid.

4 US Army FM 3-10, pp. 97-103.

conventional fires"[5] . Another US military source even goes further by stating that Sarin (GB) "munition expenditures for positive neutralization of masked troops are usually too high to be logistically supportable"[6] .

In assessing the effectiveness of chemical weapons any military commander has to calculate whether or not the other side would respond in-kind. In case of chemical counter-attacks any hope for a relief in terms of logistics will soon fade away, and most likely, considerable additional logistical burdens will accrue. Since gas masks require new filters after some hours, a steady supply of filters will be needed. The same is true for protective garments which will have to be changed and discarded after some hours. Huge amounts of decontamination substances, solvents and water are needed. Additional numbers of wounded soldiers, both from fighting units and from combat support troops, might soon pose new problems for field hospitals. The result of a CW response by the opponent then may be a general slow-down of operations, mainly due to additional logistical burden associated with chemical defense and the general downgrading effect on soldiers having to wear NBC-defense suits and masks or having to work under similarly cumbersome conditions of "collective NBC defense". The same kind of general impedement and harassment that one sought to inflict on one's enemy would then rebound to the side that initiated chemical warfare.

Even if the side that was initiating chemical warfare was rather sure that it would not run into a retaliation in-kind , there is another side-

5 US Army Field Manual 100-5 ("Operations"), 1982, pp. 7-13.
6 US Army FM 3-10, p. 200, para 29.

effect that has to be reckoned with in judging the effectiveness of chemical weapons - the so-called downwind hazard. Under certain weather conditions the use of non-persistent nerve agents, like Sarin against a target area of no more than a dozen hectares, may result in a downwind hazard zone of up to 70 km (under some conditions even more) length in which protective measures must be enforced. Such a hazard zone may be in the intention of the user, depending on from where the wind comes. If the wind goes into his own direction this danger should disencourage him from using such chemical weapons. The downwind hazard will be greatest under conditions of virtually no air movement which are also the most favorable conditions for use of non-persistent agents[7].

What has been said so far may be summarized by the following 4 rules concerning the effectiveness of chemical weapons:

1. Chemical weapons may have formidable and devasting effects, however, it is hard to believe that any country would base its warfare efforts mainly on CW-use, since it would then make itself dependent on the vagaries of weather and topography.

2. The effects of chemical weapons may best be calculated the closer the side using them is to the place of employment, though the closer one gets, the greater the danger of being negatively affected by one's own chemical weapons will become.

3. Chemical defense usually frustrates hoped-for effects of chemical weapons use in terms of direct casualties. This would

7 C.f. Robert Mikulak, "Preventing Chemical Warfare", in: Chemical Weapons and Chemical Arms Control, ed. by Matthew Meselson, New York: Carnegie Endowment 1978, pp. 65-80, p. 69.

reduce the military effects to 3 categories: direct casualties as result of surprise; harassment or general impedement of military activities thus downgrading the enemy's fighting effectiveness; restricting the use of terrain.

4. These three effects may be offset as soon as one has to reckon with in-kind responses by the other side. A general chemical war, then, would tend to be to the disadvantage of that side that is more dependent on mobility and maneuver.

These rules may be seen as a framework under which we have to consider the doctrinal and strategic questions that are addressed below. That these limits on the effectiveness of chemical weapons are also seen by both superpowers may be inferred from authoritative military writings describing possible purposes for chemical weapons. While the above quoted FM-3-10 of the US Army restricts the use of chemical weapons to three modes - employment to cause casualties against unprotected troops or in a surprise attack; employment to harass; employment to hamper or restrict use of terrain [8] - the Soviet field manual of 1962 defines as the possible purpose of CW-use: "Chemical weapons are employed to inflict on the enemy mass losses of human beings and to impede activities of his front troops and in his rear areas. They are employed on a massive scale and in a surprise attack" [9].

Besides the rather open fromula "mass losses of human beings", which could also point to a strategic or countervalue option for chemical

8 US Army FM 3-10, pp. 20-21.

9 Text in Joachim Krause, Optionen chemischer Kriegführung in der Strategie des Warschauer Pakts, Ebenhausen: Stiftung Wissenschaft und Politik,, unpubl. study, August 1986, pp. 58-63.

weapons, both doctrinal writings converge in a rather narrow notion of what the effects of chemical weapons may actually be.

