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The Chemical Mace, Report #2*

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THE ROCHESTER COMMITTEE FOR SCIENTIFIC INFORMATION
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Chemicals: The Mace
Report #2

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The Chemical Mace
by
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1. This spring the RCSI published a report on the Chemical Mace, a chemical riot control weapon employing tear gas in a Freon-pressurized hand dispenser, and now in use by Monroe County law enforcement agencies. It was our opinion that the device was far less likely to produce lasting damage to a victim than conventional weapons, but that it was quite possible to inflict serious injury with it. With this in mind, we raised two questions: (1) Are the police adequately briefed on the precautions to be used with the Mace, and are they given instruction and equipment for providing first aid to prisoners who are Mace victims? (2) When will our area hospitals be provided with authoritative information on the composition of Mace and on the proper medical treatment of Mace injuries? At the time our first report on Mace was published, we had not received answers to these questions; developments in the controversy concerning Mace made it necessary to publish the report at that time. We now have detailed information concerning both questions, through the courtesy of Mr. Mark H. Tuohey, Jr., Commissioner of Public Safety, City of Rochester. This information is summarized here.

The Commissioner states in a letter to us dated June 12, "I can assure you that the Rochester Police Bureau personnel have been briefed on the Chemical Mace including the use of the minimum effective dose. I can also assure you that competent medical authorities in our hospitals have been briefed on Mace first aid."

The following is abstracted from the Police Bureau's General Order No. 68-9, dated May 17, 1968, on "Policy and Procedure for Use of Chemical Mace".

The Chemical Mace will be used only in conjunction with an arrest and only when necessary to overcome resistance or to defend the officer or another from physical attack. In every instance in which the Chemical Mace is used, the following procedures will be followed:

- A. Follow established arrest procedures. If the use of the Mace is required, the prisoner will be handcuffed upon effecting the arrest.
- B. After handcuffing, flush the skin area affected by the Mace with the issued water dispenser.
- C. After flushing the skin area of the arrestee, transport to nearest hospital for additional examination. While the Chemical Mace does not cause any permanent discomfort, it is extremely irritating and for this reason medical attention will always be proffered to alleviate the discomfort once the arrest is effected.
 1. Officer should thoroughly wash hands after using Mace or handling person on whom the Mace has been used. Other skin surfaces which might have been exposed to Mace should also be washed.

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- F. Water dispensing devices to comply with paragraph B above are part of issued equipment of uniform patrol units and other selected police vehicles and offices. Commanding officers will make frequent and periodic inspections to ensure that water dispensers are intact, containing a sufficient quantity of water to be serviceable at all times.

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The General Order concludes with excerpts from the Surgeon General's report on Mace; these include information on first aid and medical treatment. The order states that this material is to be the subject of roll-call discussion.

We have also been informed by some of the hospitals we had contacted earlier that they have now received copies of the Surgeon General's report.

We believe that this information from the Police Bureau satisfactorily answers the questions we raised earlier. It also establishes that Mace is viewed by the police as a weapon to be used only for defense or in overcoming physical resistance; it is not to be used in lieu of sound trucks and bull horns, for instance, in attempting to maintain law and order.

2. A medical study (toxicological study) of Mace was done recently at the Department of Pharmacology of the University of Michigan Medical School, by Drs. I. F. MacLeod, J. E. Villarreal and M. H. SeEVERS. They surveyed the available literature on Mace and other tear gas weapons, and carried out rather extensive tests of Mace. Their results and recommendations are given at the end of this report. We are pleased to note that the procedures of the Rochester Police Bureau are consistent with these recommendations.

The results of the University of Michigan study agree in substance with the R.C.S.I. first report on Mace, indicating that this chemical weapon can be used safely, and that damage to people from Mace would be the result of gross misuse of the weapon. Two findings of the Michigan study should be added here:

- A. People suffering minor damage to eyes and skin can be reassured that the record of recovery of both experimental animal subjects and human victims is good, thus sparing anxiety to victims.
- B. The results of the report underscores two types of hazard in connection with the use of Mace -- lung damage which may be serious can result from exposure to tear gas in closed cars, small rooms, or other enclosed areas; and anesthesia of the victim impairs the blink reflex and may result in the victim's suffering serious eye damage under circumstances which would result in no injury to a normal victim. Therefore the use of Mace on drunks or people under the influence of narcotics should be avoided if possible.

