CIVILIAN PROTECTION

(Grade XI)

General.

In 1915 two German Zeppelins crossed the English Channel and dropped bombs on Yarmouth and nearby villages. Several civilians were injured. Thus began a new and terrible technique in war—the terrorizing of the civil population. The experimental war waged by the Axis in Spain gave our enemies a chance to perfect this new method of attack which was used with deadly effect against Norway, the Low Countries, and France. As early as 1935 an Air Raid Precaution organization was begun in Britain with the result that counter measures for civilian protection had been taken in time to minimize the effect of the unrestricted and indiscriminate bombing which took place during the Battle of Britain. Herein lies the first principle in Civilian Defence—the setting up and perfecting of a system of protection *before* the attack takes place. Every nation which waited until an attack was imminent or had actually been started was already lost. For this reason, Canada must take adequate precautions *now*, and she must look to those either under or over military age to train themselves to perform the duties prescribed by the A.R.P. organization.

The chief object of air attacks is to dislocate the normal life of a nation and thus prevent it from making an effective defence. In the first instance these attacks are directed against objectives of military importance such as aerodromes, naval bases and factories which produce

war materials. Mass raids on cities, on the other hand, are directed against the people with the express purpose of breaking down their will to resist. By arousing fear, wrecking homes and public buildings, upsetting transportation systems and public utilities, and by keeping people sleepless, the enemy hopes to lower civilian morale to the point that the populace will give up in despair and demand capitulation. In Britain, however, these tactics seemed to have had the opposite effect. The will to resist has hardened; the people have become united in a way that has aroused the admiration of social reformers the world over. While the natural characteristics of the British race, their dogged fortitude and grim humour, have enabled them to stand up under unprecedented strain, nevertheless credit must be given to the British A.R.P. organization which taught the people what to expect and how to meet the emergencies as they arose.

Civilian Defence is concerned with another phase of Axis strategy—undermining the country from within by espionage and sabotage. In Holland and France this was an important factor; in Britain it failed completely. The Americas have offered great opportunities to the fifth columnist because of the racial, social and economic antagonisms which cause suspicion and prevented early and united action.

The word sabotage calls to mind the wilful destruction of munition plants, railways, bridges and public utilities. These are but the overt acts of the saboteur. There are other more subtle means which have hampered the war effort of the democracies. One might list such things as spreading false rumours, for example, concerning graft in high places or misappropriation of funds in patriotic organizations, decreasing confidence in the government or

in the security of its bonds and currency, propagating defeatist propaganda, fomenting strikes, producing "bottlenecks" in industry, and even the hoarding of food. To meet the dangers arising from this internal "softening-up" process, so cunningly promoted by enemy agents, it is imperative that eternal vigilance be practised by the authorities to check fifth-column activities, and that civilian morale be built up by educating the people to understand the psychology of war. Just as a person suffering from nervous disorders finds the cure of his ills by understanding the nature of his ailment, so the people of a nation made the target of a war of nerves, may counter these enemy tactics by a robust understanding of the nature of the attack. The C.D.C. can render the government invaluable help if it develops an organization which is keen and alert to check subversive activities and competent to instruct the people in the fundamentals of civilian defence.

CIVILIAN DEFENCE ORGANIZATION IN CANADA

A. Dominion.

A committee of ten constitute the Dominion A.R.P. Committee; six are officials of the Department of Pensions and National Defence; the Army, Air Force and St. John Ambulance Association each have one representative; the Dominion Fire Commissioner is also a member.

The duties of this committee are "to consider all the points arising in connection with A.R.P. schemes; to act, when necessary, as the medium of consultation with outside authorities, and, to provide generally for co-ordination not only between Government Departments but with such other authorities as may be concerned".

B. Provincial.

The government of each province has undertaken the task of organizing and training the Provincial C.D.C. For example in Ontario the Attorney-General has set up a committee whose duties are stated in the Provincial General Training Manual as follows: "To create a volunteer civilian organization for the protection of life and property in Ontario in the event of an emergency occasioned by war, and to facilitate the instruction and training of its members to co-operate with and assist Federal authorities and co-ordinate the organization and work of all C.D.C. units."

For purposes of organization, the Province of Ontario has been divided into Regional Areas, each being composed of a number of municipalities. Each Regional Area is subdivided into zones according to the number of municipalities which it contains, each municipality being a Zone. In large cities the Zone is further subdivided into Divisions, Districts, Sections and Sectors. With the exception of the Districts, which are designated by letters, starting with "A", all of the above subdivisions are

numbered consecutively from Number 1. Small municipalities do not have all of these subsections.