The utility of chemical weapons in modern combined land- and air-warfare

Against this background one has to ask for the utility of chemical weapons in what is called the "modern battle-field". There is no common understanding among analysts on how the battlefield of the future will look like. One may at least say, that modern warfare between highly mobile and sophisticated armed forces will surely bear a resemblance with what happened during World War II. Yet, there will be marked differences in terms of the complexity of battlefield situations, the speed of actions, the destructiveness of modern weapons and the role of technologically sophisticated means of command, control and reconnaissance[10] . The modern battlefield would also - at least in case of putative Soviet-NATO encounters - be under the damocles-sword of battlefield use of nuclear weapons.

The various notions of how the future battlefield may look are in part reflected in various national doctrines (either explicitly as authoritative writings on doctrines or implicitly as field-manuals or instruction papers) or in scholarly and professional writings. National doctrines specifying the most appropriate ways of fighting a modern war, however, are not only expressions of a certain Kriegsbild, but also increasingly reflect political guidelines. These guidelines tend to be

10 C.f. D.J. Pay, "The Battlefield since 1945", in: Warfare in the Twentieth Century - Theory and Practice, ed. by Colin McInnes / G.D. Sheffield, London: Unwin Hyman Ltd. 1988, pp. 213-235; see also Jonathan M. House, Towards Combined Arms Warfare - A Survey of 20th Century Tactics, Doctrine and Organization, Fort Leavenworth: US Army Command and General Staff College, August 1984.

governed more by considerations of strategy, stability, ethics and political compromise than by "purely professional" aspects. Thus, when we deal with the role of chemical warfare in current military doctrines for the "modern battlefield" we have to be aware of the fact that such doctrines blend both political and military considerations.

This statement holds true especially for today's Western armed forces. Most Western armies see no utility in the offensive use of chemical weapons. Some of them hold open the option of retaliation in-kind, but only one Western state - the USA - actually admits to keeping chemical weapons stocks allowing employment of such weapons.

The reasons for this small interest in chemical weapons employment are manifold and are rooted in strategic considerations, political imperatives and military-professional deliberations:

- First of all, chemical weapons are so heavily discredited as weapons of mass-destruction that in democratic societies procurement decisions or changes in military doctrine would be feasible only under certain exceptional conditions. Some countries have unilaterally (United Kingdom) or in an internationally binding form renounced possession of chemical weapons (Italy, Federal Republic of Germany).

- Secondly, considerations relating to the implementation of NATO's strategy of flexible response, especially its operational concept of forward defense, militated against Western chemical weapons employments. Since NATO has a policy of restricting combat activities to its own territory, i.e. the Eastern parts of the Federal Republic, and since this is a heavily populated area, any use of

chemical weapons would result in disastruous collateral damage. One might argue that this is not quite different from the collateral effects of battlefield nuclear weapons. However, unlike battlefield nuclear weapons, chemical weapons cannot be credited either war-preventing or war-terminating value[11] . Thus, NATO's strategic guidelines, as put down in document MC 14/3, provide for chemical weapons use only in case retaliation in-kind is needed to deter the Soviet Union from the further use of chemical weapons. Any such use of chemical weapons by NATO would take place on a limited scale only.

- A third reason for this reluctance to envisage massive employments of chemical weapons might be that, from a military professional point of view, too, chemical warfare is far from being sensible, since it would seriously compound problems of command and control. As was mentioned earlier, the complexities of the modern battlefield which military commanders will have to deal with are unprecedented. "The use of chemical and nuclear weapons", the latest US field manual for operations points out "will dramatically affect the control of forces . . . Even within small units control will be difficult."[12] This would imply that the utility of chemical weapons, as seen by the US Army, is restricted to retaliation in-kind against unprovoked chemical attacks with the sole purpose of dissuading the opposing forces from employing chemical weapons. Earlier contributions by US military authors on this subject had mentioned the necessity to fully integrate offensive chemical

11 C.f. Aspen Strategy Group / European Strategy Group, Chemical Weapons and Western Security Policy, Boston: University of America Press 1987, p. 47.

12 US Army Field Manual 100-5 ("Operations"), August 1986, p. 86.

weapons employments into the AirLand-Battle doctrine[13]. Obviously that idea has not been followed up during the final drafting of the US field manual.

