

A Handbook for

ROAD REPAIR CREWS



United States

OFFICE OF CIVILIAN DEFENSE

Washington, D. C.

A Handbook for

ROAD REPAIR CREWS



Prepared by the Training Section

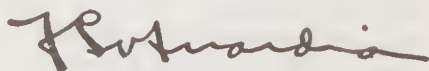
U. S. OFFICE OF CIVILIAN DEFENSE

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 civilians against the effects of 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 Road Repair Crews.



F. H. LaGuardia,
U. S. Director Civilian Defense.

Washington, D. C.
December 18, 1941.

CONTENTS

	<i>Pages</i>
Preface	III
Chain of Command	1
Number of Road Repair Crews	2
Headquarters for Road Repair Crews	2
Duties	2
Training Requirements	4
Trucks, Cars	4
Equipping the Truck or Car	4
Other Machinery, Tractors, Bulldozers, etc.	5
Duties Preliminary to an Air Attack	6
Delayed Action Bombs	7
Tools and Equipment	7
After the Raid	7
Standard Symbols for Maps	9
Types of Direction Signs	10
Notes	10
Blackouts	13
Warning System	16
What To Do In An Air Raid	18
Fire Defense	19
Magnesium Bomb	20
Water Control of Incendiaries	21
Sand Control of Incendiaries	22
Fire Extinguishers	23
Chemical Warfare Agents, Chart	24
War Gases	25
Gas-Tight Room	26
Decontamination	27
Citizens' Defense Corps	29
Enrolled Services, C. D. C.	29
Drill Manual, C. D. C.	31

A Handbook for **ROAD REPAIR CREWS**



Chain of Command.

The Public Works Emergency Division Chief, or one having similar authority, usually supervises the Road Repair Crews, the Decontamination Squads, and the Demolition and Clearance Crews. These three services are able to function best within one organization but there are communities where it may be deemed expedient to enroll, train, supervise and equip them separately. Each political subdivision will have its own area to consider, so no hard and fast rule can be laid down. There will be one leader of all Road Repair Crews, under the Public Work's Emergency Division Chief, whose responsibility will embrace all Truck Companies. An Assistant Leader of Road Repair Truck Companies is usually appointed by the Public Works Emergency Division Chief for each area of 100,000 population.

Leaders of Truck Companies are appointed by the Leader of the road repair truck companies. Truck Drivers and Assistant Drivers are appointed by the Truck Company Leader. All Leaders, Drivers and Assistant Drivers are also workers.

Number of Road Repair Crews.

Road Repair Crews of eight to twelve men are organized for each 4,000 to 5,000 population. Two to four squads are combined to form a Truck Company. These Truck Companies are further organized into groups that serve districts of not more than 100,000. It is not usual that any district will contain more than 100,000 people and no district should be without the services of a proficient Road Repair Truck Company. Each squad is expected to be able to operate alone or in combination with any number of other squads.

Units of the sizes stated above have proven to be the most effective; however, local conditions may make changes necessary.

In small communities the duties of a Road Repair Crew, a Demolition and Clearance Crew and a Rescue Squad may be combined in one Truck Company.

Headquarters for Road Repair Crews.

Road Repair Crews organized into Truck Companies will be stationed throughout the community at strategic points from which any section can be reached regardless of the extent of raids. They should not be stationed near public buildings or storage tanks.

Duties.

The duties of Road Repair Crews cover a wide range. Of course the primary duty is to restore the surface to roads in order that traffic can use it, but there are many other things associated with streets and roads that come within the scope of your work.

Medical units, fire-fighting equipment, rescue squads, police cars and workers, have to get through. The roads should be open to traffic at the earliest possible moment. In the meantime plainly marked detours must be laid out. Routes that are narrow and have overhead obstructions should be avoided, as should routes where there are steep grades and sharp turns. Ideal conditions, being seldom obtainable, the best possible road net is laid out and plainly marked.

In any case, the approval of traffic police must be obtained for a detour route before marking.

Restoring road lines, direction signs, pedestrian crossing lines, and painting poles are also part of your responsibility.

Locked or disabled cars found on the roads, that are obstructing traffic, should be removed by any means available.

Animals found wandering on the road should be secured to a tree or post in a manner that makes it impossible for them to block traffic on roads or sidewalks.

Carcasses of animals will be turned over to those experienced in their disposal.