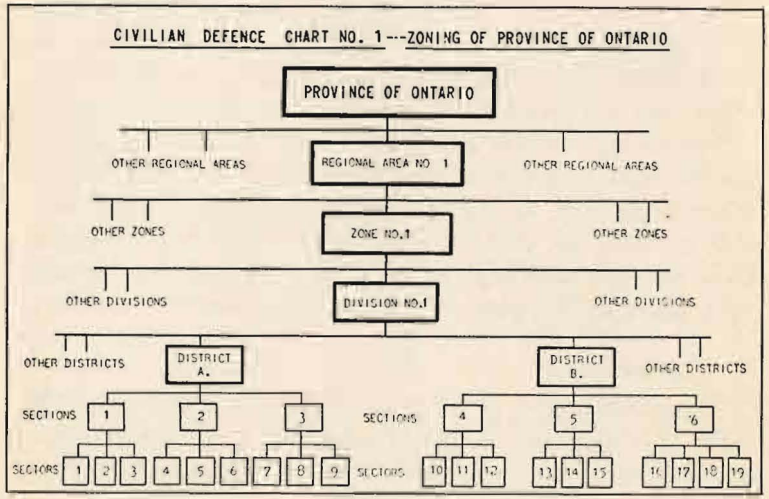


Fig. 1.

C. Local.

The provincial C.D.C. has encouraged municipalities to set up a local A.R.P. organization also known as the C.D.C. These committees are composed as follows:

Headquarters:

Chairman (usually the head of the municipal government).
Vice-Chairman.
Secretary.

Controllers:

1. Controller of Police Services.
2. Controller of Fire Services.
3. Controller of Medical Services
4. Controller of Public Utility Services.

5. Controller of Transportation Services.
6. Welfare Controller.

Under the leadership of this committee, the Warden Service is instituted. The executive head of the Zone is called the Chief Warden. Under him are the Divisional, District, Section and Sector Wardens.

The Chief Warden is responsible for the organization, control and equipment of the Wardens' Services. He assists the Divisional and District Wardens in organizing their respective Divisions and Districts. He is also responsible for the proper co-ordination of all Warden Services and the maintenance of an efficient communication system between the various units of his zone.

The Divisional and District Wardens perform duties in their own command similar to those of the Chief Warden. The recruiting of Warden personnel and the maintenance of interest, efficiency and discipline in the training and instruction of Wardens, receive their special attention.

The Section Warden arranges for the division of his Section into Sectors and the establishment of Warden Posts and Separate Posts in factories, schools, and theatres. He allocates the duties and patrols in the Sectors of his Section and, by assembling his Wardens at least twice a month, he makes sure that they have a thorough knowledge of Civilian Defence and that they are performing ther duties satisfactorily.

The Sector or Post Warden remains at his Post to receive and forward instructions and reports. He keeps a record of the attendance of all wardens and is responsible for the equipment at the Warden Post. As he is the connecting link between the C.D.C. and the public, he sees that all homes and places of business have been visited by his wardens and that they are fully aware of

the arrangements which have been made for their protection. "They should act on the basis that, generally speaking, their duty is to prevent panic and preserve order, save life and prevent injuring in the Sector as a whole".

To each of the five services listed above are attached Wardens who have been specially trained to perform the duties of that service. Though in most cases they are attached to a Warden Post, they are under the direct command of their respective Controllers.

D. Training.

All Civilian Defence Volunteers must complete a Basic Course before being assigned to the Services and Posts as Wardens. The purpose of this Basic Course is to provide them with a background of information about protection against the various forms of air attack. Usually the following nine lectures comprise the course: 1. General Organization and Control of Civilian Defence. 2. Incendiary Bombs. 3. High Explosive Bombs. 4. War Gases. 5. Personal Protection Against Gas. 6. Protection Against Gas. 7. Elements of First Aid. 8. Transportation Services. 9. Public Utilities Services.

The volunteers who have attended the basic lectures are then furnished with Arm Band and Identification Card and enter the second stage of training. Further lectures on the work of the Service they have chosen to join, precede practical exercises in performing the duties of that service. The team spirit is encouraged. In a voluntary organization whose members are undertaking a heavy syllabus of training in the all too little spare time at their disposal, it is essential that feelings of friendliness, mutual respect and good-will be stimulated. This group training enables the Wardens to work together as a team in such matters as the working of a Sector Post,

including action on receipt of Air Raid warnings, patrol, distribution of gas respirators, etc.

The third phase in the progressive training of A.R.P. wardens requires the co-ordination of two or more services at the one time. The combined exercises are usually practised under realistic blackout conditions and are made up of "incidents" which have been arranged beforehand. Frequent test mobilizations are arranged early in this phase of training to ensure that effective arrangements for the quick assembly at Posts and patrols (of all wardens) have been made.

