*A Handbook for*

# DECONTAMINATION SQUADS

*United States*

## OFFICE OF CIVILIAN DEFENSE

*Washington, D. C.*

*A Handbook for*

# DECONTAMINATION SQUADS

*Prepared by the Training Section*

## U. S. OFFICE OF CIVILIAN DEFENSE

U. S. Government Printing Office, December 1941, Washington, D. C.

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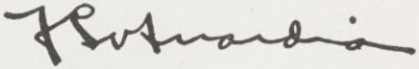
# PREFACE

This is one of a series of Civilian Defense handbooks prepared by the United States Office of Civilian Defense. The purpose of each handbook is to instruct the individual enrolled civilian defense worker in his duties, and to serve as a manual for reference.

The measures for safeguarding civilian life and property against the fire hazards resulting from air attack, which are described in the following pages, have become a necessary part of the defensive organization of any country open to air attack.

Every State and municipality should take such legal or administrative action as may be necessary to provide for the organization, direction, and training of its Fire Watcher Service.



*U. S. Director Civilian Defense.*

Washington, D. C.,
*December 1941*

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*A Handbook for*

# DECONTAMINATION SQUADS

As this is written there have been two well authenticated uses of war "gas" in the present world conflict. Mustard gas was strewn in the path of advancing bare-footed Ethiopians from Italian airplanes. Lewisite was used by the Japanese in defending Ichang from an attacking Chinese army on Oct. 7–8, 1941. In both cases the use of "gas" accomplished its objective against an enemy not prepared to deal with it.

It is known that many nations have stored large supplies of these and other war chemicals. It is unthinkable that we should fail to take steps to deal with them. The persistent gases, lewisite, mustard and ethyldichlorarsine are those most likely to be used in an attack upon centers of population. Since they contaminate the area where they are sprayed or dropped and give off their dangerous vapor for days unless neutralized, it is most important that chemicals to do this work and equipment to apply them be at hand—and that trained and courageous men protected from head to foot set promptly to work.

This is the job of the decontamination squad, your job, and it is strangely true that the better you are prepared to do your work, the less the chance that you will ever have to do it. If civilian protection forces are well enough prepared, it will be profitless for an enemy to attack civilian populations.

## *The Vesicant Agents or "Persistent Gases"*

The chemical compounds described below are grouped by the Chemical Warfare Service as vesicant agents, because they form blisters on any part of the body with which they come in contact. This is true, not only of the liquid, which is the natural state but of the vapor which it gives off by slow evaporation. Since this evaporation takes place quite slowly for mustard and lewisite, they have been called "persistent gases." The German name for them is "Yellow Cross" agents, corresponding to the marking on shells, bombs, and containers. The British call them Blister Gases.

No other war gases are completely described in the manual for the simple reason that they do not have to be chemically treated, but are quickly dispersed by air currents.

## *Mustard "Gas"*

The chemist calls this compound Dichlorethyl Sulfide (Di-klor-eth-il Sul-fide). The French Army named it "Yperite" (Eep-er-ite) and the Germans "Lost." Because of its odor, the American and British call it "Mustard Gas" although to some it suggests the odor of garlic or horseradish. In truth the odor is very faint, and often difficult to detect. When the presence of gas is suspected, be very alert to the slightest sourish-pungent odor.

When liquid mustard is scattered about, the odor will be unmistakable, even if faint. In appearance, it is a dark or amber oily liquid, but

this may not be easily recognized on the ground or on walls, as it will "soak in" to porous surfaces almost at once. This is the reason why vigorous scrubbing and "working in" of the neutralizing agent is necessary.

Liquid mustard has an amazing power of penetration. It will even "soak through" heavy rubber gloves in a few hours and penetrate ordinary clothing almost at once. It quickly penetrates the outer skin and dissolves and spreads in the body fats. "The toxic effects of mustard are caused by the protoplasmic hydrolysis of the dichlorethyl sulfide molecule and the liberation of free hydrochloric acid in the living cell." (Prentiss, Chemicals in War.) Mustard gas, like other vesicants, attacks any of the body cells, hence it affects the eyes, nose, throat, and lungs as well as the outer skin.

Depending on the temperature, mustard takes from a few days to several weeks to evaporate and all this time it gives off a vapor that itself produces the same effect as the liquid if exposure is sufficient. Rain helps to get rid of it, partly by washing away and partly by slowly combining with it to form a harmless residue. Incidentally it settles to the bottom of sewers and streams where it retains its harmful properties for some time.

Clothing to protect the wearer against mustard or other vesicants may be impermeable—that is, it may be coated with a substance that resists penetration of mustard liquid for some hours—or it may be impregnated with a substance that

chemically neutralizes the liquid. Impermeable clothing is air tight and retains the body moisture and the wearer quickly becomes fatigued. Impregnated clothing must be reimpregnated after each washing, but it is easier to wear. In either case, great care must be exercised in dressing and undressing and expert treatment must be given the clothing before it can be worn again.

Mustard liquid can be thought of as a kind of super-poison ivy, transferred at a touch from garments to fingers to other parts of the body or clothing. Hence the greatest care must be exercised in removing protective garments as shown on succeeding pages and until those garments themselves have been finally decontaminated or burned, those who handle them must in turn be protected by mask and clothing and must in turn take all precautions in undressing.

Careless people have no place in decontamination squads. They soon become casualties.

First aid for vesicant casualties is briefly given on following pages. In addition, every decontamination squad should have a copy of "First Aid for Chemical Casualties" published by the Office of Civilian Defense.

One thing to remember about mustard is that its effects are not immediately apparent. A drop of the liquid on the skin produces no sensation as it soaks in. Exposure to vapor except when highly concentrated is not noticeable save for a slight odor. But after a "latent" period of several hours, the eyes will burn slightly, and in several hours more the skin will feel just as it does after a bad sunburn.

### *Lewisite*

Chlorvinyldichlorarsine (klor-vine-ill-di-klor-ar-seen) or lewisite, is the principal American contribution to the war "gases." It is also a liquid at regular temperatures, also gives off a toxic vapor, and also attacks all parts of the body.

Lewisite has a strong natural odor, similar to geraniums—a pungent sweet odor that is unmistakable. Its effect on the body is noticeable at once, a drop on the skin producing a slight tingling sensation.

Lewisite reacts quickly with water, and therefore is quickly disposed of by rain or wetting down. But one of the products resulting from this hydrolysis is itself poisonous and must be flushed away if possible. However, this product is not volatile.

Lewisite, then, is more easily identified, more easily disposed of. But if it gets past the safeguards, it may inflict more serious casualties because it contains arsenic. If this penetrates to the blood stream it will produce arsenical poisoning. Blisters produced by lewisite themselves contain an arsenical compound that will spread the injury and must be carefully drained.

Lewisite may be mixed with mustard. Do not depend wholly on flushing it away.

### *Ethyldichlorarsine*

This substance, also a liquid at normal temperatures, volatilizes much more quickly than either mustard or lewisite, and is completely "dried up" within an hour. For this reason it is used for its true "gas effect"—that is, in vapor form—and is usually classified as a lung injurant.

"ED." as it is termed by the American army, or "Dick" by the Germans, has no odor that can be easily described. Some say a "piquant fruity odor"; others notice only a "biting, stinging sensation" in the nostrils.

It is similar in its effects to mustard although not as effective and may be neutralized, if necessary, by similar methods.

### *Decontamination*

Decontamination is a process by which a chemical agent is partially or completely neutralized, destroyed or removed. As the term is used here it applies to the neutralization of war "gases," or vesicant liquids.

The chemical agents that cause the greatest decontamination concern are the persistent vesicants (blister gases). Nonpersistent agents normally dissipate rapidly (10 minutes in the open), but some will contaminate food and corrode metals. However, contaminated food is usually discarded, and the corrosion of metal can be prevented by cleaning with oil.

The most common vesicant agents are mustard gas, lewisite, and ethyldichlorarsine.

The following decontaminating materials may be used:

***Earth.***—Earth, sand, ashes, or sawdust may be spread over a contaminated area to give temporary protection. The covering layer should be at least three (3) inches thick. This does not destroy the chemical agent, but forms a seal preventing the escape of a dangerous concentration of toxic vapor. Such covering will be more effective if wetted down by water.

***Water.***—Water will destroy lewisite as such, and rapidly enough to be used extensively for decontaminating lewisite. The reaction product of lewisite and water is a nonvolatile solid substance which is a vesicant on direct contact with any part of the body. After decontaminating lewisite with water, the area should be, if practicable, covered with a layer of earth to prevent contact with the solid substance, or thoroughly flushed. Mustard gas hydrolyzes (combines with water to form a new product) so slowly that water is not practicable for decontaminating this agent. Where sufficient drainage is present, most surfaces contaminated with mustard gas may be washed down with water. Precaution should be taken against splashing which may occur from the use of a water wash.

***Chloride of lime.***—Chloride of lime or "bleaching powder" mixed either with earth (dry mix) or with water (slurry), will destroy all vesicants. Those vesicants containing arsenic, however, will have a poisonous product as a result,

***Aeration and weathering.***—Aeration and weathering are two forms of "natural" decontamination. These methods depend upon favorable meteorological conditions, and ordinarily are too slow to be considered as normal processes of decontamination.

***Incineration.***—Incineration, or "burning," of areas contaminated by vesicants may be considered a practical method of decontamination when circumstances and conditions permit. This method should not be used in densely populated areas.

***Solvents.***—Solvents such as gasoline or kerosene can be used to remove excess vesicants from metal or nonporous surfaces. These solvents do not destroy the chemical agent but dissolve it so that it more readily may be removed.

***Protective clothing.***—Protective clothing should be worn by personnel engaged in decontamination. In most cases, decontamination can be accomplished by wearing permeable (impregnated) clothing. Impermeable clothing does not let out heated air from the body and therefore can be worn for only limited periods of time.