Sewers that are clogged by debris caused by heavy rains will have to be cleared to permit water to run off and traffic to move. There may be occasions when ditches will have to be dug to accomplish this.

High winds may bring down trees that will obstruct roads.

Slides caused by heavy rains or thawing will have to be removed.

Many of these tasks should be performed by Demolition and Clearance Crews and their assistance should be requested through the Control Center when required. However, you should be ever ready to assist in this work and if need be perform it alone.

Training Requirements.

Each member of a Road Repair Crew is required to be proficient in the following subjects:

1. Fire Defense—3 hours.
2. Gas Defense—2 hours.
3. General Course—5 hours.
4. Drill—2 hours.

Trucks, Cars.

It is doubtful if there are very many municipalities that can set aside vehicles equipped to be used for air raid work alone. However, dependable vehicles should be made available and reserve quantities of oil and gasoline stored for emergency use.

One member of each Road Repair Crew is the truck driver, another should be designated as substitute driver; each must have a thorough knowledge of the district in which he is to function and also know how to reach surrounding districts and communities.

Equipping the Truck or Car.

In many cases it will be necessary to obtain road repair equipment by purchase or by loan. This should be stored close to the truck and a supply of fuel and repair parts be made a part of the service load.

Suggested Equipment.

Shovels.
Picks.
Mattocks.
Axes.
Crowbars.
Rope, 2".
Rope, $\frac{1}{2}$ ", 500 ft.
Cable, 1" steel, 200 ft.
Sledge hammers, 10–12 lb.
Wheelbarrows.
Post-hole digger.
Heavy gloves.
Crosscut saw, 2-handled.
Electric cable.
Lamps 250–500 watts.
Black paint.
White paint.
Brushes 1", 2", 4", 6".
White show cards up to 2' x 3' for signs.
Boards up to 2' x 3' x 1" for signs.
Posts—2 by 4's for signs.
Nails, to fasten signs on posts and trees.
Handsaw, rip.
Handsaw, crosscut.
Supply of detour signs and other standard signs.

Other Machinery. Tractors, Bulldozers, etc.

A tractor with a scraping attachment or a bulldozer is almost indispensable for filling craters and should be available to every community. Where the municipality does not possess one, arrangement can be made to rent or borrow one or more from private citizens. The man who is to drive and his substitute are responsible for the tractor or bulldozer being ready when needed.

For fast transportation a truck with a ramp will speed up delivery of slow moving equipment to the scene of an incident. A plentiful supply of gasoline, oil, water, and in cold weather anti-freeze, is imperative both for initial usage and for replenishment.

Dump trucks, when available, can be used to great advantage to haul rubble.

Cities that are able to provide all this equipment will be the exception rather than the rule. It is not anticipated that every community will at once purchase everything that might be needed; however, every attempt should be made to secure a good supply of the simpler tools that will do the job efficiently by substituting hand power for mechanical horsepower.

Duties Preliminary to an Air Attack.

After your crew and truck company is trained and organized it will be to the advantage of all to practice loading and unloading your equipment. Have a place for every piece, have every piece in the best possible condition. If the amount of equipment your local defense council is able to furnish is very limited, attempt to secure vital items by loan or purchase.

Drivers and assistant drivers are responsible for the condition of their vehicles. Time spent in tuning them up will pay big dividends when the adverse conditions that exist during raids is encountered. Moments devoted to care of vehicles in a warm, dry, and lighted garage may prevent break-downs that take hours to repair on the job.

Delayed-Action Bombs.

Bombs, other than incendiary, that fall near where your crew is working will be reported to the nearest Air Raid Warden at once. When they fail to explode, if your squad is working within the danger area, work will be stopped at once and the crew and equipment withdrawn to a safe distance. Contact should be made with your headquarters to ascertain if there is work elsewhere for your squad.

Tools and Equipment.

All equipment, from sledge hammers to motor cars, performs best, through long and hard usage, when properly conditioned. During periods of operation and while waiting for calls, no opportunity should be passed up to recondition and tune up equipment. One member of each company should be made responsible for all tools.

As some machinery is equipped with steel wheels, care will be exercised not to let them come in contact with power lines that might be down. Serious and fatal burns and shocks are frequently caused by neglecting this precaution.

After the Raid.