The summary and opinions of the University of Michigan report follow.

"In summary, these experiments indicate that Chemical Mace, when delivered to the monkey to simulate heavy field exposure may produce minimal eye lesions of a few days duration.

"Permanent scarring sufficient to cause visual impairment was observed in rabbits to which Mace was applied directly to the cornea. In the monkey, liquid application of Mace produced scars, pigmentation, and surface irregularity of the cornea which are of a permanent nature.

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After reviewing all of the available evidence concerning Chemical Mace it is our considered opinion that,

1. Chemical Mace can be used with comparative safety to the eye and to the total economy of the individual as a weapon to effect temporary incapacitation providing,

(A) The recipient is alert, in possession of his normal protective reflexes such as blinking, eye closure, breath holding, turning away from the spray, and the like;

(B) The spray is directed at the recipient at such a distance that his reflexes can be brought into play;

(C) The total duration of the spray is limited to the minimum required to be an effective incapacitant.

2. Severe, long term, and possibly permanent ocular damage may occur if the cornea of the eye is exposed directly to Chemical Mace in liquid form. Such exposure resulting from discharge of the canister would, in our opinion, constitute misuse of the weapon and result from:

(A) Discharge of the weapon directly into the eye or face at very close range in normally reactive persons;

(B) Prolonged discharge at any effective distance into the face of an already incapacitated person;

(C) Discharge of large quantities in a confined space such as a small room or closed automobile.

3. There is neither evidence nor scientific rationale to support the view that significant systemic effects on the nervous system or other organ systems, other than the psychological responses to being rendered incapacitated, are induced by Chemical Mace, even by exposures which could produce significant injury to the eye, skin, or mucous membranes.

4. The irritant effect of Chemical Mace on the eye and probably on all other tissues resides almost exclusively in the tear gas (the original report uses the chemical name for the agent) fraction of the formulation. The solvent and propellant fractions have been eye-tested individually by several investigators and found to be non-injurious. Control studies in this laboratory using "Training Mace" (the complete Chemical Mace formulation lacking only tear gas) produced only minimal and transient irritation to the rabbit eye.

5. Hitherto the delivery of tear gas has relied largely on the use of explosive charges to propel and volatilize the solid tear gas. The medical records of tissue damage have implicated flame, forceable penetration of tissues by solid tear gas particles, gun wadding and powder as the principal causative factors. Aerosolization represents a marked improvement in controllability of dosage and safety. Delivery of tear gas by aerosol technics requires the use of organic-carrier solvents. In the formulation of Mace these are all of negligible systemic toxicity for man in the amounts which could conceivably be absorbed from the lung or skin in the use of the weapon.

6. Good practice requires that exposed areas be washed with clear water as soon as possible after exposure in order to minimize local effects and that the application of ointments of any kind be avoided since they localize the irritant at the site of application.

7. Officers charged with the responsibility of using Chemical Mace should be carefully indoctrinated in its proper use and instructed in the potential hazards of indiscriminate use or accidental misuse. The manufacturer would be well advised, if they have not done so, to prepare a brochure describing proper methods of use and the potential hazards of misuse."

The University of Michigan report closes by contrasting such chemical weapons, which incapacitate temporarily and without lasting damage, with conventional weapons such as night sticks, pistols, shotguns, and so forth---a comparison which we also made in our first report.

References

1. Rochester Police Bureau General Order No. 68-9, "Policy and Procedure for Use of Chemical Mace", dated May 17, 1968.
2. I. F. MacLeod, J. E. Villarreal and M. H. SeEVERS, "Report to the Ann Arbor City Council and the Ann Arbor Police Department on the Chemical Mace", dated June 6, 1968.