The Provincial C.D.C. has approved of a uniform system of Air Raid Warning Signals. In Handbook Number 6, it is summarized as follows:

Yellow	Preliminary Caution	"A.R.P. Yellow"	CONFIDENTIAL to LIMITED NUMBER of recipients who take precautionary and unobtrusive measures to be ready to act instantly the **action warning** is received.	By telephone only
White	Cancel Preliminary Caution	"A.R.P. White"	CIRCUMSTANCES NECESSITATING THE PRELIMINARY CAUTION NOW PASSED.	By telephone only
Red	Action Warning	"A.R.P. Red"	**Public Warning** — Meaning that an air raid may occur within a short time. If after dark — signal for blackouts. Fluctuating or intermittent signal.	Public warning by siren plus telephone call
Green	All Clear	"A.R.P. Green"	INDICATES "ALL CLEAR" that raids have passed or threat of attack has been removed. Steady Signal.	Public warning by siren

Fig. 2.

INCENDIARY BOMBS

Purposes.

The chief object of an incendiary bomb attack from the air is to set fire to a large urban area containing industrial plants and the homes of their workers. Usually high explosive bombs are used at the same time and this helps to spread the fire which, in turn, completes the work of destruction. In night bombing, fire bombs light up the target and enable the crew of the aircraft to drop the bombs with precision. Of course, it is also the hope of the enemy that the natural horrors of a great conflagration will produce panic among the populace. Sundays and holidays are the favoured time for using large numbers of incendiaries, as it is at such time that the fire-fighting agencies are likely to be under-staffed.

Typical Kilo Magnesium Bomb.

The most effective bomb used by the Germans is the Kilogram Magnesium Bomb. It will burn at a very high temperature for a considerable time, cannot be extinguished easily, is cheap and easy to manufacture, and is so light that a large bomber can carry as many as two thousand of them. The standard bomb consists of a tube 9 inches long and two inches in diameter, made of magnesium alloy with a small proportion of aluminium to keep it together. The casing is ¼ inch thick. At one end is a tail, made of sheet iron, 5 inches long, to steady the bomb in flight. The lower portion (about 2 inches) of the tube is filled with mercurial ammoniate called fulminate and this will burn at a temperature of 2500°C. without oxygen. The major part of the case is filled with iron oxide and aluminium filings (thermite) which burns at a temperature of 1300°C. In the base is the firing mechanism. When the bomb strikes, a needle in the igniter is driven through a small percussion cap. This ignites the fulminate and thermite which burn with intense heat 40 or 50 seconds before the magnesium becomes a molten mass. In the initial period a violent spluttering takes place and the burning magnesium may be thrown over a radius of 50 feet. The magnesium alloy melts and runs like water into cracks, joints and partitions, starting fires wherever it comes in touch with inflammable materials. After the first minute the bomb burns less fiercely for about fifteen minutes.

Dispersal by Aircraft.

The dispersal of incendiary bombs depends upon the speed and height of the aircraft. The bombs, packed in paper cartoons of 10 and 20, slide down a chute, and are automatically released when a fixed knife cuts the paper. A bomber, travelling at 200 miles per hour, dropping 20 per second, will cover three miles, with a possible fire every 60 to 70 yards. At a slower speed the fires may be much more numerous but the area covered will be less. If fifteen per cent of the bombs hit buildings and only half of these start fires, seventy-five fires could be started by a single aircraft.

Penetration and Methods of Control.

An incendiary bomb, when dropped from 5,000 feet, attains its maxium striking power of 305 feet per second. When it strikes a building it usually passes through the roof and is stopped by the first tight board floor. If the attic is floored, special care should be taken by householders that all inflammable materials, such as old furniture, boxes of books and papers, etc, are removed.

If the floor is sufficiently supported by bearing partitions, a layer of sand bags, laid close together, may prevent a fire-bomb from penetrating to the lower floors. In homes where there is no attic stairs, it is wise to cut an opening into the attic through one of the clothes-closets, and provide a ladder, so that fire fighters may have ready access to the roof space. Frequently, the bomb strikes a rafter or ceiling joist and starts to burn in the attic.

For the first half-minute after impact the ordinary incendiary bomb can be scooped up and removed with comparative safety. It is only after the outer casing has been ignited that there is great danger to the operator. However, as sometimes an explosive bomb, of a size and shape similar to incendiary bambs, is dropped with the ordinary incendiary bombs, it is now recommended that the magnesium bomb be not handled immediately. In a minute or two it will be apparent whether the bomb is explosive or incendiary.

Once a bomb has penetrated a building it is necessary to (a) control the bomb and, if possible, prevent it from burning through to the next floor, and (b) extinguish the fire started by the bomb. Householders are advised to have quantities of water and sand in readiness to deal with the bombs, but there is a technique in the use of these materials with which all should be familiar.