MARK CONTAMINATED AREA

### *Marking Contaminated Areas*

When it is not practicable to decontaminate an area at once, it should be marked with danger signs showing the agents involved and the date and hour of contamination.

Sentries may be posted, when deemed necessary, to warn unauthorized persons not to enter such areas.

### *Recommended Outlay of Equipment for a Decontaminating Squad or a Civilian Decontamination Center*

20 cans (50 lb. each) chloride of lime.
1 gallon oil, medium, lubricating (labeled).
2 cans (5 gal. each) kerosene (labeled).
4 brushes, whitewash (long handled).
4 apparatus, decontaminating, 3 gallon (pressure type) complete with paddle and funnel, M2.
1 box (12 tubes) impregnite, shoe, M1.
10 yards cheesecloth, medium, 2 feet wide.
6 shovels (long handled).
4 rakes.
4 brushes, scrubbing.
4 picks or pick mattocks.
4 scythes or sickles.
4 brooms, stable.
8 brooms, common.
8 buckets, G. I., 14 quart.
1 can, galvanized, 15 gallon.
1 axe, single bit.
20 pounds rags, clean.
24 signs, "Danger—GAS."
2 hoses, garden, 50-foot lengths.
25 pounds of soap, issue.
4 oilers, with spout, ½ pint.
4 lanterns, kerosene.
6 flashlights.
1 screw driver, 6 inches.
1 pliers, combination, 6 inches or 8 inches.
4 curtains, gasproof.
Facilities for provision of water.

The following items are recommended for each squad in the first-aid kit:

½ pound sodium bicarbonate.
3 pounds soap, Government issue.
½ gallon kerosene.
4 ounces hydrogen peroxide—3% solution.
½ pint High test bleach paste (mix in glass jar one part bleaching powder with one or two parts water).
1 teaspoon.
3 medicine droppers sterile gauze (for use as applicators).
3 ounces 2 percent sodium Bicarbonate solution in water.

### *Mixing Slurry*

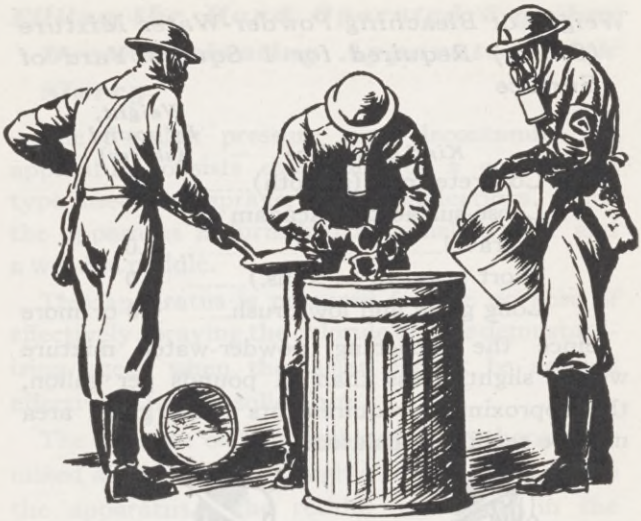
Slurry is a 50-50 mixture of chloride of lime and water. Proportions shown are 2 gallons of water weighing 16 pounds, and 3 shovelfuls of bleach weighing about 16 pounds.

Thorough mixing to remove lumps is essential. First add about 2 quarts of water to the 16 pounds of chloride of lime and work into a smooth paste; then add remaining water and stir thoroughly.

Since 1 pound of chloride of lime is needed to decontaminate each square yard of area, the amount shown above will fill a 3-gallon sprayer and properly treat 16 to 20 square yards.

The agent is very corrosive to most metals and cotton fabrics. Therefore, it should never be used where this corrosive action will cause excessive damage to material and equipment.

The mixing of slurry is not dangerous enough to necessitate wearing protective clothing, but this mixing is normally done at or near the contaminated area.



MIXING SLURRY

# Appendix I

***Unit coverage.***—In decontaminating operations, involving the use of chloride of lime mixed with earth or sand, 1 pound of chloride of lime is recommended per square yard of area to be decontaminated. However, in the use of bleaching powder-water mixture (slurry) this rule does not apply and the amount of bleach used per unit surface will be found on the next page.

*Weight of Bleaching Powder-Water Mixture (Slurry) Required for 1 Square Yard of Surface*

| *Kind of surface* | *Weight, by pound (slurry)* |
|---|---|
| Concrete road (smooth) | 1.0 |
| Loose-surfaced macadam or gravel | 2.0 |
| Short grass (3 to 5 ins.) | 3.0 |
| Long grass and low brush | 4.0 or more |

Since the bleaching powder-water mixture weighs slightly less than 11 pounds per gallon, the approximate requirements for a given area may be readily calculated.

FILLING PUMP CONTAINER WITH SLURRY

### *Filling the Hand Operated 3-gallon Decontaminating Apparatus with Slurry*

The 3-gallon pressure type decontaminating apparatus consists essentially of a commercial type insecticide sprayer with modifications. With the apparatus is furnished a funnel-strainer and a wooden paddle.

This apparatus is procured for the purpose of effectively spraying the chloride of lime demustardizing agent when the latter cannot be applied effectively in the solid form.

The chloride of lime and water are thoroughly mixed and strained through a funnel-strainer into the apparatus. The residue remaining in the strainer should be spread over the contaminated area.

The apparatus is assembled and locked, and the hand pump operated about 20 or 30 strokes to build up the pressure necessary to force out the mixture.

The mixture should not be allowed to remain in the apparatus for more than 30 minutes. Immediately after use the apparatus must be completely disassembled, thoroughly cleaned, rinsed with clear water, and all working parts oiled.

### *Decontamination of Buildings*

In general, if liquid vesicants have been carried into buildings the buildings should be abandoned. However, important installations of buildings can be decontaminated with slurry, a mixture of 50

percent chloride of lime and 50 percent water, by weight. Concrete and wooden floors readily absorb mustard gas and should be covered with a layer of freshly prepared slurry by means of brooms, and left on the floor for at least 24 hours. The slurry is then removed by scrubbing the floor with water (hot soapy water is preferable).

### *Decontamination of Walls and Ceilings*

If walls and ceilings of a building are not too heavily contaminated, the mustard may be neutralized by spraying or swabbing with slurry, a mixture of 50 percent chloride of lime and 50 percent water, by weight. The 3-gallon decontaminating apparatus (pressure type) is particularly suited for spraying walls and ceilings which cannot be readily reached with brooms or brushes. After 24 hours, the walls and ceilings should be washed with hot soapy water and the room or building aired for several hours. If mustard gas odors are still present, the decontamination process should be repeated.

If a building is contaminated with lewisite alone, it can be decontaminated with water, preferably with a high pressure hose. The resulting compound is an arsenic poison and must be washed away.

A mixture of mustard and lewisite gas can be decontaminated with slurry. The lewisite is reacted upon by the water in the slurry.

DECONTAMINATING WALLS

### *Use of Solvent to Remove Mustard Gas from Heavily Contaminated Equipment*

Greasy or oily metal surfaces which have been contaminated with mustard or lewisite should first be cleaned with kerosene or gasoline. These solvents do not destroy mustard but dissolve it so that most of it may be removed. A rag soaked

with gasoline is used to wash down or gather up the liquid mustard without spreading it.

The very thin coating of mustard which will remain is then destroyed by spraying with steam, followed by washing with hot soapy water, drying, and an application of light oil.

Rags used for the purpose should be buried or burned in a fire with a good draft, since they will be grossly contaminated.

The ground or floor on which contaminated solvents have run must be treated with chloride of lime-earth mixture or slurry to destroy the dissolved mustard gas.

SLURRY MUST BE WELL SCRUBBED IN

DECONTAMINATING VEHICLE

### *Cleaning Vehicle Contaminated with Mustard Gas*

Vehicles or other machinery may require the attention of an entire squad. In the picture above, slurry is being applied to the chassis.

A final washing with hot soapy water will remove the corrosive slurry. A film of light oil is applied to all metal surfaces to prevent rusting.

### *Cleaning Equipment After Decontamination Operations*

To remove all traces of chloride of lime, all spray apparatus, mixing buckets, brooms, and other pieces of equipment are washed in several changes of water.

Certain materials can be decontaminated more satisfactorily and with less waste of solution by applying the solution with swabs of cloth instead of by spray. Heavy rubber gloves should be worn for all decontaminating operations. The liquid

DECONTAMINATING EQUIPMENT

will not accidentally come in contact with the skin if this method is used. With some items of equipment, the contaminated articles may be dipped or drawn through the solution.

Hot soapy water will aid in the cleaning of decontaminating apparatus, and a plentiful supply of strong laundry soap is an invaluable item in the supply list of a decontaminating squad.

### *Decontaminating a road*

Two men fully protected, as is driver, are riding on front fenders and spraying a 50–50 mixture of chloride of lime and water in advance of truck.

One tank load of slurry (1,600 lb. of chloride of lime and 200 gal. of water) can cover a gravel road 8 yards wide for a distance of 200 yards.

A TRUCK-MOUNTED SPRAYER

Since mustard will not penetrate cement, concrete, or other smooth surface roads as rapidly as it will penetrate gravel, dirt and cinder road surfaces, a larger area of the former (8 yd. wide and 400 yd. long) can be decontaminated.

For heavily contaminated areas, as much as 4 pounds of chloride of lime slurry per square yard should be used. One tank load will cover an area of approximately 800 square yards in such cases.

If lewisite is sprayed on a road it may be destroyed by hosing it down with water. A high pressure hose is preferable, though the modern street flushing truck may be used for this task. The resultant product will be an arsenic compound which is poisonous and must be washed away.

If lewisite and mustard are mixed, the normal slurry load in the power-driven apparatus will destroy both vesicants.