While there seems to be a general reserve, albeit with differences in nuances, within the Western world concerning the military utility of chemical weapons, the same cannot be said with a view to the Soviet Union. It would be equally wrong, however, to credit to the Soviet Union such a high appreciation of chemical weapons that, as some authors have suggested, one had to assume that offensive chemical warfare would constitute a major, if not crucial, part of Soviet military doctrine. Estimates claiming that up to 50 percent of Soviet artillery fillings were actually chemical and that the Soviets would use chemical weapons as a main force multiplier in any European conflict[14] seem to be exaggerated. Yet, there is something special to the Soviet view of the role and utility of chemical weapons in modern warfare.

Unlike Germany, Great Britain, USA or France, the entry into the age of mechanized and combined land warfare was accompanied in the Soviet Union with a considerable and conspicuous role for chemical warfare.

The first Soviet field manual that dealt with mechanized warfare, the 1936 field instructions attempted to integrate chemical warfare, especially the employment of chemical weapons, into the new

13 See William G. Hanne, "The Integrated Battlefield", in: Military Review, No. 6, 1982, pp. 34-44.

14 See f.i. John Erickson, "The Soviet Union's Growing Arsenal of Chemical Warfare", in: Strategic Review, Vol. 7, No. 4, Fall 1979, pp. 63-71 (p. 65); Manfred Hamm, "Deterrence, Chemical Arms Control and Warfare", in: Orbis, Vol. 29, No. 1, Spring 1985, pp. 119-163 (p. 137).

doctrine. The field manual contained large sections on chemical warfare, the main utility of chemical weapons was seen with defensive operations or with flank-securing operations. Great emphasis was thus put on the role of airplanes to spray toxic liquids (mainly mustard gas). The main utility of chemical warfare was seen in denying access to certain areas[15].

This line of thinking was continued after the war when Soviet military doctrine changed under the influence of the invention of nuclear weapons. During the 1950s and 1960s the prevailing Soviet image of the modern battlefield was the one in which nuclear, chemical and conventional weapons were used altogether. Making the best use of chemical weapons was thus an imperative, since their use was anticipated anyhow. In line with the overall offensive orientation of Soviet military doctrine, chemical weapons employments to support and sustain offensive operations were envisaged in the 1962 field manual[16].

The 1962 field manual placed the use of chemical and nuclear weapons in close connection. Its image of war was that of a general military struggle comprising all weapon categories at once. In the years following the issuing of that field manual, Soviet military thinking evolved towards a more differentiated and complex approach. More particularly, conventional options were envisaged by which victory without the use of nuclear weapons was supposed to be achievable. Since then, almost no doctrinal writings on the utility of chemical weapons could be found in open Soviet military literature.

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15 For further information see the forthcoming book by Joachim Krause and Charles K. Mallory on Chemical Warfare in Soviet Military Strategy (1991).

16 See text in Krause, *Optionen* (fn 9).

This development triggered off a lot of speculation among Western observers as to the possible role of chemical weapons within the conventional option. Many surmised that they would share the fate of nuclear weapons. They would be kept out of planning for the initial war period and be retained as possible means to either react to Western chemical or tactical nuclear strikes or to force a breakthrough at a later stage when the situation would otherwise become hopeless[17] . Others thought that chemical weapons were conceived of as conventional weapons and that they might rank high as a ingredient segment of any offensive operation, especially of operations in the depth of NATO's defense[18] . Full clarity about this issue could never be won, although it seemed that the rather alarmist views that were expressed by the adherents of the latter school of thinking were somewhat overexaggerated:

- First of all, the concept of conventional option was such a demanding concept, the success of which largely depended on optimal predictability during the first phase, that it was hardly imaginable that Soviet planners would like to rely so heavily on chemical weapons. They would then have made the success of the whole operational concept dependent on the vagaries of weather.
- Secondly, and equally important, it is noteworthy that the success of a conventional option depended to a great deal on the postponement of any NATO decision to initiate the use of nuclear

17 Christopher N. Donnelly, "Soviet Preparations for Warfare in NBC-Conditions," in: Chemical Ware in Soviet Military Doctrine, ed. by Enrico Jacchia, Rome: Centro di Studi Strategici 1985, pp. 27-41; Julian P. Robinson, "Chemical Weapons and Europe", in: Survival, Vol. 24, No. 1, Jan./Feb. 1982, pp. 9-18.