The Use of Water.

In the first place never pour water on the bomb, as this causes the bomb to splutter more violently, and as a consequence, molten metal will be flung in all directions. After the initial period of intense burning has passed, water may be sprayed in a fine stream upon the bomb. The water supplies additional oxygen to the burning

magnesium and causes the bomb to burn out more rapidly.

A special appliance known as the stirrup hand-pump is used to control the fire and bomb. Attached to the pump is a hose 30 feet long, at the end of which is a combination nozzle which can produce either a spray or an ⅛ inch jet of water. The jet will throw a steady stream of water 30 feet, while the spray is effective at 15 feet. The spray may be changed from spray to jet, or vice versa, by pressing a button on the base of the nozzle. There are also on the market in Canada five gallon hand water pump fire extinguishers with an adjustable nozzle similar to the stirrup pump. The tanks of these can be refilled. Six to eight gallons of water usually is sufficient to extinguish both the bomb and the fire, if the operator is experienced. The advantage of these duel purpose pumps consists in enabling the fire fighter, at a safe distance, to attack both the fire and the bomb, each of which requires separate treatment.

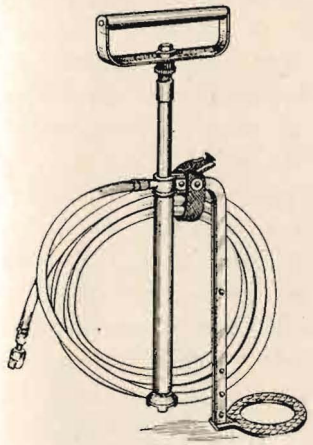


Fig. 3.

Two people may efficiently operate the pump but three are preferable. Their duties are as follows:

No 1 is in charge and operates the nozzle at the end of the hose;

No. 2 pumps the water from the pail at the other end of the hose, taking about 70 double strokes per minute for the jet and 35 for the spray;

No. 3 keeps the pail replenished and relieves No. 2 when necessary. He should also watch for the possible outbreak of fire in the floor below or in other parts of the same storey.

When only two are available the duties of No. 2 and No. 3 will be combined.

An independent source of water supply should be arranged in case the mains are damaged and the water pressure cut off or reduced. For this purpose water should be stored in buckets and the bath-tub.

To approach the fire without being overcome by smoke, fumes and heat, No. 1 should bear in mind that in a smoke-filled room, the air is purest about 12 to 18 inches from the floor, and, at this level, he can best breathe and see. Therefore he should approach from a prone position. It is wise for him to carry (1) a fire-man's axe or a light hatchet, preferably with an insulated handle, so that he may deal with any obstacle which blocks his way; (2) a flash light to assist him in locating smouldering remains; (3) a wet blanket, folded and slung across the left arm, to provide protection against smoke, heat and flying particles of the magnesium.

Sequence of Action.

The normal procedure in dealing with a bomb may be summarized as follows:

(1) Allow the bomb to splutter for the initial period of one minute.

(2) Try to extinguish the fire it has started by directing a jet of water upon it from a distance.

(3) Direct the spray upon the bomb, working gradually towards it from a prone position. Continue to spray water upon the bomb until it is entirely consumed. If

necessary, from time to time, change the nozzle to the jet, to keep the resultant fire under control.

(4) A soon as the bomb is extinct, make sure there is no fire left smouldering in the building. It may be necessary to use the axe to life floor boards or remove panelling from the walls.

The Use of Sand.

If the bomb falls on concrete, tiled floor or other incombustible surface, it may be covered with fine sand, ashes or similar material and kept under control so that it may be scooped up and removed.

In England the Redhill Container is used extensively for carrying sand. As one side is longer than the other it may be tipped readily upon the floor and the sand easily removed with the Long-handled Scoop or a Shovel. The Hoe, which also serves as an extension for the handle of the scoop, is used to draw the bomb into the emptied Redhill Container, the handle of which is slung to permit the operator to carry it without burning his hand. If ordinary buckets are used it is wise to leave about two inches of sand in the bottom before placing the molten bomb inside. A shovelful of sand on top will reduce the heat on the handle.

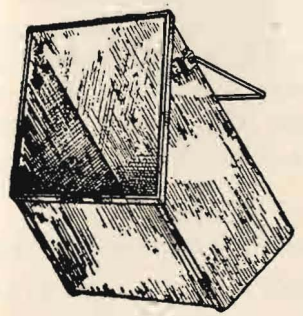


Fig. 4.