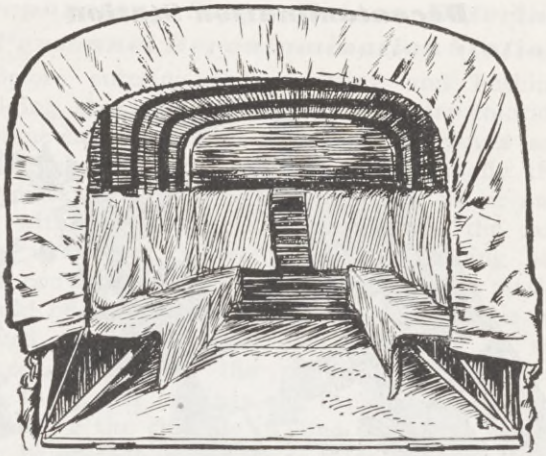
This type of truck-mounted unit is used by the U. S. Army. Note that flushing nozzles are also adapted to spraying walls.

### *Adjustment of Protective Clothing*

In the proper adjustment of protective clothing, it is necessary for personnel to assist one another. Men are equipped with two pairs of gloves; one, a pair of impregnated cotton gloves. In order to protect the feet, shoes are shuffled through a mixture of bleaching powder and earth every few minutes.

All personnel should be inspected for proper adjustment of clothing and equipment prior to entering contaminated areas.

ADJUSTING CLOTHING FOR GAS TIGHTNESS



TRUCK FOR TRANSPORTING CONTAMINATED PERSONNEL

### *Truck Protection for Transporting Mustardized Personnel*

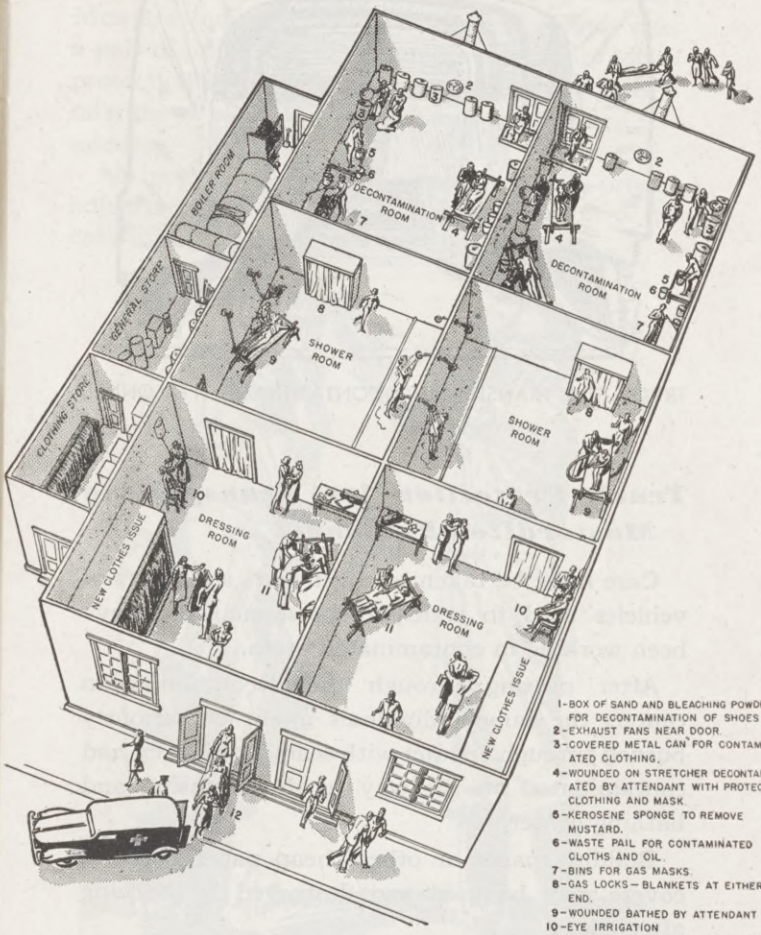
Care must be taken to cover seats and floors of vehicles used to transport personnel who have been working in contaminated areas.

After passing through the decontamination center, the same individuals might be seriously burned through contact with seats which they had contaminated on the way to the cleansing and bathing center.

Building paper or other cheap paper or cloth covers may be used and destroyed by burning after use.

If canvas covers are used, they may be decontaminated by boiling or steaming.

# *Decontamination Station*




1-BOX OF SAND AND BLEACHING POWDER FOR DECONTAMINATION OF SHOES
2-EXHAUST FANS NEAR DOOR.
3-COVERED METAL CAN FOR CONTAMINATED CLOTHING.
4-WOUNDED ON STRETCHER DECONTAMINATED BY ATTENDANT WITH PROTECTIVE CLOTHING AND MASK.
5-KEROSENE SPONGE TO REMOVE MUSTARD.
6-WASTE PAIL FOR CONTAMINATED CLOTHS AND OIL.
7-BINS FOR GAS MASKS.
8-GAS LOCKS—BLANKETS AT EITHER END.
9-WOUNDED BATHED BY ATTENDANT
10-EYE IRRIGATION
11-PHYSICIAN AND NURSE CARE FOR WOUNDED.
12-WOUNDED EVACUATED TO HOSPITAL AFTER DECONTAMINATION

### *Preparatory Steps Before Entering Personnel Decontamination Station*

Before entering the cleansing and bathing building, shoes are again shuffled in dry chloride of lime-earth mixture. The rubber gloves are deposited in a box provided, and normally the gas masks are removed and hung up to air and dry with the facepieces removed from the carriers. However, where protective clothing has been contaminated by liquid vesicants, the masks should be kept on until the outer clothing is removed. In such cases, assistance may be required to remove the contaminated clothes. The shoes and leggings are brushed thoroughly to remove the chloride of lime and earth which may be present in creases or folds.

Cotton gloves are being worn during this step.

If personnel have been contaminated by direct spray of mustard gas from airplane, or their carriers have come in contact with contaminated foliage, then the gas mask carriers should be turned in for salvage or destroyed.

REMOVING PROTECTIVE CLOTHING

***Removal of Outer Protective Clothing***

Shoes and leggings or boots are removed and deposited in boxes while protective cotton gloves are still worn. Paper on floor is removed and burned after use.

After removal of shoes and leggings the men swing around on the bench and place feet (now in socks) on clean floor. Outer garments are removed as shown above. Cotton gloves are worn until outer clothing is removed.

Boxes are provided to receive the items of contaminated clothing. The clothing is made ready for further use by sending it to a decontaminating unit where mustard is destroyed by steaming and laundering.

*NOTE.*—Men do not put stocking feet on contaminated paper. To avoid contaminating clean floors, roped off passageways and arrows painted on the floor indicate route through bathing and cleansing centers.

### *Bathing*

Even if it is believed no skin has come in direct contact with mustard, it is necessary to bathe following exposure, since the liquid mustard might penetrate holes or defects in protective clothing, or in removing the clothing the skin may become contaminated. Use plenty of strong soap and, if possible, warm or hot water.

FIRST AID FOR MUSTARD

| Liquid | Vapor |
|---|---|
| | Take a good soapy bath. NEVER use bleach paste. |
| Large drops penetrate the uniform within 10 minutes. If no better facilities exist follow procedure "A." | As a rule only drops larger than B-B shot will penetrate the uniform. If exposed, follow "A" procedure. The skin should be treated at once and clothing be removed within 10 minutes. |
| If near a gas cleansing center or decontaminating unit that can be reached within 10 minutes, follow procedure "B." | |

NEVER use bleach paste once the skin has turned red. Only use soap and water.

### *Procedure "A"*

1. Remove free liquid on exposed skin with whatever means are available.
2. Swab off free liquid from clothing and remove or cut away all contaminated clothing.
3. Wipe hands with clean swab.

### *Procedure "B"*

1. Proceed to decontamination unit (avoid tall grass and mud).
2. Remove clothing, which should be placed in bin or bag outside of hut.
3. Rub with bleach paste which is prepared by mixing one part bleach and one part water (by weight). Bleach paste should be removed within 5 minutes with water or soap and water. Straight gasoline or kerosene may be used as a solvent in aiding the removal of liquid vesicants.
4. Wash off with soapy water.
5. Put on clean clothing and, if necessary, protective clothing.

### *First Aid for Lewisite and Ethyldichlorarsine*

The first aid procedure for lewisite and ethyldichlorarsine is similar to that for mustard. After exposure the clothing should be removed immediately. Bleach paste is not so effective in first aid of lewisite and ethyldichlorarsine. A 10-percent solution of sodium hydroxide in 30-percent glycerin should be applied to exposed areas and removed with alcohol, repeating the process three or four times. A 5-percent solution of sodium hydroxide may be used. The fat solvents and soap and water are effective and should be used when no other measures are available.