Air Raid Wardens will inform the control center of damages to roads in his section, the control center will notify the Road Repair Truck Company of their location and extent. If it is within the area assigned to your company you will proceed, with all your vehicles and equipment, to the scene of the incident and take the necessary actions to permit traffic to get through.































Rope off the damaged section with materials from your own truck or with materials that will be supplied by the Warden. Lay out the alternate routes to be used and post as many signs as are necessary to reroute traffic around the area, first checking your arrangements with police authorities. Post guides if necessary. (1,000 lb. bombs will form a crater, in soft earth, 40 ft. across, 6 ft. deep and cause damage to utilities to 10 ft.) Ascertain if any utilities buried under the road have been damaged. If they have been, it will be the responsibility of the chief of public works to say whether it is more important to repair the utilities or to repair the road first. When it is decided to fill in the holes the rubble from the street itself and from buildings that have been destroyed will be used and paving will be replaced.

Cooperation with Demolition and Clearance Crews will lighten the amount of work that will have to be done and shorten the hauls of debris. The usual practice is to demolish walls onto the area formerly occupied by the building. However, when there is a need for materials to fill holes they could be pulled or blown down onto the road where the material can be handled more efficiently.

After alternate routes are marked out and holes are filled in the next step is to restore all signs and lines as were previously in use. When this is finished and caution signs have been placed to warn traffic of the repaired section, the alternate routes will be abandoned, the signs removed and the guides relieved.

Standard Symbols for Maps.

Use these standard symbols on all maps—they are intended to make clear the facts you and others will need to know in a hurry.

 Warden's Post	 Bomb Crater
 Fire Watcher's Station	 Roped-off Area
 Fire Alarm	 Street Car Tracks
 Telephone	 Double Tracks
 Air Raid Shelter	 Cisterns or Water Reserves
 Gas-Proof Air Raid Shelter	 Sector Limits
 Entrance to Shelter	 Zone Limits
 Fire Station	 Site of Gas Bomb
 Decontamination Squad Depot	 Contaminated Area (For large area, blue cross-hatch)
 Repair Squad	 Street Lamp
 Casualty Station	 Fire Hydrant
 Decontaminating First Aid Station	 Sewer Gratings
 Bomb Squad Station	 Manhole
 Location of Incident (Show number in center)	 Tree
 Demolished Building	 Sandbags

Types of Direction Signs.



This Page Is for Notes

This Page Is for Notes

This Book Belongs to: _____

(First name)

(Initial)

(Last name)

Enrolled Status:] _____

My Home Address Is: _____

My Telephone Number Is: _____

*Or my home can be reached
by calling* _____

In case of emergency, notify: _____

City _____ *State* _____

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.

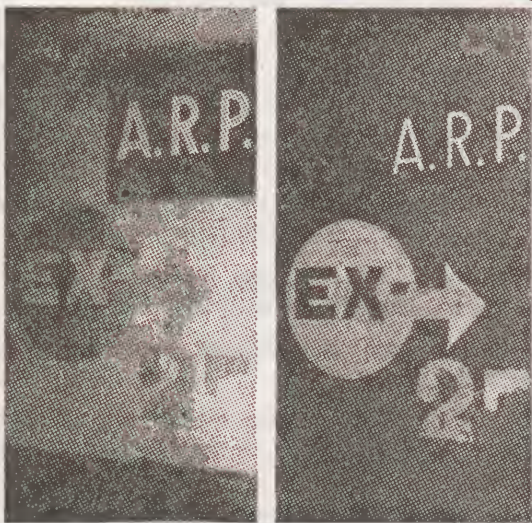
Buildings. Windows and doors must be covered with opaque materials. Paint on the glass, heavy curtains, light “baffles” or screens are some of the ways. No cracks of light must show.

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



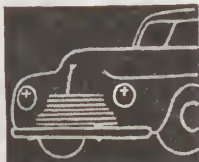
1. Painting curbs, trees, poles and hydrants with white paint. There is a luminous paint, also, that gives off a faint blue light quite visible in total darkness.

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.



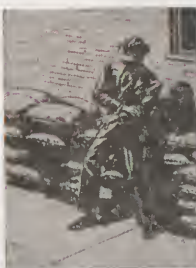
Use your flashlight as little as possible, if at all. **Never** point it upward.