As the sand method cannot be used until after the thermite has burned out, because of the intense heat, it is not nearly so effective as the water technique. Another

disadvantage is that the operator cannot work easily from a prone position. For this reason it is recommended that the fire fighter wrap a wet blanket about him. When a bomb falls in the garden or on the street it should be covered at once with sand, so that the light from the fire it creates cannot guide other bombers.

Sometimes a fire-bomb is controlled by a Snuffer, an asbestos and wire cage-like cover on a long handle. It merely keeps the burning bomb localized until it can burn itself out. As they are not used extensively it may be assumed that they have not proved satisfactory.

Chemical Fire Extinguishers.

The average commercial fire-extinguishers are almost useless. In the first place they are hard to handle, when the operator is lying down and they are usually too small in capacity. A second objection is that they frequently contain chemicals which will generate gas if brought in contact with burning magnesium. The standard soda acid type may be used upon the fire but not upon the bomb.

Advance Precautions for Prevention and Control of Fires.

Every householder should know (1) the telephone number of the Fire Hall and local C.D.C. headquarters; (2) the location of the nearest fire box. As the Fire Brigade, even though augmented by auxiliary firemen, would be taxed to capacity, if an area should be attacked with incendiary bombs, it is vitally important that the public should know how to handle fires. Institutions such as schools and hospitals should make careful plans and train their personnel thoroughly.

The techniques described in this Chapter should be

familiar to every member of the household and preliminary drills in the use of the available apparatus should be carried out. All fire-fighting equipment, even if only a garden hose, a long-handled spade or shovel, and a hoe or rake, should be kept in an appointed place. Buckets of water and sand should be placed at strategic points in the house. All fire hazards should be removed so far as possible.

Personal Safety and Rescue Work.

The following information and precedure should be studied by every person, as this knowledge may be useful long after the threat of air raids may have passed.

1. Should your clothing catch fire, place your hand over your mouth, lie down and roll. If the clothing of another person is on fire, make him lie down, forcibly if necessary, with the burning part uppermost. Then smother the flames with a blanket, rug or overcoat, rolling him on the floor or ground after wrapping the cloak about him.

2. To escape from a window without a rope, sit on the sill with feet outside; then turn round, lower the body to the full extent of the arms, and drop with knees bent.

3. Keep doors and windows closed in order to restrict the supply of fresh air to the fire. Before opening the door of a burning room, feel the surface of the door to determine how close the fire on the inside is to the door. If the door is hot, open very cautiously, a few inches at a time. Place your foot against doors opening outward, to control its swing, and use the door as a shield for your body. Approach from a prone or crouching position with head low.

4. When using stairways, passages or when crossing rooms, keep near the walls where there is greater support for the floor. In rescue work avoid the use of stairways if entrance can be made through a window.

5. To move an insensible person, turn him on his back, tie his wrists together and, kneeling astride, insert your head through the loop made by his arms; then crawl, dragging him with you. If it is necessary to take him down stairs, get around in front of him and place your hands under his armpits. Pull him down gently, keeping close to the wall.

6. In searching a house for occupants, start at the top and work your way down, making sure that you enter every room.

Air raids on Canada probably would be of the "hit and run" variety. As enemy planes would have to operate from distant bases or aircraft carriers it is unlikely that they would carry many high explosive bombs because of their weight. Incendiary Bombs, on the other hand, could be carried by thousands. Therefore the real danger in Canada seems to be from Incendiary Bombs. Viewed from this angle the information and training outlined in this chapter is of prime importance. "It is far better to be ready and not needed than to be needed and not ready."

HIGH EXPLOSIVE BOMBS

A High Explosive Bomb consists of a relatively thin steel case containing a highly explosive mixture and fitted with a fuse and detonator. The detonator ignites the fuse which sets off the explosive. The highly compressed gases thus released burst the bomb casing into a multitude of jagged splinters.

There is a great variety in the size and weight of High Explosive bombs. They weigh from 4 pounds to about 4,000 pounds and vary in length from a few inches to 14 feet. The 250, 500 and 1,000 pound bombs are used most frequently.

The type of bomb used is directly related to the purpose of the attack. Against troops, thickly populated areas and airdromes with grounded planes parked nearby, the *Anti-personnel* type is used. The instantaneous fuse of this bomb causes it to burst on impact, while the thicker casing provides more metal to be shattered and dispersed by the explosion. Bombs made from specially processed steel and fitted with partially delayed action fuses are known as *Armour-piercing* bombs and are used against ships, concrete emplacements and heavily fortified places. The bombs most commonly used are the *General Purpose* types. Blast rather than fragmentation is required so the bombs have a short delay fuse which permits it to penetrate a building before detonation. These *Demolition* bombs leave deep and wide craters and cause great damage to factories, homes and public utilities. The *Land Mine*, a cylinder about 2½ feet in diameter and 9 feet long filled with 1,500 pounds of high explosive, will wreck a block of city houses. A parachute reduces the speed of its descent to 40 miles per hour, and as a consequence, it does not penetrate far into the ground. Thus the full force of the blast is directed against buildings. British