## METHODS OF DECONTAMINATION FOR ROAD SURFACES

| Surface | Method of Treatment |
|---|---|
| **Treatment for Fine Spray.** | |
| All surfaces | In busy thoroughfares hose down with water if this can be done within 30 minutes.<br>In all other circumstances leave to weather. |
| **Treatment for Gross Spray and Outer Zone of Bomb Contamination.** | |
| All surfaces | Hose down with water as quickly as possible for 10 minutes. Repeat treatment. Pavements for immediate use can be brushed with thin slurry. |
| **Treatment for Heavy Contamination Around Bomb Craters.** | |
| Stone facings | Brush slurry well into joints. Leave in contact for 15 minutes. Finally hose down with water. |
| Wood paving | Hose with water for 15 minutes. If jointing material is soft, cover with sand. (If heavy liquid splashes visible, treat with bleaching powder and sand before hosing; brush well over surface and leave in contact for 1 or 2 hours.) |
| Tarred macadam or asphalt. | Hose with water for 15 minutes. Use slurry for heavily contaminated areas. In certain cases road heating machines may be used. |
| Natural earth, grass, etc. | Cover with 2 to 3 inches of fresh earth and leave to weather. If contamination very heavy and near to occupied premises, add top layer of earth and bleaching powder in the proportion of 3 to 1. |
| Stone paving and concrete. | Hose with water for 10 minutes. Brush slurry well into surface for 5 minutes. Also treat gutters. Finally hose down with water. |

## METHODS OF DECONTAMINATION FOR BUILDINGS

Note.—No special treatment required for spray contamination.

| Material | Treatment for liquid contamination |
|---|---|
| Stone or brickwork | Hose down with water if this can be done before the liquid has had time to soak in, but not otherwise. Spray or brush surface with slurry. Leave in contact as long as possible (not less than 24 hours). Repeat treatment. |
| Concrete floors and tiles. | Hose with water. Apply slurry and brush thoroughly over surface. Leave in contact for 6 hours. Hose with water. Apply sodium silicate solution (water glass) liberally when available, and let dry. |
| Glazed tiles | Hose with water and treat with slurry. Scrub into the joints. |
| Papered walls | Paint or spray with slurry. Apply alternate layers of bleach paste and paper, and leave in position for at least 48 hours. |
| Painted walls (wood or plaster). | If immediate treatment can be applied, treat as above and finally repaint. If the contamination has been prolonged, remove the paint completely. |
| Wooden floors | Absorb visible liquid with fresh earth or sawdust which should be burned or buried. Scrub the surface with slurry and water, and sand. Leave in contact for 24 hours, then brush off and wash with water. Repeat treatment two or three times when necessary. Soaked boards should be removed and burned. |
| Unpainted woodwork | General treatment as for wooden floors. Hardwood articles and mouldings should first be swabbed with kerosene, and then treated with paste of bleaching powder and vaseline, which should be left in contact for a short period, and then wiped off, leaving a thin film on the surface. |

## METHODS OF DECONTAMINATION FOR HOUSEHOLD ARTICLES

| Article | Treatment |
|---|---|
| Furniture (hardwoods). | Swab thoroughly with kerosene, then give prolonged treatment (not less than 48 hours) with mixture of bleaching powder and vaseline. Owing to possible danger from personal contact with furniture hasty decontamination should not be attempted. |
| Upholstery | All upholstery must be stripped from the wooden framework. In many cases it will probably be quicker and easier to destroy it by burning and replace with new material. When it is necessary to undertake decontamination, use the following methods:<br>Fabrics.—Immerse in boiling water for 1 hour. This will shrink woolens.<br>Leather.—Expose for prolonged period in a current of hot air, but if heavily contaminated, it is safer to destroy by burning.<br>Padding.—Hot-air treatment may occasionally be applicable, but in general it will be safer to burn. |
| Bedding | Treat as for upholstery according to whether textile is wool or cotton. Mattresses may be treated in a steam disinfector. |
| Carpets, rugs, etc | If lightly contaminated, hang in open air to weather for 7 days in mild weather, and 14 days in colder weather. If wetted with blister gas, spray with soda solution before hanging out to air to prevent tendering of the fabric. If carpets are heavily contaminated they should be destroyed by burning unless arrangements can be made to immerse them in boiling water for 2 hours. |
| Linoleum | If in good condition and only the upper surface is contaminated, treat with bleach and water cream. If it is worn and the basic fabric is contaminated, it is safer to destroy by burning. |
| Metal fittings | Swab well with kerosene or gasoline and rub dry with clean cloths. |
| China, glass, and earthenware. | Treat in boiling water or strong bleaching powder solution. |

## METHODS OF DECONTAMINATION FOR VEHICLES

| Vehicle | Treatment | Labor and time | Materials required |
|---|---|---|---|
| Buses or streetcars and closed commercial delivery cars. | For Spray Contamination.—Hose down exterior thoroughly with water. Treat handrails and other metal parts, which have to be touched, with gasoline. | 2 men, 2 hours. | 1 quart gasoline (not containing tetraethyl lead). |
| | For Gross Liquid Contamination.—Hose down with steady stream of water. Brush over fabric top and all woodwork, including back and front steps with thin slurry. Leave in contact for ½ hour, then wash off. Treat all metal parts by swabbing with gasoline. Finally, leave to weather for 24 hours. | Exterior. 2 men, 3 hours. | 7 lb. bleaching powder.<br>1 gallon gasoline. |
| | If the interior has been contaminated, this will have to be decontaminated carefully before the vehicle can be taken into use again. Contaminated upholstery will probably have to be removed and destroyed. | Interior. No estimate possible. | ---------- |
| Open delivery cars and trucks. | General treatment as for buses will meet normal requirements. Where there is contact danger the inside should be scrubbed with slurry and sand, and left for 2 hours, after which it should be washed off. Even then the floor will not be safe to sit on, if it has been heavily contaminated. | 2 men, 2 hours (working time). | 7 lb. bleaching powder.<br>1 pint gasoline. |
| Private cars---------- | Hose down thoroughly. Swab with kerosene or gasoline parts liable to be touched. If contaminated inside upholstery will have to be removed. | 1 man, 3 hours. | 1 gallon gasoline. |

# BLACKOUTS

Blackouts are ordered only on the authority of the War Department. A blackout may be ordered during any period when hostile forces are believed to be in the vicinity, whether or not enemy airplanes have been sighted.

***"Blacking Out"*** a city means that light sources must be so hidden or dimmed that an enemy bomber will have difficulty in finding the target and lack aiming points such as main street intersections. Following are the general plans used.

***Street Lights.*** These are fitted with low-watt bulbs and covers that diffuse the light.

***Automobiles.*** Headlights must be covered except for a small pair of slits and hooded.

***Traffic Lights.*** Are treated the same way as automobile headlights.

***Buildings.*** Windows and doors must be covered with opaque materials. Paint on the glass, heavy curtains, light "baffles" or screens are some of the ways. No cracks of light must show.

***Aids to Seeing.*** Since people have to move about during a blackout, the lack of light may be somewhat offset and safety promoted by—

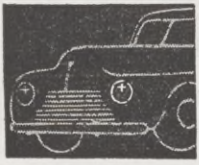
1. Painting curbs, trees, poles and hydrants with white paint. There is a luminous paint, also, that gives off a faint blue light quite visible in total darkness.

2. Painting signs of luminous paint or making them of fluorescent material on which shines ultra-violet or "black" light or installing dimly lighted signs with horizontal screens to diffuse the light.



3. Painting white fenders and stripes around automobiles.

Members of the Citizens' Defense Corps who have outside duties during a blackout can be identified more easily if they wear a white cap or white-painted helmet; also a white belt fitted with crossed straps over the shoulders.



***Individual Conduct During a Blackout.***

Observe traffic rules. Keep to the right and remember the man or vehicle approaching *from* your right *has* the right of way.

If you must smoke, go into a hallway or covered place to strike the match. No smoking in the open is an even better rule. Make all crossings at intersections. It is hard for a driver to see you.

Be sure that everyone you know is acquainted with these simple rules.

DO NOT run when air raid warnings sound after dark during blackouts.

Use your flashlight as little as possible, if at all. Never point it upward.

Curb edges and direction signs painted white will help you find your way.

Keep pets on leash if you take them out after dark.

If an air raid warning sounds, get under cover, you may be hit by shell fragments.

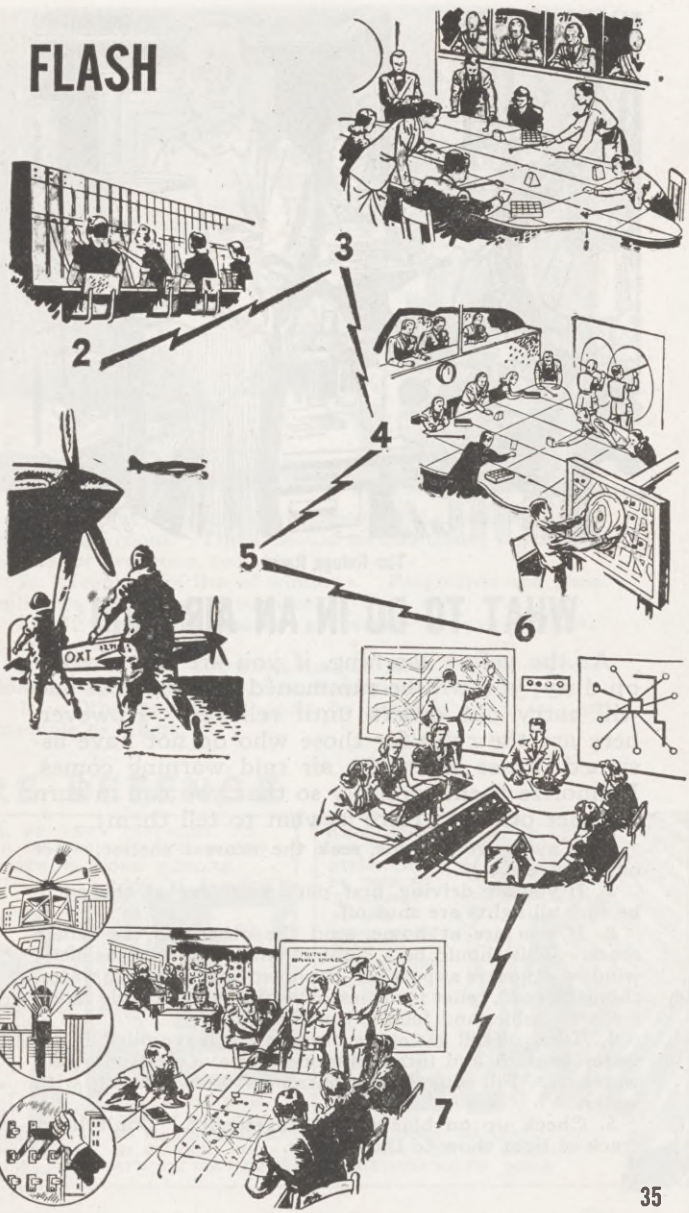
If you don't know the neighborhood the first policeman or warden will tell you where to go.