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



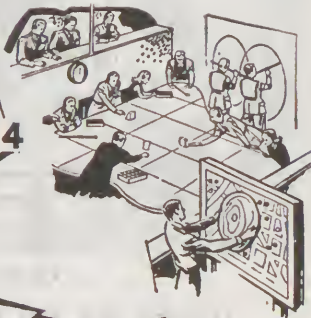
2



3



5



4

6



7



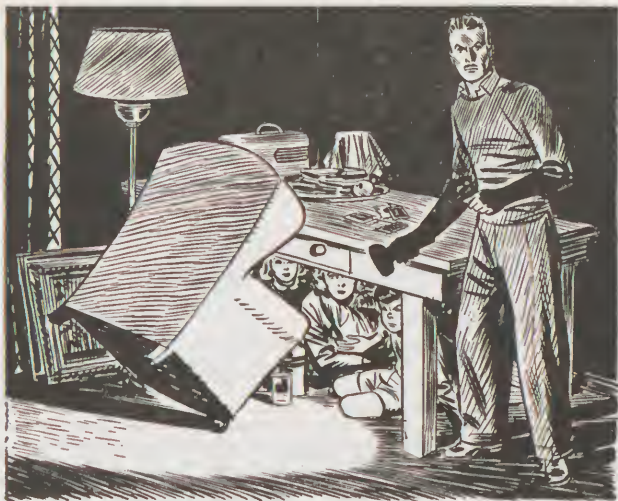


The Refuge Room

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.

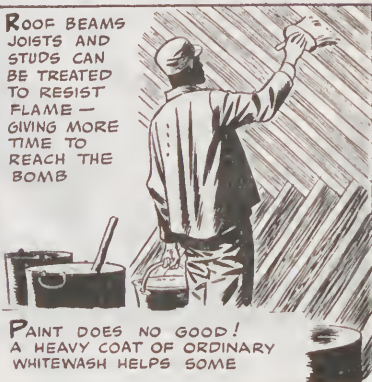
FIRE DEFENSE

IT WILL BE VERY DIFFICULT TO FIGHT A MAGNESIUM BOMB UNLESS SOME WORK IS DONE BEFORE THE ATTACK



ALL FURNITURE TRUNKS AND JUNK OF ALL KINDS SHOULD BE REMOVED FROM ATTIC OR TOP FLOOR!

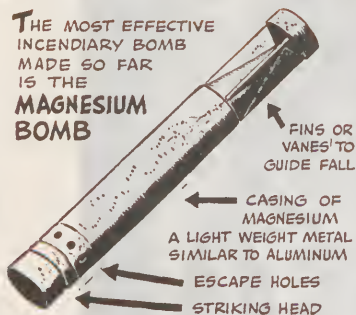
ROOF BEAMS JOISTS AND STUDS CAN BE TREATED TO RESIST FLAME — GIVING MORE TIME TO REACH THE BOMB



PAINT DOES NO GOOD! A HEAVY COAT OF ORDINARY WHITEWASH HELPS SOME

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...**



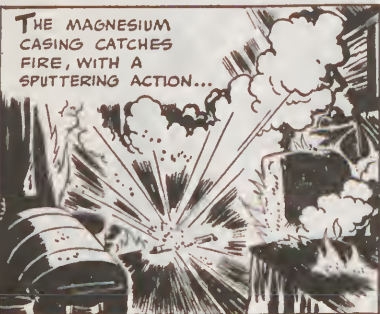
**...THUS, THEY USUALLY START BURNING
IN A TOP STORY OR ATTIC**

**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.

YOU USE UP A BUCKET IN 1½ MINUTES



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



JET ON SURROUNDINGS!



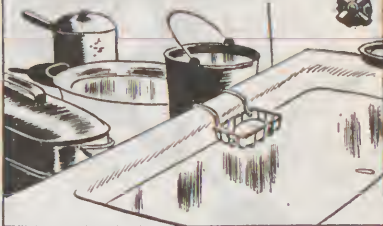
SPRAY ON BOMB

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

APPROACH THE BOMB IN A CROUCHING OR CRAWLING POSITION. PLACE THE SAND BUCKET, UPSET, TO ALLOW A FULL-ARM SWING TOWARD THE BOMB



TRY TO COVER THE BOMB WITH DRY SAND, TO CONFINE IT'S ACTION, SO THAT YOU CAN GET NEAR ENOUGH TO SCOOP IT UP ON THE SHOVEL



WHEN THE BOMB IS UNDER FAIR CONTROL, SCOOP IT UP ON THE SHOVEL, FIRST RIGHTING THE BUCKET, BUT LEAVING SOME SAND IN THE BOTTOM...