rules require complete evacuation from all premises within a ¼ mile of an unexploded land mine. Sometimes a large bomb contains several smaller bombs which are released as the bomb falls. The *"Mulatoff Breadbasket"* tosses many incendiary bombs in a wide circle before the main High Explosive bomb strikes. In the *"Pearl Necklace"* smaller High Explosive bombs are wired to the larger bomb. The smaller bombs are very sensitive and detonate from vibration or shock and cause the large bomb to explode. *Time-bombs* of various sizes have a clock-like fuse which is set to go off from two hours to one week after the bomb penetrates the ground.

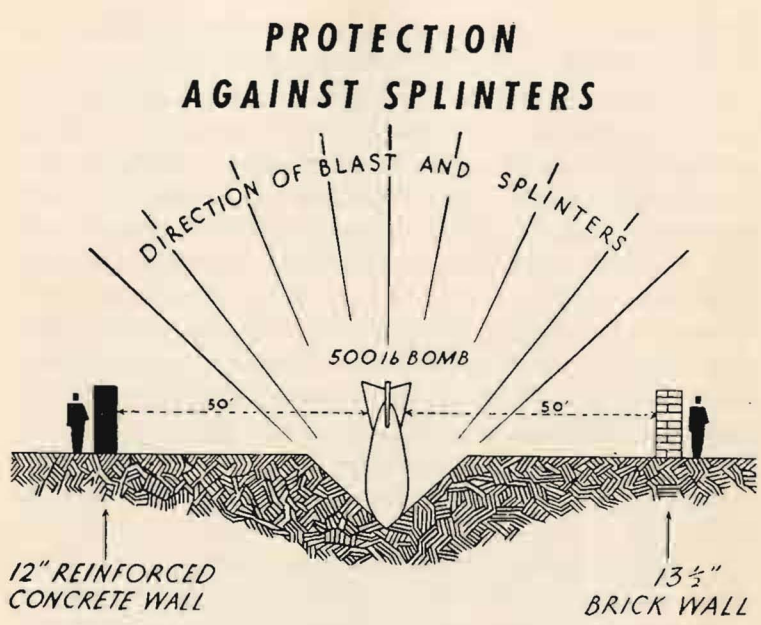
The explosion of a High-Explosive bomb has several destructive effects. The blast, the air pressure created by the explosion, strikes outward creating a vacuum. The inrushing of air or suction causes walls to topple and glass to be drawn out of windows. A bomb exploding in the ground causes violent earth shock which undermines the foundations of buildings. The fragmentation, or breaking up of the casing into splinters, presents a hazard to people even a mile away. These four hazards—blast, suction, earth shock, and fragmentation—must all be considered when protective measures against High Explosive bombs are being planned.

The natural reaction to the prospect of aerial bombardment is a desire for shelter. This instinct is sound. Even such a simple precaution as lying down reduces the danger by 50%; remaining indoors will cut the hazard by 70%. It is possible to build shelters 60 feet underground or construct a reinforced concrete structure with walls and ceiling 6 feet thick, and thus give almost complete protection to a limited number. To attempt the use of great quantities of material and labour, is to completely misunderstand the nature of modern warfare and to do just what the enemy hopes will be done.

The target of aerial bombardment is the community not the individual. The aim is not to kill off the civilian population so much as to disrupt normal civilian life. If workers can be kept from their benches or their efficiency impaired by sleepless nights in cold, damp underground shelters, the production of munitions and other necessities of war can be greatly reduced. Ill-advised, time-taking programs of construction might accomplish more for the enemy than his bombs. The problem then of A. R. P. organizations is to inform the public of the facts, to get them to take reasonable precautions and above all to keep the community functioning. If this is done civilian morale can be maintained at a high level.

British experience shows that the chances of an individual becoming a casualty are relatively small. Even in Coventry, fatalities were only a little over 1% of the population. The total number of people killed by air raids on Britain since the war started, does not equal the fatalities caused by automobiles in the United States during the same period. To no small degree the magnificent passive resistance to enemy air activities made by the British people has been brought about by the careful and intelligent work of the A. R. P. authorities.