When an observer sights a group of hostile planes, he picks up his telephone (1) and says *Army Flash*. The Central Operator (2) at once connects him with the assigned Filter Center (3) to which he reports the type of planes, number, height, and direction of flight. When several reports agree, watchers transmit the data to an Information Center (4) where developments over a large area are plotted on a huge map.

Watching the map, Air Corps officers order interceptor planes into the air, (5) direct them to contact with the enemy; another officer notes the cities threatened and flashes a yellow, blue, or red alarm, according to the degree of danger, to the proper Warning District Center (6).

At this point, Civilian Defense takes over from the Air Corps, telephones the warnings to Control Centers (7) within the Warning District. And here the Commander of the local Citizens' Defense Corps orders the alert, has the public warning sounded usually short blasts on air horns, power horns or steam whistles or on the wailing sirens—and if the bombers arrive overhead, directs the operation of passive defense. Learn the air raid warning for your city.

# FLASH



The Refuge Room

# WHAT TO DO IN AN AIR RAID

At the yellow warning, if you are not already on duty, you will be summoned to your post and will carry out orders until relieved. However, here are the rules for those who do not have assigned duties when the air raid warning comes. Memorize them carefully so that you can in turn instruct others. Here is what to tell them:

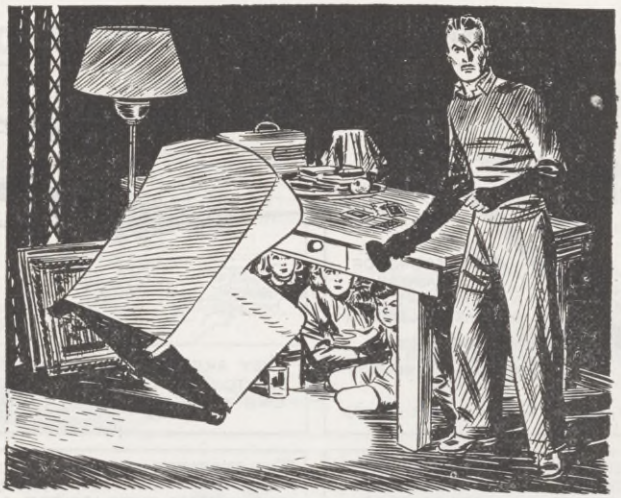
1. If away from home, seek the nearest shelter. Get off the street.

2. If you are driving, first park your car at the curb; be sure all lights are shut off.

3. If you are at home, send the others to the refuge room. This should be a comfortable place with as little window exposure as possible, equipped with drinking water, things to read, toilet facilities, a flashlight, a portable radio, a sturdy table, and food if you like.

4. Turn off all gas stove burners but leave pilot lights, water heaters and furnaces alone. Leave electricity and water on. Fill some large containers or a bathtub with water.

5. Check up on blackout arrangements. Don't let a crack of light show to the outside.



6. See that everyone's eyeglasses and dentures are in the refuge room. There should be additional warm garments for everyone, too.

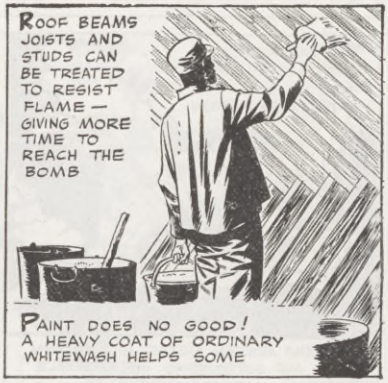
7. Keep out of line of windows. Fragments and glass splinters cause most casualties.

8. If bombs fall nearby, get under a heavy table, an overturned davenport.

9. Don't rush out when the "all clear" signal sounds. Maintain the blackout. The Raiders may return.

10. Otherwise, keep cool; be sensible and set an example to others.

## FIRE DEFENSE

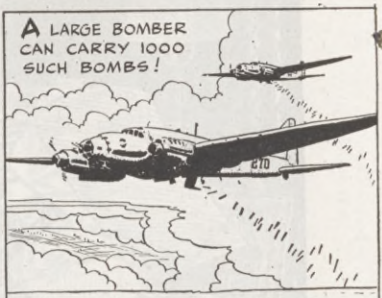



# HOW THE MAGNESIUM BOMB WORKS

THE MOST EFFECTIVE INCENDIARY BOMB MADE SO FAR IS THE **MAGNESIUM BOMB**


LENGTH, ABOUT 14" WEIGHT, 2.2 POUNDS

A LARGE BOMBER CAN CARRY 1000 SUCH BOMBS!



THEY ARE USUALLY RELEASED 20 TO 50 AT A TIME, SPREAD LIKE SHOT BEFORE STRIKING.

DROPPED FROM A HEIGHT OF 20,000 FEET, THEY DEVELOP ENOUGH FORCE TO PENETRATE AN AVERAGE ROOF...

...THUS, THEY USUALLY START BURNING IN A TOP STORY OR ATTIC

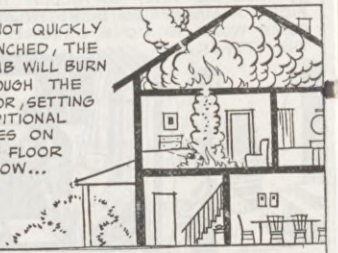
THE THERMITE FILLING OF IRON OXIDE AND FINELY DIVIDED ALUMINUM IS THEN IGNITED AND DEVELOPS A FIERCE HEAT OF **OVER 4500 DEGREES!**

THE FLAME ROARS OUT OF THE ESCAPE HOLES.

THE MAGNESIUM CASING CATCHES FIRE, WITH A SPUTTERING ACTION...

...FLAMING MOLTEN METAL IS THROWN ABOUT AND SURROUNDING INFLAMMABLE MATERIAL CATCHES FIRE

IF NOT QUICKLY QUENCHED, THE BOMB WILL BURN THROUGH THE FLOOR, SETTING ADDITIONAL FIRES ON THE FLOOR BELOW...



**BUT, WITH PROMPT ACTION AND SIMPLE TOOLS, A MAGNESIUM BOMB CAN BE QUENCHED!**

# CONTROLLING WITH WATER

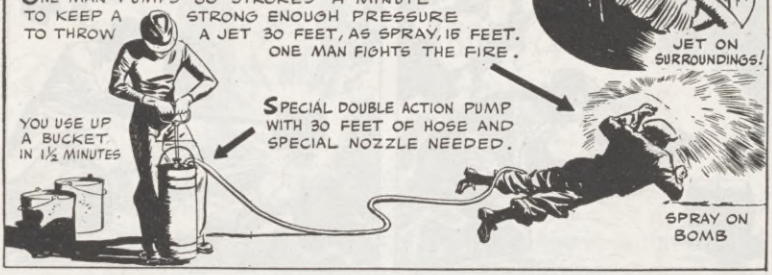
TO FIGHT A BOMB WITH WATER, YOU NEED TWO MEN AND SPECIAL EQUIPMENT. REMEMBER, YOU CAN'T PUT OUT THE BOMB — YOU FEED IT WATER, TO BURN OUT!

ONE MAN PUMPS 80 STROKES A MINUTE TO KEEP A STRONG ENOUGH PRESSURE TO THROW A JET 30 FEET, AS SPRAY, 15 FEET. ONE MAN FIGHTS THE FIRE.

JET ON SURROUNDINGS!

SPECIAL DOUBLE ACTION PUMP WITH 30 FEET OF HOSE AND SPECIAL NOZZLE NEEDED.

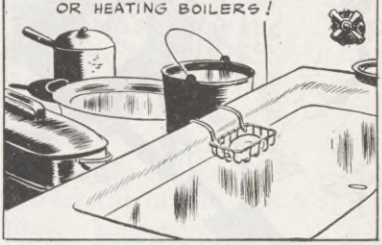
YOU USE UP A BUCKET IN 1½ MINUTES



SPRAY ON BOMB

A THIRD PERSON IS MOST USEFUL TO CHECK OTHER POINTS FOR FLAME REPLENISH WATER AND RELIEVE PUMPER.

AMPLE STORAGE OF WATER SHOULD BE PROVIDED IN ADVANCE, AS WATER MAINS MAY BE BROKEN BY HIGH EXPLOSIVES AND PRESSURE LOST! FILL THE TUB, EXTRA PAILS AND DON'T FORGET IN A PINCH —— THE CONTENTS OF HOT WATER OR HEATING BOILERS!



**NEVER** THROW THE CONTENTS OF A WATER PAIL ON A BOMB!

...IT WILL SCATTER WITH EXPLOSIVE VIOLENCE!

IF CONTROL OF THE BOMB SEEMS DOUBTFUL, HAVE AN ALARM TURNED IN, BUT CONTINUE FIGHTING THE BOMB UNTIL HELP ARRIVES OR SUPPLIES ARE EXHAUSTED!

1 LEARN **NOW** HOW TO CALL


2 LEARN **NOW** LOCATION OF NEAREST ALARM...

MILTON CANIFF

# CONTROLLING WITH SAND







# ABOUT FIRE EXTINGUISHERS

Many houses and public buildings have fire extinguishers. They will be as useful as ever in putting out fires caused by an incendiary bomb. For putting out the bomb itself, the extinguisher may not be suitable.

Read the label. If it says that the contents include CARBON TETRACHLORIDE, it cannot under any circumstances be used on a magnesium bomb. It is not only ineffective, it may cause dangerous gas to be generated. After the bomb is burnt out, use it on any remaining fire.

All water-type extinguishers are suitable. If the label says SODA-ACID, that's simply a means of creating pressure in the extinguisher. Turn it upside down, use it. You can get a spray effect by putting the thumb over the nozzle, use the jet on surrounding fires. However, *one extinguisher is not enough to burn out a magnesium bomb.* And you cannot refill the extinguisher.

It is best to have sand or pump-bucket equipment handy, use them on the bomb, and save the extinguishers for resulting fires.