18 Amoretta Hoeber /Joseph D. Douglass, "The Neglected Threat of Chemical Warfare", in: International Security, Vol. 3, No. 1, Summer 1978, pp. 55-82; Charles Dick, "Chemical Warfare in Soviet Military Doctrine", in: Chemical Warfare in Soviet Military Doctrine, ed. by E. Jacchia, pp. 17-25.

weapons. Even if chemical weapons could have contributed to the Soviet success on the battlefield within a short period of time, the same chemical attacks could also shorten the Western release procedure for nuclear weapons.

The latest developments in the Soviet debate on military doctrine seem to corrobate this view. This debate - which is, for the first time, being conducted in a rather open manner - is characterized by a virtual lack of any positive mention of the utility of chemical weapons. Its main purpose is to spell out what is meant by such lofty principles as "reasonable sufficiency" or "defensive defense". In such circumstances it is no surprise that chemical weapons, which still figure under the category of "weapons of mass destruction" are not weapons of first choice. As in Western countries, the influence of public attitudes negative to chemical weapons are increasingly felt in the process of doctrine-formulation. But also in the classical, military-professional field the prime time for chemical weapons seems to lie in the past in the Soviet Union. Military writers are increasingly concerned with the utility of advanced conventional munitions which promise a much better future coverage of most of those targets that were thought to be covered by chemical weapons[19].

The developments in both East and West suggest that the utility of chemical weapons for the future battlefield is increasingly appraised as questionable. This is due to the impact of politically motivated criticism of chemical weapons as being insidious weapons of mass destruction, due to strategic considerations, and due to substantial

19 C.f. Mary Fitzgerald, "The Dilemma in Moscow's Defensive Force Posture", in: Arms Control Today, No. 3, November 1989, pp. 15-20.

doubts within the military as to the possible consequences on the battlefield as soon as the "chemical genie" is out of the bottle.

It might be a reflection of these current trends that the two superpowers and all other military powers of the northern hemisphere are prepared to forgo possession of chemical weapons, and, if needed, to destroy their own stocks within the framework of a global ban on chemical disarmament. There is a good chance, therefore, that chemical weapons will be phased out from the arsenals of tomorrow's potential battlefield.

The utility of chemical weapons for less sophisticated Third World battlefields

What has been said about the declining utility of chemical weapons for the modern battlefield may not be true for less sophisticated wars in the Third World. As the Gulf war between Iraq and Iran has shown, there may be political and military leaders who see utility in employing chemical weapons.

As to the Gulf war, there are three aspects that are salient:

- The Iraqis used chemical weapons mainly in order to fend-off massed infantry attacks against fixed and fortified positions. The employment of chemical weapons was a desperate attempt to frustrate Iranian efforts to pierce through Iraq defense lines by human waves of fanaticed Shiite fighters[20]. They were also used in an offensive mode at a later stage of the war.
- The large-scale use of chemical weapons by the Iraqi forces proved to be successful in many individual tactical situations and

20 C.f. J. Johnston, "Chemical Warfare in the Gulf - Lessons for NATO", in: British Army Review, No. 91, April 1989, pp. 25-31 (p. 30).

was often decisive in stopping Iranian infantry assaults. However, the Iraqis did not succeed in forcing the Iranians into an early armistice nor were chemical weapons decisive in the eventual break-up of hostilities. On the contrary, the Iranians got increasingly accustomed to the Iraq gas attacks and developed an impressive ability to sustain offensive operations using protective gear[21] . In 1986, it was estimated that only about 2 percent of the total of Iranian casualties have resulted from chemical attacks[22] . This share might have increased until 1988, however.

The use of chemical weapons in the Gulf did not happen without restraint. Although they were capable of responding in-kind, the Iranians obviously never used chemical weapons. Iraq employed chemical weapons only on the battlefield and refrained from attacking major cities or predominantly civilian targets in Iran. In both cases, the fact that Iraq and Iran were to a certain degree dependent on foreign supplies might have been decisive. Iraq had some more latitude in this respect than Iran, since it knew that the main apprehension of the major powers in East and West was a proliferation of the Iranian revolution by dint of a successful Iranian military campaign against Iraq. Bakhdad thus could reckon with the connivance of the major powers with at least a limited use of chemical weapons against the Iranian offensive.

