1. INTRODUCTION. Attention is directed to Circular 76, Department of the Army, 1948. Chemical casualties, caused by these agents, commonly known as the G-series (GA, GB, and GD) may occur. The following data are published for the information and guidance of medical officers in the treatment of such cases.

2. PHYSIOLOGICAL EFFECTS AND MECHANISM OF ACTION. The physiological effects of these agents are attributable, for the most part, to irreversible inactivation of cholinesterase (physostigmine-like action), and include pupillary constriction, spasm of the ciliary body of the eye lens, bronchoconstriction, bronchorrhea, increased motor activity of the gastro-intestinal tract, and generalized fibrillary skeletal muscular twitchings. Headache, nausea, vomiting, salivation, and diarrhea may be associated with the action of these agents. Following large doses, death may occur in a few minutes; with moderate doses, death may be delayed for several hours. In certain animals, the central nervous system is stimulated, and tonic and clonic convulsions result. This is true of the cat and dog and may also apply to man. Effects of subtoxic exposure may be cumulative so that subsequent moderate exposure may produce severe poisoning.

3. TOXICOLOGY. Toxic doses of these agents may result from breathing the vapors or from body contact with liquid.

a. Effect of vapors. A few minutes (1 to 5) exposure of an unmasked individual to barely detectable concentrations of the vapors causes pupillary constriction and difficulty in visual accommodation in man. Slightly greater exposures cause pain in the chest, headache, nausea, and other effects as noted in paragraph 2. Animal experiments indicate that these agents are much more toxic on inhalation than war gases heretofore employed. Inhalation of saturated vapor...
for 1 minute may be lethal to man. Exposure of the unbroken skin to vapor appears to offer little threat of serious effect.

b. Effect of liquid. Liquid contamination of the skin is a real hazard. In animal experiments, small amounts of the liquid if left undisturbed on the skin may cause death in a matter of a few minutes. There may be localized muscular twitchings at the site of liquid contamination before generalized signs appear. Entrance to the body through the eye surfaces and through the linings of the mouth and nose is even more rapid.

5. CAUSE OF DEATH. Death from poisoning is a result of respiratory failure brought about by a combination of the ultimate central depression and the peripheral paralysis of the muscles of respiration. [AG 800.5 (4 Nov 47)]
L. ORDER OF THE SECRETARY OF THE ARMY:

OFFICIAL:  
EDWARD F. WITSELL  
OMAR N. BRADLEY  
Major General  
The Adjutant General

Chief of Staff, United States Army

DISTRIBUTION:

Army:
Tech Sv 3, 6 (25); AGF (5); OS Maj Comd (2); Base
Comd (2); MDW (6) A (21); (Overseas) (8); CHQ
(3); D (2); R (2); R (2); Bn (3); Sep C (2); Class I,
II Instls (2); Tng Ctr (2).

Air Force:
USAF (5); USAF Maj Comd (2); USAF Sub Comd (2);
W (2); G (2); Class III Instls (2).

For explanation of distribution formula see TM 38-405.

(1) After exposure to these agents, the blue dot tube, when heated, gives a blue color that fades out. The test will only detect vapor which is present over the liquid agents. It does not detect small concentrations which may be physiologically active. To make test, tear off lead wrapper and heating pad. Insert blue dot end of the glass tube into pump. Slowly take 20 full pump strokes. Remove from pump, and heat tube with matches or cigarette lighter for about 5 seconds. (Avoid excessive heating of tube, since this will char contents of the tube and invalidate the test results.) After tube is cool, add liquid from blue bottle to unmarked end of the tube. If gas is present, a blue ring will form in the upper end of the tube.

(2) Immediately after the dispersal of GA in moist air, hydrolytic products that are not detected with the blue dot tube can be recognized by use of the red dot tube of this kit. To make this test, tear off the wrapper, insert and mark with a red dot into pump, and slowly take five full pump strokes. A pink color indicates the presence of this agent or HCN.

3. Use of paper, liquid vesicant detector, M6, or point, liquid vesicant detector, M5—Droplets of these agents will cause the olive-green color of these detectors to change to red.

4. Recognition—These agents are not easily detected in the field by odor and the vapors are not irritating to the nasal passages. However, their presence can be recognized by observing the pin-point contraction of the pupils of the eyes of individuals exposed to very low concentrations of these gases. The alarm should be given pending verification of the presence of these agents by the detector kit.

5. Protection—Use gas mask—This gas mask gives protection for the eyes and respiratory tract and for the skin covered by the facepiece.

T. First aid—General first-aid procedures outlined for treatment of casualties are effective for treatment of casualties from these agents. Contamination must be treated immediately by bathing the liquid and washing the contaminated area with slightly alkaline or soapy water. Proceed as first-aid treatment is outlined below:

Physiological effects

First aid

Vapor, when inhaled, causes nausea and diarrhea and may be followed by muscular twitching and convulsions. Even in low concentrations, they cause the pupil of the eye to contract. This makes it difficult to see, especially in dim light, and causes headache. After short exposure, a sense of tightness in the chest may be noticed, which is increased by deep breathing. Liquid does not injure the skin, but penetrates the skin and poisons the body. Contraction of the pupil may not appear as a warning sign under these conditions.

& Reference—More detailed information is contained in TB CW 84, Trees of Poisoning Caused by Chemical Agents of the G-Series. (AG 101.6 (4 Nov 41))

By Order of the Secretary of the Army:

Omar N. Bradley
Chief of Staff, United States Army

Edward F. Whitehead
Major General
The Adjutant General