... IF THE BOMB CAN BE DROPPED FROM A WINDOW TO SOME PLACE WHERE IT CAN BURN OUT WITHOUT HARM —

GET RID OF IT THAT WAY!



... OTHERWISE, PUT IT IN THE BUCKET ON TOP OF SAND, COVER IT WITH MORE SAND ...



... THEN, HOLDING THE BUCKET ON THE SHOVEL, CARRY IT OUT OF THE HOUSE ...





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

			
HOSPITAL CASE	FIRST AID STATION	LUNG PROTECTION NEEDED	COMPLETE PROTECTION NEEDED

- The importance of proper first aid for gas victims cannot be overemphasized. The following are general rules which apply in all cases.
- Act promptly and quietly; be calm.
 - 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.
 - Summon medical aid promptly; if possible, send the victim to a hospital.
 - Do not permit the patient to smoke, as this causes coughing and, hence, exertion.
 - Keep the patient at absolute rest; loosen clothing to facilitate breathing.
 - Remove the patient to a gas-free place as soon as possible.

CLASS	NAMES AND SYMBOLS	FORM	ODOR	PERSISTENCE	TACTICAL CLASS	PROTECTION	FIRST AID (After removed from gassed area)	PHYSIOLOGICAL EFFECT
VESICANTS	MUSTARD <small>HS-CH₂CH₂SH</small>	LIQUID AND VAPOR	 Earth, brownish, mustard	One day to one week. Longer if dry or cold.			Address; remove liquid mustard with protective emulsion, 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.
	LEWISITE <small>CL-CH₂CH₂SH</small>	LIQUID AND VAPOR	 Bitterness	One day to one week. Longer if dry or cold.			Address; 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. Advanced poison.
IRRITANTS	CHLOROPICRIN <small>CHLOROPICRIN</small>	GAS	 Pungent, acid	Open 8 hours. Wounds 12 hours.			Wash eyes, keep quiet and warm. Do not use bandages.	Coughs severe coughing, crying, vomiting.
	DIPHOSGENE <small>THION-DIPHOSPHORIC DIACID</small>	GAS	 Especially, lung	30 minutes.			Keep quiet and warm. Give caffeine as a stimulant.	Causes coughing, breathing hurts, eyes water, sore.
LACRIMATORS	PHOSGENE <small>CASPHOSGENE</small>	GAS	 Bitter, dry, sour and	10 to 20 minutes.			Keep quiet and warm, bed rest. Caffeine as a stimulant. Loosen clothing, no alcohol or cigarettes.	Irritation of lungs, increased vomiting, tears in eyes, delayed feeling. Occasionally symptoms delayed. Later coughing, heart failure.
	CHLORACETOPHENONE <small>C-CH₃-CO-CH₃</small>	GAS	 Apple blossom	12 minutes.			Wash eyes with cold water or boric acid solution. Do not bandage. Rest and. For skin, remove scaly skin.	Induces eyes smart. Snot, slightly. Tears flow. Temporary.
STERNUTATORS	BROMBENZYL CYANIDE <small>C-CH₂-CH-BrCN</small>	GAS	 Sour fruit	Several days. (Heads in water.)			Wash eyes with boric acid. Do not bandage.	Eyes smart; shut, tears flow. Effect lasts same time. Headache.
	ADAMSITE <small>(C-CH₃)-NH-CH₃</small>	GAS	 Earl's smoke	10 minutes.			Keep quiet and warm. Loosen clothing. Breathe. Spray nose with soap-saline or salt-bleaching powder. Aspirin for headache.	Causes sneezing, stick depressed feeling, headache.
	DIPHENYLCHLORARSINE <small>(C-CH₃)-CH₂-CH₃</small>	SMOKE	 Sour fruit	Summer 10 minutes.			Removes to nose or keep quiet. From breathing powder bottle.	Causes stick 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.

