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The Status of Tear Gas and Other Sensory Irritants in Chemical Warfare

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I. The Use of Chemical Irritants in War

Certain chemical irritants are used in various countries for domestic police purposes. When used in this manner, they have been called "riot control agents". It is important to understand, however, that these same chemicals have been widely employed as agents of chemical warfare. When used in this fashion, they are called "harassing agents".

Although usually not lethal by themselves, harassing agents are employed in war to drive an enemy from cover to face capture or attack by high explosive or other weapons, to upset his fire, and to reduce his fighting efficiency by forcing him to mask.

Harassing gases were the first chemical warfare agents employed in World War I. Altogether, some 13,000 tons were used, about the same amount as that of mustard gas.

An even greater quantity of harassing agents, mostly ω-chloroacetophenone (CN) and adamsite (DM), was produced by the belligerents during World War II. The munitions into which these agents were loaded included grenades, artillery shells, mortar cartridges, aircraft bombs, candles, and bulk disseminating devices.

The principal harassing chemical warfare agent to be prepared and used in massive quantities since World War II is o-chlorobenzalmalononitrile (CS), often in a form treated with an hydrophobic adjuvant to aid dispersal and render it more persistent in the field. The properties of CN, DM, and CS are summarized in Appendix A.

II. The Status of Tear Gas and Other Harassing Agents Under the Geneva Protocol

The Geneva Protocol of 1925 prohibits the use in war of "asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices..." Many governments have expressed the view that the use of tear gas and other harassing agents in war is prohibited by the Protocol. This position was declared by the United Kingdom, France, Roumania, Yugoslavia, Czechoslovakia, Japan, Spain, The Soviet Union, China, Italy, Canada, and Turkey at Geneva on 15 January, 1931.*

Subsequent discussion of the matter at Geneva led to an expression by the United States of America that while the use of tear gas for local police purposes should be allowed, its use in war should be prohibited.** This was the agreed view of the nations participating in the Disarmament Conference, expressed in a resolution adopted on 23 July, 1932.

III. Future status of chemical irritants

Over the past forty years, many nations have employed chemical irritants for police purposes while regarding their use in war as prohibited. Their use for police purposes is a matter for national legislators, and is not at issue here.

The situation that the agents have remained outlawed for military use at least for the last four decades is one that should not be altered unheedingly. Nevertheless, there is a danger that this might happen, not so much by direct re-negotiation of the Geneva Protocol, but by indirect sanction of infractions of the Protocol and of the customary international law upon which it is based.

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* Documents of the Preparatory Commission of the League of Nations Disarmament Conference. C.4.M.4. 1931. IX. pp. 311-314. Attached as Appendix B.

** Minutes of the Bureau of the League of Nations Disarmament Conference, Series C, Volume I, page 57.

In itself, the military use of harassing agents is relatively unimportant compared with other dangers. The hazard lies in that the subsequent progression to psycho-chemicals or vesicants and then on to nerve gases may become appreciably more probable. It is not impossible that an irritant agent will produce deaths on a battlefield. Again, in the eyes of an enemy that has access to lethal chemical weapons, there may be little difference between use of a lethal gas and of an irritant that increases the lethality of other weapons: in the heat of battle, the two may be quite indistinguishable. Quite apart from the danger of a disproportionate enemy response to harassing agents, the field commander who uses such agents is himself at least partially equipped and prepared to use more dangerous ones.

In view of the foregoing, the Pugwash Study Group on CB Warfare urges the delegates to the Eighteen-Nation Disarmament Committee in Geneva which soon may discuss these matters to pay heed to the important historical and practical distinctions between, on the one hand, the use of irritants for local police purposes and, on the other hand, their use for military purposes, emphasizing that in the latter the irritants are agents of chemical warfare.

APPENDIX A

ω-Chloroacetophenone (CN) $C_6H_5COCH_2Cl$

CN is essentially a lachrymator (tear gas). On exposure to a concentration of above about 0.5 mg/m^3, a copious flow of tears begins in less than a minute. At higher concentrations, or with prolonged exposure, intense irritation is experienced in the nose and upper respiratory tract, soon followed by an itching and burning of moist areas of exposed skin. Recovery is swift after exposure ends, but at high dosages, such as might be experienced within an enclosed space, serious lung damage may occur. A number of deaths have been reported in the literature, due mainly to pulmonary oedema.

The field concentration for militarily-significant harassing effects is above about 7 mg/m^3. The human lethal inhalation dosage, extrapolated from animal data, is estimated at around 11,000 mg-min/m^3, about the same as that for the blood gas, cyanogen chloride.

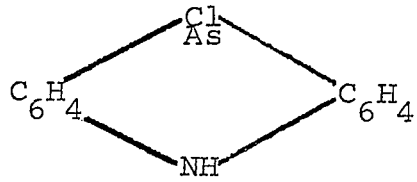
o-Chlorobenzalmalononitrile (CS) $^{(o)}Cl.C_6H_4.CH=C(CN)_2$

CS was developed in the 1950's as a replacement for CN. It was the culmination of a search for a harassing agent that would provide a more potent irritant action than CN and a lower probability of complete incapacitation than such agents as DM (see below).

Its effects are qualitatively rather similar to those of CN, but are brought about at lower field concentrations: militarily-significant harassment occurs at concentrations above about 1 mg/m^3. The functioning of a munition charged with CS is thus likely to be considerably more effective over a greater area than the same munition charged with CN.

A variety of human lethality estimates have been made which range from 25,000 up to 150,000 mg-min/m^3. With regard to this variation, it is pertinent to note that the human lethality estimates for the harassing agents are highly uncertain. They are made by extrapolation from results obtained with laboratory animals. Data from instances of death in police-type or combat employment can only be extremely imprecise.

10-Chloro-5, 10-dihydrophenarsazine (adamsite, DM)



DM is a sternutator (upper respiratory irritant) developed during World War I. When used in minimum concentrations, it causes great irritation to the upper respiratory tract, the sensitive peripheral nerves, and the eyes; it also irritates the outer skin, but not to so great an extent; when present in stronger concentrations, or when inhaled in weaker concentrations for a long time, it attacks the deeper respiratory passages. The irritation begins in the nose, as a tickling sensation, followed by sneezing, with a flow of viscous mucous, similar to that which accompanies a bad cold. The irritation then spreads down into the throat and coughing and choking set in until finally the air passages and the lungs are also affected. Headache, especially in the forehead, increases in intensity until it becomes almost unbearable, and there is a feeling of pressure in the ears and pains in the jaws and teeth. These symptoms are accompanied by an oppressive pain in the chest, shortness of breath, and nausea which soon causes retching and vomiting. The victim has unsteady gait, a feeling of vertigo, weakness in the legs and trembling all over the body. These symptoms start two or three minutes after exposure begins; after it ends, recovery is usually complete in one to two hours.

The field concentration of DM for militarily-significant harassing effects is about the same as that for CS. The human lethal inhalation dosage is estimated at around 15,000 mg-min/m^3.