It is difficult to foresee the consequences of the protacted use of chemical weapons during the Gulf war on the other theaters of war in the Third World. In terms of military effectiveness the use of chemical

21 Ibid.

22 C.f. E. Karsh, The Iran-Iraq War - A Military Analysis, London: I.I.S.S. (Adelphi: Papers No. 220), Spring 1987, p. 56.

weapons was not a complete success. However, in terms of political consequences, the damage might be considerably larger. It could have happened that the Iraqi's use of chemical weapons has created the myth that chemical weapons were apt to terminate infantry and artillery dominated wars such as the Gulf war. Such a myth might be difficult to debunk as soon as it has sunk in into the minds of military and political leaders of the Third World.

The utility of chemical weapons in civil and anti-guerilla warfare

During the final phase of the gulf war, the Iraqis used chemical weapons in a different and considerably more effective mode: by using chemical weapons against unprotected Kurdish population and guerilla fighters the Iraqis achieved decisive successes in quelling the Kurdish rebellion from August 1988[23] . This could set a precedent for further similar action at different places of the world. Civil wars, such as the fight between Kurds and Arabs, are widespread in Asian and African regions and are often protracted over decades. The temptation to follow the Iraq example might be big for many governments especially in remote areas. There are already reports, although unconfirmed so far, that the Angolan government has used chemical weapons against the UNITA rebels[24] .

The Iraqis were not the first to employ chemical weapons in a civil war. During the 1963-1967 civil war in Yemen the republican side, supported by Egypt, launched air attacks with chemical weapons

23 Johnston, Chemical Warfare in the Gulf, p. 28.

24 C.f. R. Hallerbach, "Angola als Versuchslabor für chemische Kampfstoffe", in: Europäische Wehrkunde, No. 7, July 1989, pp. 433-435.

against the Royalists[25] . The strongest efforts in the area of chemical warfare during a civil war, however, were undertaken by the US forces during the Vietnam war. Tear gases were used on a large scale to force Vietcong out of fox holes and tunnels, herbicides and defoliants were employed in order to deforest hundreds of square miles of South Vietnamese jungle. The expenditure of chemical substances in Vietnam was impressive: about 7000 tons of irritants such as CS and 18,85 million gallons of herbicides and defoliants[26] . The employment of tear gases proved its utility on various occasions, the large-scale spraying of forest turned out to be a huge failure. It not only failed to produce the hoped shift in military balance, it also had disastrous ecological consequences. The long term effects on human health and the resulting genetic damages are almost unmeasurable.

Between the use of chemicals during the Vietnam War and the Gulf war there were no proven cases of chemical weapons employment in Third World conflicts. However, a lot of often very substantial allegations were made that pointed to chemical warfare activities in the pursuit of anti-guerilla or civil war campaigns. Chemical weapons were probably used by Soviet and Afghan troops against the Islamic resistence between 1980 and 1983, chemical weapons attacks were reported from Southeast Asia after 1975, where the Communist governments of Vietnam and Laos continued their fight against Hmong and Meo-Tribes that had sided with the Americans during the second Indochina war.

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25 See SIPRI, The Prevention of CBW, Stockholm: Almquist and Wiksell 1971, pp. 225-237.

26 See Edward M. Spiers, Chemical Weaponry, London: MacMillan Press 1989, pp. 100-112.

It is not the purpose of this paper to clarify whether or not such allegations were well founded[27] . It might rather suffice to point to the fact that many chemical weapons possess a strong value for counter-insurgency warfare and for use in civil war, especially if one side lacks the necessary means of chemical defense.

The utility of chemical weapons during foreign interventions in Third World countries.

When Italy in 1935 intervened in Ethiopia her success in the campaign against the troops of emperor Haile Selassie was to a considerable degree the consequence of her ruthless use of chemical weapons (mainly mustard gas). The imperial forces were totally unprepared against such a threat and were vulnerable to almost all kinds of chemical attacks[28] . Today the picture is a totally different one. The scope and character of military interventions in Third World countries are of a totally different kind as in the thirties (like f.i. the military interventions in Grenada, Panama or US strikes against Libya). Today it is rather to the potential interventionist who must be concerned about chemical warfare.