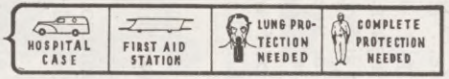
A foam extinguisher will also help to control a bomb, but one extinguisher load will not finish the job.

See that the extinguishers you know about are ready for use.

# CHEMICAL WARFARE AGENTS

## REFERENCE AND TRAINING CHART

LEGEND




The importance of proper first aid for gas victims cannot be overemphasized. The following are general rules which apply in all cases.

A. Act promptly and quietly; be calm.

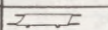
B. Put a gas mask on the patient if gas is still present or, if he has a mask on, check to see that his is properly adjusted. If a mask is not available, wet a handkerchief or other cloth and have him breathe through it.

C. Keep the patient at absolute rest; loosen clothing to facilitate breathing.

D. Remove the patient to a gas-free place as soon as possible.

E. Summon medical aid promptly; if possible, send the victim to a hospital.

F. Do not permit the patient to smoke, as this causes coughing and, hence, exertion.

| CLASS | NAMES AND SYMBOLS | FORM | ODOR | PERSISTENCE | TACTICAL CLASS | PROTECTION | FIRST AID [After removal from gassed area] | PHYSIOLOGICAL EFFECT |
|---|---|---|---|---|---|---|---|---|
| VESICANTS | **MUSTARD** $S(CH_2CH_2)_2Cl_2$ DI-CHLORETHYL SULFIDE | LIQUID AND VAPOR | Garlic, Horseradish, Mustard | One day to one week. Longer if dry or cold. |  |  | Undress; remove liquid mustard with protective ointment, bleach paste, or kerosene; bathe; wash eyes and nose with soda solution. | Delayed effect. Burns skin or membrane. Inflammation respiratory tract leading to pneumonia. Eye irritation, conjunctivitis. |
| VESICANTS | **LEWISITE** $CHClCH\text{-}AsCl_2$ CHLOROVINYL-DICHLORARSINE | LIQUID AND VAPOR | Geraniums | One day to one week. Longer if dry or cold. |  |  | Undress; remove liquid Lewisite with hydrogen peroxide, lye in glycerine, or kerosene; bathe; wash eyes and nose with soda. Rest—Doctor. | Burning or irritation of eyes, nasal passages, respiratory tract, skin. Arsenical poison. |
| LUNG IRRITANTS | **CHLORPICRIN** $CCl_3NO_2$ NITRACHLOROFORM | GAS | Flypaper, anise | Open 6 hours. Woods 12 hours. |  |  | Wash eyes, keep quiet and warm. Do not use bandages. | Causes severe coughing, crying, vomiting. |
| LUNG IRRITANTS | **DIPHOSGENE** $ClCOOC\text{-}Cl_3$ TRICHLOROMETHYL CHLOROFORMATE | GAS | Ensilage, Acrid | 30 minutes. |  |  | Keep quiet and warm. Give coffee as a stimulant. | Causes coughing, breathing hurts, eyes water, toxic. |
| LUNG IRRITANTS | **PHOSGENE** $COCl_2$ CARBONYL CHLORIDE | GAS | Musty hay, Green corn | 10 to 30 minutes. |  |  | Keep quiet and warm, bed rest. Coffee as a stimulant. Loosen clothing. No alcohol or cigarettes. | Irritation of lungs, occasional vomiting, tears in eyes, dazed feeling. Occasionally symptoms delayed. Later, collapse, heart failure. |
| LACRIMATORS | **CLORACETOPHENONE** $C_6H_5CO\text{-}CH_2Cl$ | GAS | Apple Blossoms | 10 minutes. |  |  | Wash eyes with cold water or boric acid solution. Do not bandage. Face wind. For skin, sodium sulphite solution. | Makes eyes smart. Shut tightly. Tears flow. Temporary. |
| LACRIMATORS | **BROMBENZYLCYANIDE** $C_6H_5CH\text{-}BrCN$ | GAS | Sour fruit | Several days. (Weeks in winter.) |  |  | Wash eyes with boric acid. Do not bandage. | Eyes smart, shut, tears flow. Effect lasts some time. Headache. |
| STERNUTATORS | **ADAMSITE** $(C_6H_4)_2\text{-}NHAsCl$ DIPHENYLAMINECHLORARSINE | GAS | Coal Smoke | 10 minutes. |  |  | Keep quiet and warm. Loosen clothing. Reassure. Spray nose with neo-synephrin or sniff bleaching powder. Aspirin for headache. | Causes sneezing, sick depressed feeling, headache. |
| STERNUTATORS | **DIPHENYLCHLORARSINE** $(C_6H_5)_2\text{-}AsCl$ | SMOKE | Shoe Polish | Summer 10 minutes. |  |  | Remove to pure air, keep quiet. Sniff chlorine from bleaching powder bottle. | Causes sick feeling and headache. |

# WAR GASES

***General Notes.***

War "Gases," or chemical agents used to produce casualties, are surprise weapons. As this is written, they have not been used against the British or others trained to protect themselves. They have been used against the Ethiopians and the Chinese.

A gas-tight room suitably located offers fair protection against any probable concentration of war gas in a city. For those whose duties take them into the streets a gas mask offers full protection against all but the "blister gases" (liquid vesicants). To enter areas where mustard or lewisite is present, full protective clothing is needed.

War gases may be dropped in bombs or simple containers and liquid vesicants may also be sprayed by airplanes.

The gas warning is a "percussion sound"—that is, bells, drums, hand rattles, rapidly struck resonant objects of any kind. If the presence of gas is suspected, report to the nearest warden. Do not shout if distant gas alarms are heard. The danger is local and the spreading of an alarm must be left to the wardens.

The notes on the following pages are simply for reference for those who have received instruction in protection against gas. Reading them will not by itself make you an expert in gas defense.

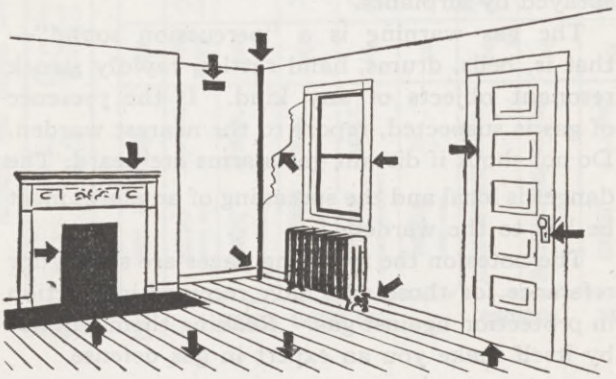
# THE GAS-TIGHT ROOM

War gases hug the ground, flow into cellars and basements. Upper floors of a dwelling are away from dangerous concentrations. If all openings and cracks are closed, a room three stories from the ground will offer good protection against war gases.

To stop cracks and small openings, tape of various kinds may be used. A mush made by soaking newspapers in water or patching plaster may be used for caulking larger openings. A piece of wall board, nails and caulking material may be kept handy to cover a window broken by the blast of high explosives.

One door may be used as an entrance by fastening over it a blanket in such a way as to seal it tightly when no one is going in or out. If soaked in oil to close the air spaces, the blanket is more effective.

Store necessary supplies in such a room—food, water, chairs, a battery-operated radio, flashlight and by all means provide some sort of toilet facilities—use it as the refuge room.



Allow 20 square feet of floor space for each person who is to occupy an average room with a ceiling nine feet high. This will give enough air to occupy the room 10 hours.

The illustration shows where to stop up cracks, how to hang the blanket at the entrance door.

## "Blister Gases" and Decontamination.

Lewisite and mustard "gas" are liquids in the normal state. They give off a dangerous vapor that acts as a war gas and unless chemically neutralized may persist for a week, contaminating the air for a considerable distance down wind.

Full protection against these chemical agents is afforded by gas-proof clothing, covering the wearer from top to toe and tightened at wrists and ankles. The greatest care must be used in undressing after exposure to lewisite or mustard and this is done at personnel decontamination stations, where vesicant casualties are also taken for first aid.

Decontamination of streets, walls, and buildings is effected principally by means of chloride of lime (bleaching powder) freshly mixed with earth and water as a slurry or paste. It must be thoroughly worked into cracks and crevices and the resulting product flushed away. This work is done by the decontamination squads.

The liquid vesicants are very penetrating and ordinary shoes or clothing offer no protection. Do not go into the streets after a gas alarm has been sounded except on direction of the Warden.