While the construction of shelters which will stand a direct hit is not feasible, protection can be provided against flying splinters, fragments of glass and falling debris. Three types of shelters are common in England: (1) pre-fabricated surface or underground shelters erected in the garden; (2) shelters constructed from concrete, brick or sand-bags (outside); (3) a Refuge



Thickness of Materials Safe against Splinters

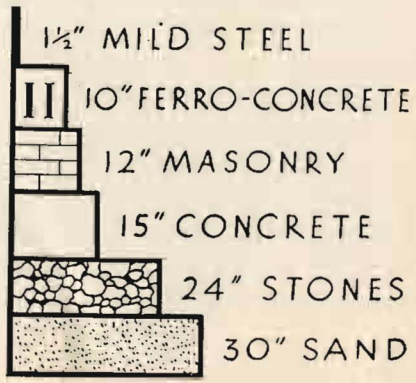


Fig. 5.

Room located inside the house. Numbers 1 and 2 are recommended for those whose houses are frame or lightly constructed; Number 3 for those whose homes are substantially built of brick or stone. The latter type should be carefully considered by residents in Canada.

The thickness of materials of walls sufficient to give protection against splinters is indicated in the accompanying chart. Overhead protection requires at least 5 inches of reinforced concrete, six inches of ordinary concrete or one foot and one half of earth or sand. "The required amount of overhead protection against falling debris caused by the collapse of buildings varies according to the construction of the building and the position of the shelter in relation to it. In the case of a well-constructed building, the roof and two floors above the shelter or refuge room are considered to be adequate protection, provided the ceiling of the shelter or refuge room is strong enough to withstand the fall of debris."

The simplest type of out-door shelter is made by digging a Trench 6 feet deep and 3 to 4 feet wide. The walls are boarded up to prevent the earth from collapsing on the occupants and a ceiling is made by planks covered with sand-bags or earth. Exits should be provided at both ends of the trench and care should be taken ditches are dug to drain the surface water away from the shelter.

The following summary will provide the essential points to consider in the construction of a Refuge Room.

REFUGE ROOM

Location.

Basement.—Best against splinters and falling debris but subject to earth shock.

Kitchen, Alcove under stairs, Wider Hallways.—Good if outside wall is brick and there is another house not more than 30 feet away.

A narrow room with the longer walls towards the side-drive is best.

Ceiling.—Narrow span for joists; otherwise supported by stout props.

Exits.—At least two as far apart as possible. Basements should have one exit which leads directly out-of-doors. Windows and coal-shutes can be adapted.

Windows.—Avoid rooms with large windows, especially bay windows. If not protected by wall of adjoining house it must be blocked up or protected by a barricade reaching 6 feet above the floor level. Small area at top left to admit light and air. Barricades should be 2-3 feet thick and located not more than 3 inches from the window. Protect top with tar paper. Protect glass on the inside by adhesive tape, wire netting with heavy fabric inside or by solid screen of fir ply-board, tightly fitted. Dampened blankets or movable solid screens will make the room gas-proof and light-proof provided they can be fitted tightly, with edges clamped or taped.

Doors.—Should be provided with Air Locks which will serve as Light Locks also. Never lock the doors.

Openings.—Seal all fire-places, chimneys, vents, cracks and joints.

Furniture.—Stout table, couch, chairs.