One of the by-products of industrialisation in Asia, Africa and Latin-America is that the probability of production or acquisition of chemical weapons by Third World countries has increased. About 20 countries are viewed by the US government as being interested in and

27 See for example Elisa D. Harris, "Sverdlovsk and Yellow Rain - Two Cases of Soviet Noncompliance?", in: International Security, Vol. 11, No. 4, Spring 1987, pp. 41-95; Julian P. Robinson, Jeanne Guillemin, Matthew Meselson "Yellow Rain: The Story Collapses", in: Foreign Policy, No. 88, Fall 1987, pp. 100-117.

28 C.f. Stanley D. Fair, "Mussolini's Chemical War", in: Army, Vol. 35, No. 1, Jan. 1985, pp. 44-53.

capable of the production or acquisition of chemical weapons. Among them are such trouble makers as Libya or Syria.

One of the major apprehensions that was voiced in the US in connection with the debate on chemical weapons proliferation was that they might be useful in fighting US interventions or other military activities undertaken on the territory of foreign states (like for instance French troops in Chad). There surely is such a threat which cannot be denied. However, one should avoid being overly alarmist in this respect. There are two factors that strongly limit the utility of chemical weapons for any Third World leader who intends to employ them against US, Soviet, French or British units:

- First of all, the military effect will be difficult to calculate since these are armed forces with a relatively high degree of protection against any chemical hazards.
- Secondly, defying one of the above mentioned powers by the unprovoked offensive use of chemical weapons would be an invitation for a retaliation. Such a retaliation could be in-kind or it could involve much more powerful weapons including nuclear weapons or highly effective conventional munitions. It is hard to see why, for example, a political leader like Col. Ghaddafi should try to invite a potentially disastrous reaction from the USA through initiating chemical attacks against US forces.

The utility of chemical weapons in "strategic" warfare

During the debate on the security implications of the chemical weapons proliferation in the Third World often the term "poor man's atomic bomb" was used. What is behind that notion is the danger that chemical weapons might be used in a strategic mode. By this term the literal use of chemical weapons as weapons of mass destruction is implied. A rocket salvo dispersing a few tons of a non-persistent chemical agent throughout a crowded and busy city can create enormous havoc resulting in ten thousands of casualties. The effect surely would be not as destructive as the use of even a single nuclear device. Also, defensive measures would be possible provided there were some warning time. Yet, there is an incentive for those Third World governments that see a need for some kind of strategic strike capability and that are devoid of any nuclear capability to look for a chemical arsenal. Especially the situation in the Middle East is conducive for such calculations. Since Israel is considered to be in possession of nuclear weapons and since Israel's enemies in the Arab world were unable to acquire or produce nuclear weapons so far, the chemical weapon is obviously considered by radical Arab leaders as a potential means of establishing a strategic threat against Israel.[29]

Although chemical weapons would be far less effective than nuclear weapons, this threat has to be taken seriously. Due to its small size and high population density Israel would, relatively speaking, be rather vulnerable to massive chemical attacks on civilian targets. The

29 See the latest threat by Iraqi leader Saddam Hussein, as reported in International Herald Tribune, April 3, 1989, p. 1.

acquisition of Soviet missiles like the SS-21 or modern bomber aircraft by Syria during the last 10 years have increased this threat[30] .

It is doubtful whether Syria or Iraq would actually dare to attack major Israelian cities except in a situation of deep despair (for example after a crushing military defeat on the battlefield, or after a nuclear strike by Israel). Yet, the simple fact that they possess chemically charged missiles able to reach Jerusalem, Haifa of Tel Aviv within minutes is already a factor influencing the strategic equation in that region.

It seems that outside the Arab world no one else tries to counterbalance a "strategic" nuclear threat by "strategic" chemical weapons. Thus, one might assume that only a small fraction of radical Arab leaders actually see a military utility in a strategic employment mode for chemical weapons. Whether this example will be followed by others is still an open question. The peculiarities of the Arab-Israeli conflict, on the one hand, militate against the contention that others might look for a strategic chemical capability, too. On the other hand, the proliferation of ballistic missile technology and modern bomber aircraft could increase the temptation for many Third World nations to try to acquire a chemical capability, too. Most likely, only a global chemical weapons ban, combined with an effective regime to curb the spread of missile and aircraft technology could contain such a trend.

