

APPENDIX B

CHEMICAL WEAPONS

The Iraqis developed their proficiency in chemical weapons gradually during the war with Iran. They were motivated to find a solution to the impact of Iranian human wave infantry attacks which—like that of the Chinese attacks on U.S. forces in Korea—was devastating. The unpredictability of the attacks was very demoralizing, but the psychological impact on individuals caught up in the insensate violence of them was worse. For a psychological parallel in Western experience one may look to the 1939 Russo-Finnish War, and, in a particularly dramatic sense, to German experiences on the Eastern Front as conveyed in Guy Sajer's *Forgotten Soldier*.

A review of Iraqi chemical weapons employment reveals an initial use in 1982 of CS, a riot agent producing massive tears, some skin irritation and some difficulty breathing. In this instance, surprise was effective in achieving extreme disorganization on a tactical level, which in turn ruined the operation's execution.

The next reported employment was in July 1983 in the (Val Fajr II) fighting near Haj Umran. Here, the Iraqis are reported to have employed mustard gas, a persistent blister agent which can blind and cause death under "ideal" conditions. Its principal use, from World War I to the present, however, is not to kill, but to incapacitate and overburden rear services—it is very effective in degrading the performance of rear echelon activities as far forward as artillery and command and control operations.

In the 1983 employment, the Iraqis used mustard gas against an Iranian force which had captured a mountain top position. Unfamiliarity with the gas characteristics caused the attack to fail. Mustard gas is heavier than air and seeks the lowest elevation. The Iraqis discovered this as they attempted

to counterattack up the mountain only to be met and overwhelmed by their own weapon. The next employment showed a rapid learning curve as the Iraqis fired large quantities of mustard gas on the attacking Iranians at Penjwin (Val Fajr IV) in November 1983. They followed this with a more lethal attack in late February 1984 (Khaybar I). Here, they may have used the nerve agent, tabun, although this is less definite. Tabun inhibits cholinesterase, an enzyme in the nervous system that allows successive nerve endings to connect with each other. Once the connection is interrupted, the natural body functions cease from lack of required external signals from the brain.

Tabun is a crude agent; however the Iraqis are believed to have developed sarin, a more sophisticated variety that acts like tabun. This was supposedly employed during the 1988 attack on the Al Faw peninsula, and in several of the other operations which made up the Tawakalna Ala Allah campaign. However, we doubt this was the case. Similarly, we find no evidence whatsoever that the Iraqis have ever employed blood gasses such as cyanogen chloride or hydrogen cyanide.

Blood agents were allegedly responsible for the most infamous use of chemicals in the war—the killing of Kurds at Halabjah. Since the Iraqis have no history of using these two agents—and the Iranians do—we conclude that the Iranians perpetrated this attack. It is also worth noting that lethal concentrations of cyanogen are difficult to obtain over an area target, thus the reports of 5,000 Kurds dead in Halabjah are suspect.

Mustard gas—the agent most commonly associated with Iraq—is relatively easy to handle, although it is a two-edged weapon. Its persistence is a function of humidity and temperature, making its use as a long-term contaminant—in European conditions—nearly ideal. In the Middle East, however, where temperatures soar above 100 degrees Fahrenheit, its persistence is significantly reduced—unless one of two alternatives is followed. It may be made more persistent by thickening, which does not reduce its

effectiveness, but does limit its dispersal. A second alternative is to impregnate a carrier with the agent, the preferred one being any talcum-like substance that will absorb the agent and still disperse on carrier impact.

The tactics of chemical employment are similar to other weapons having short or long-term effects. It is desirable to make the first volleys of any chemical attack a mixture of two agents, vomit or nausea agents and killer agents like phosgene, cyanogen, or nerve. The soldier who is asleep or too slow masking either dies directly from the effects of the lethal agent or indirectly from having to mask and unmask while vomiting and in the process, inhaling the lethal agent.

Persistent agents like mustard are usually fired on artillery positions, lines of communication and likely counterattack routes, as well as command and control installations. Against artillery, gas attacks are principally meant to slow down servicing of the guns, reduce the accuracy of sighting, and degrade the processing of commands. In most circumstances it produces a significant increase in gunner fatigue as body heat builds up inside protective suits. Further, the constant movement of the cannoneers means that avenues of penetration for the gasses are progressively opened; seams are the point of greatest movement and frequently where sweat accumulates to further degrade the protective qualities of the overgarment. The passage of voice commands is rendered difficult, in what is already a practically impossible situation. Additionally, some soldiers suffer from claustrophobia and can tolerate being masked only so long.

In summary, chemical agents are effective in degrading command and control, fire support and lines of communication. One of the most dramatic examples of this was during Operation Khaybar I in February 1984. In this operation, the Iranians attacked through the Hawizah Marshes, attempting to cut the Basrah-Baghdad road. In a notable example of battlefield interdiction, the Iraqis isolated the forward elements of the attacking force with mustard, cutting them off almost entirely from resupply by land. When the Iraqis

counterattacked, they encountered Iranians who had no ammunition and who had not eaten for several days.

An additional Iraqi tactic was to target Iranian infantry in its assembly areas, as well as supply points. These attacks caused the less-well-protected rear echelon soldiers and volunteers to flee.

Chemical weapons require quite particular weather and geographic conditions for optimum effectiveness. Given the relative nonpersistence of all agents employed during this war, including mustard, there was only a brief window of employment opportunity both daily and seasonally, when the agents could be used. Even though the Iraqis employed mustard agent in the rainy season and also in the marshes, its effectiveness was significantly reduced under those conditions. As the Iraqis learned to their chagrin, mustard is not a good agent to employ in the mountains, unless you own the high ground and your enemy is in the valleys.

We are uncertain as to the relative effectiveness of nerve agents since those which were employed are by nature much less persistent than mustard. In order to gain killing concentrations of these agents, pre-dawn attacks are best, conducted in areas where the morning breezes are likely to blow away from friendly positions.

Chemical weapons have a low kill ratio. Just as in WWI, during which the ratio of deaths to injured from chemicals was 2-3 percent, that figure appears to be borne out again in this war although reliable data on casualties are very difficult to obtain. We deem it remarkable that the death rate should hold at such a low level even with the introduction of nerve agents. If those rates are correct, as they well may be, this further reinforces the position that we must not think of chemical weapons as "a poor man's nuclear weapon." While such weapons have great psychological potential, they are not killers or destroyers on a scale with nuclear or biological weapons. For comparison, during WWI, the U.S. Army suffered some 70,552 gas casualties requiring hospitalization.

Of these, 1,221 died. Deaths on the battlefield attributed to gas are recorded as 200, but on WWI battlefields, cause of death was often difficult to ascertain. The point is that 27.3 percent of all American casualties were gas generated and 31.4 percent of wounded were gas related, but the death rate was only 2 percent.

Fuel Air Explosives. Although not technically chemical weapons, fuel air explosives (FAE) are unusually effective, but are largely unknown in the U.S. Army. These weapons, normally air delivered but capable of delivery by MRL systems, create a cloud which, when ignited, explodes with tremendous force—several times the force of equivalent weight conventional explosives. Further, the effect is enhanced by the total coverage of the impacted area to include penetration of structures as with any vapor. When ignited, the force of the explosion creates pressure waves in excess of 200+ psi within the structure. Lethal overpressure for human beings is approximately 40 psi. The grain elevator explosions in the American Midwest are essentially FAE disasters. We believe the Iraqi Army has used and will target headquarters or fortified installations with these weapons.