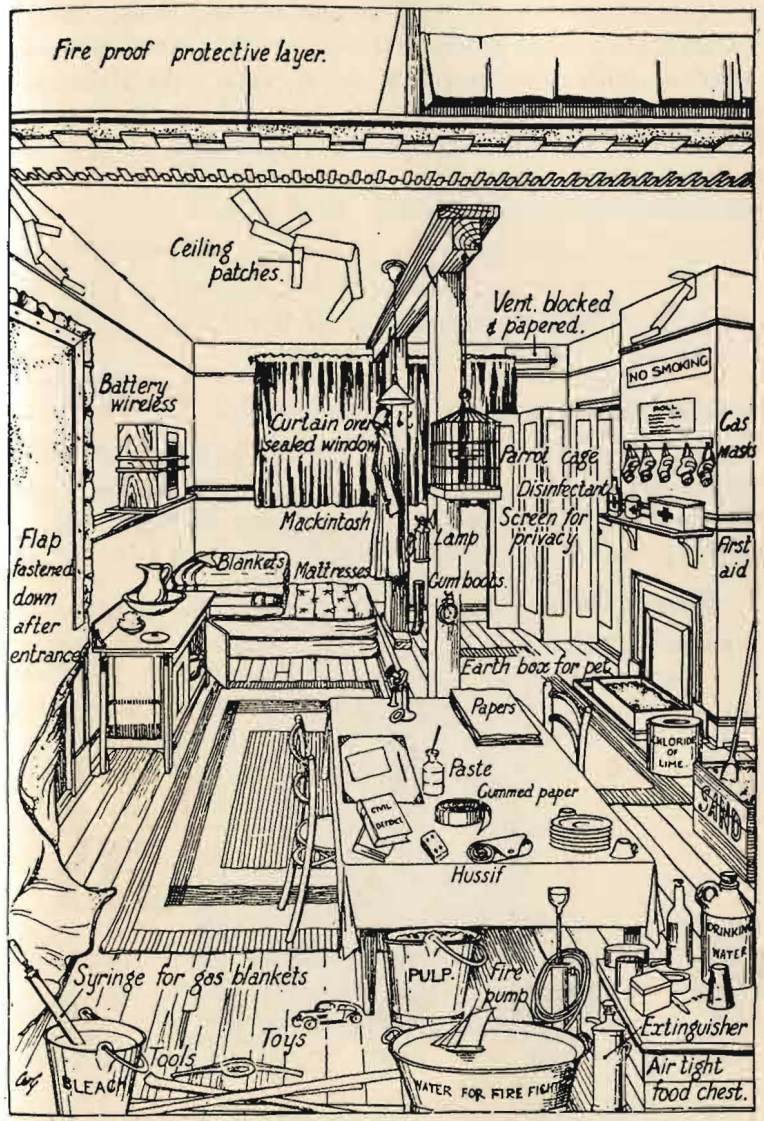


Fig. 6.

Equipment.—Fire-fighting apparatus and tools, pump, extinguisher, shovel, hoe, crowbar, pick, saw, gloves, goggles, pails of water and sand, First Aid Kit, gas masks, drinking water, air-tight food box, radio, games, toys, books, writing materials, adhesive tape, candles or lamp, flashlight, mattress and blanket, broom, dust pan, wash basin.

Arrangements.—Sanitation, cooking, heat, pets, communication with neighbors, telephone, turning off gas and water at mains. Make your Refuge Room safe, healthful, comfortable, attractive—in that order.

Conduct during a Raid.

Keep away from windows. Do not rush out-of-doors to see what is happening. Keep cool. Sit on the floor against the outside wall if bombs are falling nearby.

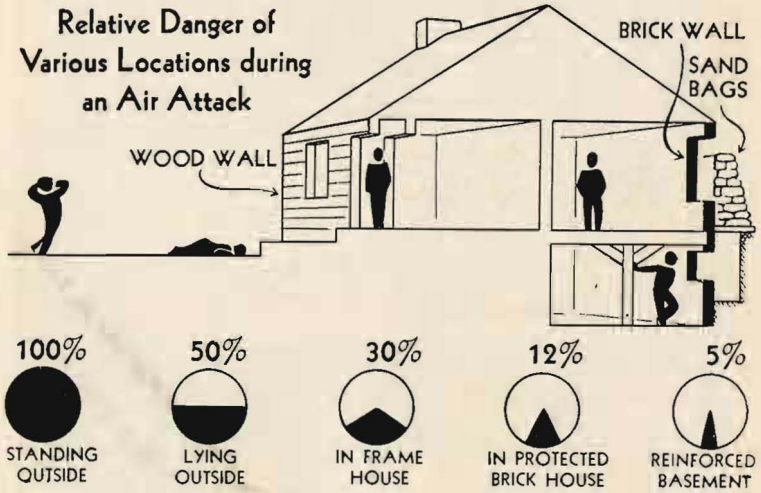


Fig. 7.

Think of others, especially the children and the aged. Do something to occupy the mind. Use the telephone only in case of emergency.

Rules for Personal Safety if caught in a raid out-of-doors.

Seek shelter at once in a public shelter or a private house. Get under a brick or stone archway, or in a well-constructed hall of a large solid building. *Lie Down,* in a ditch or close to a parapet or curb. Lie tight against it. Put cotton batting in your ears and a small piece of wood or rubber between your teeth. Never watch a dog fight in the air. Spent bullets or anti-aircraft shell splinters may hit you. Carry your gas-mask with you wherever you go.

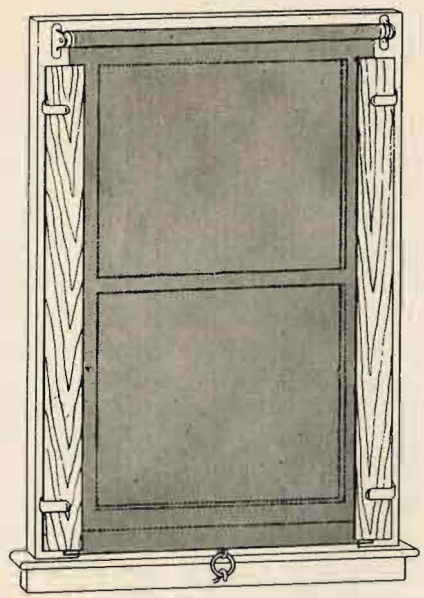


Fig. 8.—Roller-shade with Raffle-boards to prevent light leagake at sides.