30 Syria currently has a holding of at least 18 SS-21 launchers (100-120 km range) and 18 SCUD-B launchers (310 km range); see I.I.S.S., The Military Balance 1989-1990, London: Brassey's 1989, p. 115.

Conclusions

In striking a resumé at this point, one is faced with a remarkable incongruence between two different trends: While in the so-called northern heimsphere the military utility of chemical weapons seems to be gradually decreasing due to political, strategic and doctrinal considerations, somewhat differing conceptions prevail in Third World areas as to the utility of these weapons. Chemical weapons, though, are still the exception and most wars and armed conflicts are exclusively fought with conventional weapons. What makes a difference is:

- that the same political inhibitions against the use of chemical weapons do not always exist,
- that there are conflicts typical for third world areas, such as anti-guerilla warfare, ethnically motivated civil wars, infantry-led wars in which chemical weapons employments are, relatively speaking, more promising options than under conditions of modern combined warfare;
- and that situations might accrue in which individual states could strive for chemical weapons as a means of strategic retaliation.

This leads us to the question of whether or not a global ban on the possession, production and storing of chemical weapons is feasible given the above mentioned differences. Such a ban will be feasible only as long as the military utility of chemical weapons is relatively low. Otherwise, the temptation to exploit the fact that verification never can be 100 percent watertight might be too strong for some countries which could try to gain significant military advantages by violating the Convention.

While the trends in the Western and the Eastern world towards a downgrading of the role and importance of chemical weapons would very much favour the completion of a Chemical Weapons ban, the same cannot be said with respect to the Third World. However, it seems that the military utility of chemical weapons in these areas is not so high that it would turn out to be either infeasible or disastrous to complete a chemical weapons ban. Eventually, common political pressure by East and West might be necessary in order to pave the way for a global ban on chemical weapons.

Table 1

Influence of Defense on Effectiveness of GB Munitions
French Estimates

level of protection	relative quantity of GB munitions required to obtain a given level of casualties
Enemy troops not equipped with masks	1
Enemy troops carrying but not wearing masks when attack occurs:	
-poorly trained in chemical defense (30 seconds to don masks)	4
-well trained in chemical defense (15 seconds to don marks)	10
Enemy troops wearing masks when attack occurs	20*

* Casualties thought likely to result because of faulty masks, leaks around edges of the mask, and poor mask discipline.

Source: Gye-Jacquot, "Véterinaire Commandant. Possibilités de toxiques de guerre," L'Armee, June-July 1965, pp. 38–47 in Stockholm International Peace Research Institute. CB Weapons Today (The Problem of Chemical and Biological Warfare, *vol. 2) (Stockholm: Almqvist and Wiksell, 1973), p. 139.*

Table 2

Influence of Defense on Effectiveness of GB Munitions
United States Estimates

defensive posture	level of protection: A-troops in the open or in open foxholes B-troops in field fortifications with overhead cover or in ventilated vehicles	percent casualties among target population for a 1-battery fire attack delivered by 155 mm. howitzers firing into an area of 2 hectares*
Troops not equipped with respirators	A	50-90
	B	50-90
Troops carrying but not wearing respirators:		
-troops under stress (crawling or hot or cold or on the assault or fatigued)	A	10-20
-troops mildly active	A	5-10
	B	2-5
Troops rested and well prepared (good antigas discipline, some already masked or in protective shelter)	A	3
	B	1

* Each howitzer firing one round (3 kg. of GB; 6 weapons per battery). Wind speed between 1 and 5 miles per second. Overcast day above 0°C.

Source: Figures calculated from data given in United States, Department of the Army, Department of Army Field Manual FM 3–10, *March 1966 in Stockholm International Peace Research Institute.* CB Weapons Today (The Problem of Chemical and Biological Warfare, *vol. 2) (Stockholm: Almqvist and Wiksell, 1973), p. 139.*

Tables taken from Robert Mikulak, "Preventing Chemical Warfare", in: Chemical Weapons and Chemical Arms Control, ed. by Matthew Meselson, New York: Carnegie Foundation 1978, page 67 and 68.