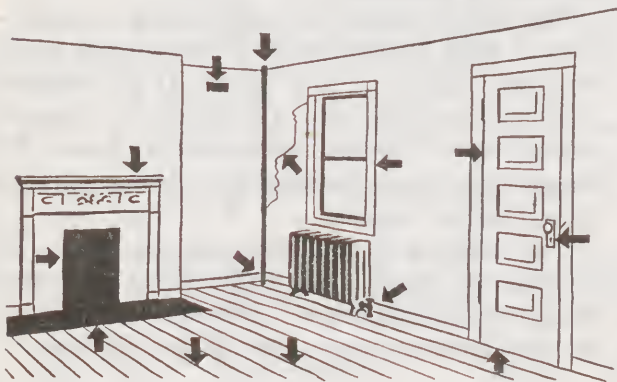
THE GAS-TIGHT ROOM

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	CHIEF WARDEN	STATE WARDEN	NO OTHER RANKS	★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★ ★
AUXILIARY FIREMEN	"	SQUAD LEADER	PLATOON LEADER	COMPANY LEADER	FIRE CHIEF	FIRE CHIEF	STATE FIRE COORDINATOR	NO OTHER RANKS	★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★ ★ ★
AUXILIARY POLICEMEN	"	"	"	"	CHIEF OF POLICE	"	NO OTHER RANKS	NO OTHER RANKS	★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★ ★ ★
BOMB SQUADS	"	"	NONE	"	"	"	NO OTHER RANKS	NO OTHER RANKS	★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★ ★ ★
RESCUE SQUADS	"	"	DEPOT LEADER	"	FIRE CHIEF	"	NO OTHER RANKS	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	CONTROLLER	NO OTHER RANKS	COORDINATOR	NO OTHER RANKS	★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★ ★
LOCAL STAFF	"	AS REQUIRED	"	"	"	"	"	"	★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★ ★ ★
STATE STAFF	"	AS REQUIRED	"	"	AS DESIGNATED	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	★ ★ ★ ★ ★	★ ★ ★ ★ ★ ★
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 Coordinator.

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 required of a volunteer for award of the insigne. Drill for units of the Citizens' Defense Corps, moreover, 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. II—A Volunteer at Attention



the front, heels are together, feet forming a right 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.

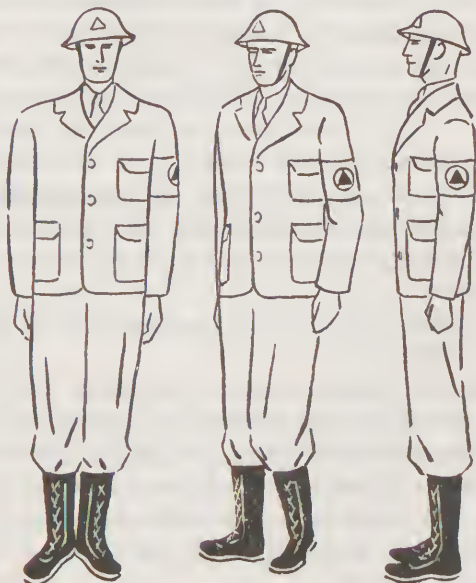
Facings.

(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.

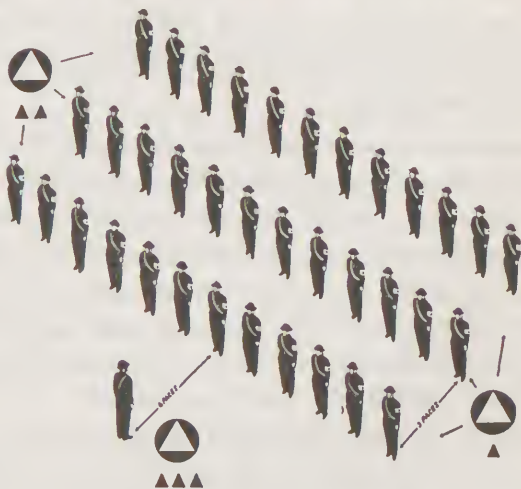
Other Marchings.—March other than at Attention. The commands are: Route Step, MARCH or At Ease, MARCH. Route Step MARCH, at the command MARCH Volunteers are not required to march at attention or to maintain silence. At Ease, MARCH is the same as Route Step, MARCH, except that Volunteers will maintain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



OFFICE OF CIVILIAN DEFENSE
WASHINGTON, D. C.

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE TO AVOID
PAYMENT OF POSTAGE, \$300