| RANK DESIGNATION | ▲ | ▲▲ | ▲▲▲ | △ | △△ | △△△ | ★ | ★★ | ★★★ | ★★★★ |
|---|---|---|---|---|---|---|---|---|---|---|
| AIR RAID WARDEN | FIRST CLASS | SENIOR OR SECTOR WARDEN | ZONE LEADER | GROUP LEADER | CHIEF WARDEN | STATE WARDEN | NO OTHER RANKS | | | |
| AUXILIARY FIREMEN | " | SQUAD LEADER | PLATOON LEADER | COMPANY LEADER | FIRE CHIEF | STATE FIRE COORDINATOR | NO OTHER RANKS | | | |
| AUXILIARY POLICEMEN | " | " | " | " | CHIEF OF POLICE | NO OTHER RANKS | | | | |
| BOMB SQUADS | " | " | NONE | " | " | NO OTHER RANKS | | | | |
| RESCUE SQUADS | " | " | DEPOT LEADER | " | FIRE CHIEF | NO OTHER RANKS | | | | |
| MEDICAL FIELD UNITS | " | TEAM LEADER | SQUAD LEADER | UNIT LEADER | CHIEF OF E.M.S. | STATE MEDICAL DIRECTOR | NO OTHER RANKS | | | |
| MEDICAL AUXILIARIES (stretcher teams) | " | " * | " * | NO OTHER RANKS | | | | | | |
| NURSES' AIDES | NO RANK DESIGNATIONS | | | | | | | | | |
| EMERGENCY FOOD AND HOUSING | FIRST CLASS | UNIT LEADER | DEPOT LEADER | COMPANY LEADER | CHIEF WARDEN | NO OTHER RANKS | | | | |
| DRIVERS UNITS | " | CONVOY LEADER | " | " | NO OTHER RANKS | | | | | |
| MESSENGERS | " | SENIOR MESSENGER | PLATOON LEADER | " | NO OTHER RANKS | | | | | |
| ROAD REPAIR CREWS | " | CREW LEADER | DEPOT LEADER | " | | | | | | |
| DEMOLITION AND CLEAR. | " | " | " | " | CHIEF OF EMER. WORK S. | NO OTHER RANKS | | | | |
| DECONTAMINATION SQUADS | " | SQUAD LEADER | STATION LEADER | " | | | | | | |
| FIRE WATCHERS | " | NO OTHER RANKS | | | | | | | | |
| REPAIR CREWS | " | CREW LEADER | SERVICE LEADER | NONE | CHIEF OF UTILITIES | NO OTHER RANKS | | | | |
| LOCAL STAFF | " | AS REQUIRED | | STAFF UNIT LEADER | CONTROLLER | COMMANDER | COORDINATOR | NO OTHER RANKS | | |
| STATE STAFF | " | AS REQUIRED | | | AS DESIGNATED | AS DESIGNATED | ASST. COORDINATOR | COORDINATOR | NO OTHER RANKS | |
| U. S. STAFF | " | AS REQUIRED | | | | AS DESIGNATED | AS DESIGNATED | AS DESIGNATED | REGION DIRECTOR PRINCIPAL ASSTS | U.S. DIRECTOR |
| | | | | | | | | | | |
| | | | | | | | | | | |
| EQUIVALENT ARMY TERM | PVT. 1st CLASS | NON-COMM. OFF. | LIEUTENANT | CAPTAIN | MAJOR | COLONEL | BRIG. GEN. | MAJ. GEN. | LIEUT. GEN. | GENERAL |

*ASSIGNED BY RED CROSS TO CHIEF OF EMERGENCY MEDICAL SERVICE.

# CITIZENS' DEFENSE CORPS

The team of trained civilian services organized to operate the passive defense is known as the Citizens' Defense Corps. It includes regular forces of the city—police, firemen, welfare workers, sanitation men—as well as volunteers. It operates as a unit under the local Defense Co-ordinator.

*Staff.*

The Citizens' Defense Corps is headed by a Commander assisted by a staff. His second in command is the Executive Officer. There are others who operate the control center and the communications, account for personnel and property and assign transportation. The Chiefs of the Fire and Police Departments assist him in the passive defense. There is a Chief Air Raid Warden, a Chief of Emergency Medical Services, and others who control groups of the enrolled volunteers. Learn the organization of the Citizens' Defense Corps in your community.

### *Enrolled Volunteer Services of The Citizens' Defense Corps.*

Air Raid Wardens are in complete charge of a sector containing the homes of about 500 people. To them the warden is the embodiment of all Civilian Defense.

Auxiliary Firemen assist the regular fire-fighting forces.

Auxiliary Policemen assist the police department in enforcing blackout restrictions, in traffic control, and in guard duties.

Bomb Squads are specially trained squads of police to handle and dispose of time bombs and duds.

Rescue Squads are trained crews of about 10 men each with special equipment to rescue the injured from debris.

Medical Forces consist of first-aid parties and stretcher squads and personnel at casualty clearing stations. Members of these forces are doctors, trained nurses, and assistants.

Nurses' Aides assist nurses. They have special Red Cross Training.

Emergency Food and Housing Corps members provide welfare services to the needy and homeless.

Drivers Units consist of emergency drivers of vehicles used by the Civilian Defense services.

Messengers carry supplies, dispatches, and messages wherever needed.

Road Repair Crews restore normal flow of traffic as quickly as possible. Utility repair men work with these crews and with demolition squads.

Demolition and Clearance Crews remove rubble, fill bomb craters, and remove unsafe walls or parts of buildings.

Decontamination squad members are specially trained to treat clothing and equipment as well as streets and walls contaminated by war gas.

Fire Watchers must spot and combat incendiary bombs.

# A MANUAL OF DRILL

*for the*

# CITIZENS' DEFENSE CORPS

*Adapted from the Basic Field Manual of the United States Army*

Basic drill is not required of a volunteer for award of the insigne. Drill for units of the Citizens' Defense Corps, however, is recommended as it helps to coordinate the work of individuals under a single command. The purposes of drill are:

**1** To enable a leader to move his unit from one place to another in an orderly manner.

**2** To aid in disciplinary training by instilling habits of precision and response to the leader's orders.

**3** To provide a means, through ceremonies, of enhancing the morale; develop a spirit of cohesion; and give an interesting spectacle to the public.

**4** To give leaders practical training in commanding volunteers.

***Drills should be frequent, intensive, and of short duration.***

### *General.*

A normal squad of volunteers contains 12 men or 12 women, all of one service. It consists of a leader, an assistant leader, and other personnel. As far as practicable, the squad is kept intact. The usual formation of the squad is a single rank or single file. This permits variations in the number of men composing the squad.

### *To Form the Squad.*

The command is; FALL IN. At the command FALL IN the squad forms in line as shown. Squad leader on the squad's extreme right, assistant leader on the squad's extreme left.

To secure uniformity, the tallest leader is put in charge of the first squad, the second tallest in charge of the second squad, etc. Assistant

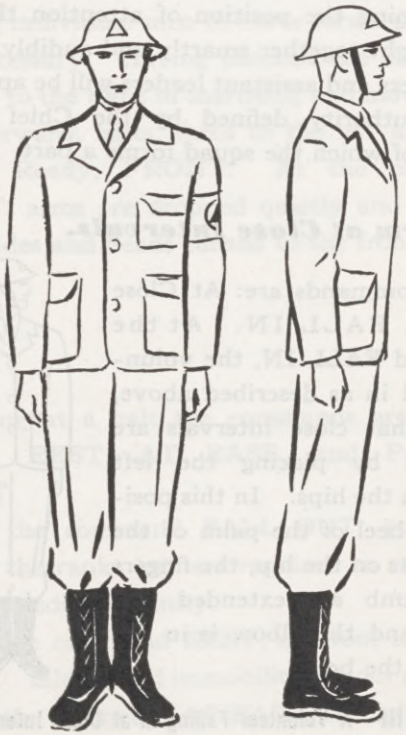
Fig. 1—A Squad in Line

leaders are similarly arranged. Other volunteers are placed according to height beginning with the tallest being placed next to the leader.

On falling in, each man except the one on the left extends his left arm laterally at shoulder height, palm of the hand down, fingers extended and

joined. Each man, except the one on the right, turns his head and eyes to the right and places himself in line so that his right shoulder touches lightly the tips of the fingers of the man on his right. As soon as proper intervals have been obtained, each man comes to attention, drops his arm smartly to his side and turns his head to

**Fig. 11—A Volunteer at Attention**



front, heels together, feet forming a 45-degree angle; knees are straight without stiffness, hips level and drawn back slightly, body erect and resting equally on hips, chest lifted and arched, shoulders square and falling equally. Arms hang straight down without stiffness with the back of the hands out, fingers held naturally. Head erect and squarely to the front, chin drawn in so that the axis of the head and neck is vertical, eyes straight to the front. The weight of the body rests equally on the heels and the balls of the feet. In assuming the position of attention the heels are brought together smartly and audibly.

(Leaders and assistant leaders will be appointed under authority defined by the Chief of the Service of which the squad forms a part.

### *To Form at Close Intervals.*

The commands are: At Close Interval, FALL IN. At the command FALL IN, the volunteers fall in as described above, except that close intervals are obtained by placing the left hands on the hips. In this position the heel of the palm of the hand rests on the hip, the fingers and thumb are extended and joined, and the elbow is in the plane of the body.

**Fig. III—A Volunteer Falling in at Close Interval**

### *To Aline the Squad.*

If in line, the commands are: Dress Right, DRESS, Ready, Front. At the command DRESS, each man except the one on the left extends his left arm (or if at close interval, places his left hand upon his hip), and all aline themselves to the right. The instructor places himself on the right flank one pace from and in prolongation of the line and facing down the line. From this position he verifies the alinement of the men, ordering individual men to move forward or back as is necessary. Having checked the alinement, he faces to the right in marching and moves three paces forward, halts, faces to the left and commands: Ready, FRONT. At the command FRONT, arms are dropped quietly and smartly to the sides and heads turned to the front.

### *Rests.*

Being at a halt the commands are: FALL OUT, REST, AT EASE, and PARADE REST.

At the command FALL OUT, volunteers leave the ranks but are required to remain in the immediate vicinity.

At the command REST, one foot is kept in place. Silence and immobility are not required.

At the command AT EASE the right foot is

kept in place. Silence but not immobility is required.

At the command of execution REST of Parade REST, move the left foot smartly 12 inches to the left of the right foot keeping the legs straight so that the weight of the body rests equally on both feet. At the same time, clasp the hands behind the back, palms to the rear, thumb and fingers of the right hand clasping the left thumb without constraint; preserving silence and immobility.

Being at any of the rests except FALL OUT, to resume the position of Attention, the commands are Squad (or other unit being commanded) ATTENTION. At the command ATTENTION take that position in your squad.

***Eyes right (left).***

The commands are: Eyes (Preliminary Command), RIGHT (Command of Execution) (LEFT) Ready FRONT! At the command RIGHT, each man turns his head and eyes to the right. At the command FRONT the head and eyes are turned to the front.

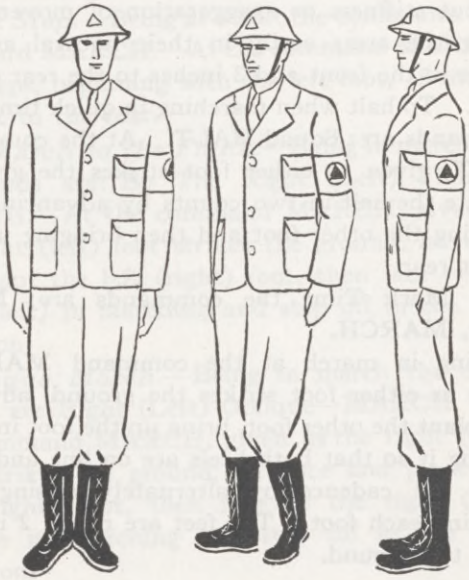
***Facings.***

(*All Facings are executed at the halt.*)

*To the flank.*—The commands are Right (Left) FACE. At the command FACE, slightly raise the left heel and the right toe: Face to the right, turning on the right heel, assisted by a slight pressure on the ball of the left foot. Next, place the left foot beside the right. Exercise Left FACE on the left heel in a corresponding manner.

*To the rear.*—The commands are: About FACE. At the command FACE, carry the toe of the right foot a half-foot length to the rear and slightly to the left of the left heel without changing

Fig. IV—Executing Right FACE



the position of the left foot; weight of the body mainly on the heel of the left foot; right leg straight without stiffness. (TWO) Face to the rear turning to the right on the left heel and on the ball of the right foot, place the right heel beside the left.

### *Steps and Marchings.*

All steps and marchings executed from the halt, except right step, begin with the left foot.

*Quick Time:* Being at a halt, to march forward in quick time, the commands are: Forward MARCH. At the command Forward, shift the weight of the body to the right leg without perceptible movement. At the command MARCH, step off smartly with the left foot and continue the march with steps taken straight forward without stiffness or exaggeration of movements. Swing the arms easily in their natural arcs, 6 inches to the front and 3 inches to the rear of the body. To halt when marching in quick time, the commands are: Squad HALT. At the command HALT, given as either foot strikes the ground, execute the halt in two counts by advancing and planting the other foot and then bringing up the foot in rear.

To Mark Time the commands are; Mark-Time, MARCH.

Being in march at the command MARCH, given as either foot strikes the ground, advance and plant the other foot, bring up the foot in rear, placing it so that both heels are on line and continue the cadence by alternately raising and planting each foot. The feet are raised 2 inches from the ground.

Being at a halt, at the command MARCH, raise and plant first the left then the right as prescribed above.

The halt is executed from mark time as from quick time.

*Half Step.*—The commands are: Half Step MARCH. At the command MARCH, take steps of 15 inches in quick time. To resume the full step from the half step or mark time the commands are: Forward MARCH.

*Side Step.*—Being at a halt the commands are: Right (Left) Step MARCH. At the command MARCH, carry the right foot 12 inches to the right, place the left foot beside the right, left knee straight. Continue the cadence of quick time. (The side step is executed in quick time from the halt and for short distances only.)

*Back Step.*—Being at a halt the commands are, Backward MARCH. At the command MARCH, take steps, beginning with the left foot, 15 inches straight to the rear.

*To March to the Flank.*—Being in march the commands are: By The Right (Left) Flank—MARCH. At the command MARCH, given as the right (left) foot strikes the ground, advance and plant the left (right) foot, then face to the right (left) in marching and step off in the new direction.

*Oblique March.*—Being in march the commands are Right (Left) Oblique—MARCH. At the command MARCH, given as the right (left) foot strikes the ground, advance and plant the left (right) foot, then face to the right (left) oblique in marching and step off in the new direction.

To resume the original direction, the commands are—Forward, MARCH. At the command MARCH each individual faces half left (right) in marching then moves straight to the front.

*Change Step.*—The commands are Change Step, MARCH. Being in march at quick time, at the command MARCH, given as the right foot strikes the ground, advance and plant the left foot, plant the toe of the right foot near the heel of the left and step off with the left foot. (Execute the change on the right foot similarly, the command MARCH being given as the left foot strikes the ground.)

*To the Rear.*—To face to the rear in marching, being in march, the commands are: To The Rear, MARCH. At the command MARCH, given as the right foot strikes the ground, advance and plant the left foot, turn to the right about on the balls of both feet and immediately step off with the left foot.

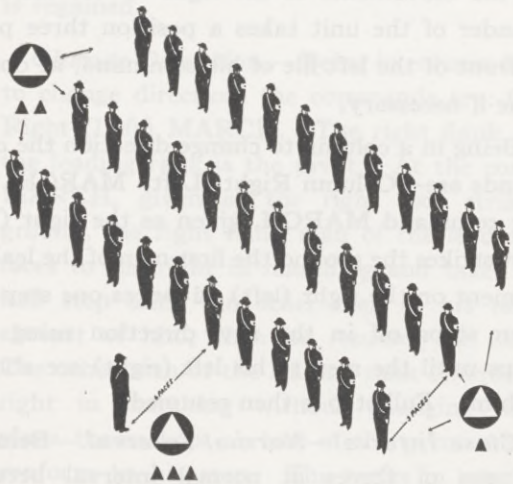
*Other Marchings.*—March other than at Attention. The commands are: Route Step, MARCH or At Ease, MARCH. Route Step MARCH, at the command MARCH Volunteers are not required to march at attention or to maintain silence. At Ease, MARCH is the same as Route Step, MARCH, except that Volunteers will maintain silence.

*Dismissing the Squad.*—The unit being at a halt the leader calls the unit to attention, if they are not at attention, from a point six paces in front of the center of the unit. He then will give the command—DISMISSED. Volunteers are then free to go and do as they please until the next regularly scheduled drill period.

### *Forming the Platoon.*

To form the platoon, which consists of 3 squads—the command, FALL IN will be given by the senior leader facing the area on which he wishes the platoon to form. At this command the unit will form facing the leader with its center 6 paces to his front in 3 parallel lines (each of these lines constitutes a squad). (Should there be insufficient men to form 3 complete squads, skeleton squads of as near equal number as possible will be formed in 3 ranks, squad leaders placing themselves directly behind one another.)

**Fig. V.—A Platoon in Column of Squads**



*From this formation the unit can march; forward, to the right, or to the left.*

***Platoon Movements.***

At the command: Forward MARCH, each man steps off with his left foot directly to his own front preserving his relative position and so regulates his step that the ranks remain parallel to his original front.

At the command: Right (Left) FACE Forward MARCH, the unit executes a right face on the heel of the right foot and ball of the left foot at the word FACE and at the word MARCH they step off with their left foot as in moving to the front. (Left face is performed by turning on the heel of the left foot and the ball of the right foot.) In the movements to the right or left the commander of the unit takes a position three paces in front of the left file of his command, at double time if necessary.

Being in a column to change direction the commands are—Column Right (Left) MARCH. At the command MARCH, given as the right (left) foot strikes the ground the first man of the leading element on the right (left) advances one step and then steps off in the new direction using half steps until the men to his left (right) are abreast of him. Full step is then resumed.

*Close Interval—Normal Interval.*—Being in column of threes at normal interval between squads to March or form at Close Interval, the commands are: Close, MARCH. At the command MARCH, the squads close to the center by

obliquing until the interval between men is 4 inches. The center squad take up the half step until the dress has been regained.

If this movement is executed from the halt, the squads close toward the center by executing Right or Left Step until 4-inch intervals are reached.

Being in column of threes at close interval between squads to March or form at Normal Interval, the commands are: Extend, MARCH. At the command MARCH, the squads open to the right and left from the center by obliquing until the normal interval is regained.

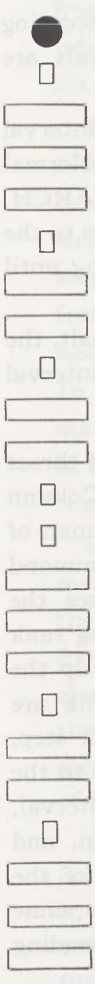
If this movement is executed from the halt, the squads Right or Left Step until normal interval is regained.

*Change Direction.*—Being in column of threes to change direction, the commands are: Column Right (Left) MARCH. The right flank man of the leading rank is the pivot. At the command MARCH, given as the right foot strikes the ground, the right flank man of the leading rank faces to the right in marching and takes up the half step until the other men of his rank are abreast of him, then he resumes the full step. The other men of the leading rank oblique to the right in marching without changing interval, place themselves abreast of the pivot man, and conform to his step. The ranks in rear of the leading rank execute the movement on the same ground and in the same manner as the leading rank.

## Fig. VI

### *Forming the Citizens' Defense Corps for Parade*

(Services will form and move as platoons)



Mayor, Defense Coordinator and Dignitaries.

Commander, C. D. C.

Staff.

Messengers.

Drivers.

Fire Department Chief.

Auxiliary Firemen.

Rescue Squads.

Police Department Chief.

Auxiliary Police.

Bomb Squads.

Colors.

Warden Service Chief.

Air Raid Wardens.

Fire Watchers.

Emergency Food Housing Units.

Medical Service Chief.

Medical Field Units.

Nurses' Aides Corps.

Public Works Service Chief.

Demolition and Clearance Crews.

Road Repair Squads.

Decontamination Corps.



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Fig. VI

*Forming the Citizens' Defense Corps for Parade*

(Services will form and move in platoons)

- Mayor, Defense Coordinator and Dignitaries.
- Commander, C. D. C.
- Staff.
- Messengers.
- Drivers.
- Fire Department Chief.
- Auxiliary Firemen.
- Rescue Squads.
- Police Department Chief.
- Auxiliary Police.
- Bomb Squads.
- Colors.
- Warden Service Chief.
- Air Raid Wardens.
- Fire Watchers.
- Emergency Food Hoarding Units.
- Medical Service Chief.
- Medical Field Units.
- Nurses' Aides Corps.
- Public Works Service Chief.
- Demolition and Clearance Crews.
- Road Repair Squads.
- Decontamination Corps.

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