CIVILIAN DEFENSE MANUAL

Instructions and General Information for the Protection of Life and Property in Event of Emergency on the Campus of Ohio State University

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PRINCIPAL DEFENSE TELEPHONE NUMBERS

For Fire, Police, Medical Aid, Call
University Operator .................. O

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Service Department .................. 365
Architect’s Office ..................... 361
Business Manager’s Office .......... 332
President’s Office ................... 312
Information Desk .................... 721

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All University telephone lines will be needed for emergency use in event of an air raid or fire alarm. Staff members and students must eliminate all unnecessary calls at such times.

Statement by the President of the University to the Faculty, Administrative Staff, Employees and the Student Body

* * *

A Defense Organization has now been set up by the Ohio State University for cooperation with the Civilian Defense Councils of the State of Ohio, Franklin County, and the City of Columbus to prevent espionage and sabotage, and to collaborate with the Federal Bureau of Investigation and other national agencies in the execution of emergency disaster plans.

Uniform plans for civilian defense throughout Franklin County have been adopted and are now in effect. All government agencies and University-owned resources necessary to civilian defense have been coordinated so that they may be used at any point stricken by disaster.

Air raid warning service is operated by the Franklin County Defense Council, under the supervision of the Army Air Corps.

While the University cooperates with these agencies of national, state, and local government, yet it recognizes a special responsibility for the protection of its own students and staff and of its own property, against any emergency which may arise as a result of the war.

It is our hope that we shall never be called upon to make use of the Defense Organization on our campus. But this is a war where the unexpected happens quickly, and we must be prepared for any contingency.

We have set up an organization the functions of which are not limited to disasters coming from the war. The program in many instances has been built around existing plans for fire drill and fire protection, particularly in the cases of the dormitories and the Hospital.

All staff members and students are expected to familiarize themselves thoroughly with this manual and the instructions to be issued from time to time by the division leaders, in order that they may be ready to fulfill their duties on an instant’s notice. The failure of any individual to do his part may mean a serious breakdown in the entire organization.

As will be noted in the chart appearing on another page, I have designated Mr. Carl E. Steeb, business manager of the University, as “Commander of Defense Work.”
Under Mr. Steeb's general direction are two major divisions, that on “Physical Plant Protection” under the leadership of Mr. Paul H. Ellemann, maintenance engineer, and that on “Faculty, Student, and Employee Safety,” under the leadership of Mr. Howard Dwight Smith, University architect.

All members of the educational and physical plant staffs and the student body will kindly give complete cooperation.

HOWARD L. BEVIS, President.

Preface to General Instructions

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Under war conditions the danger from fire is greatly increased. The outbreak of a fire during a blackout period would immediately destroy the effectiveness of the blackout in a large portion of the area surrounding the fires. It is important to understand the principles of fire prevention as well as to know how to extinguish fires before they become unmanageable.

In any scheme of protection against fires or incendiary bomb attacks all possible steps should be taken in advance to reduce the fire hazards that normally exist in buildings or structures on the campus. A large number of fires occurring simultaneously on the campus or in the city cannot be extinguished by the regular fire departments.

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In the construction of existing buildings, the University naturally did not anticipate the danger of bombing attacks. The campus therefore has no bomb-proof shelters. It does have some areas, however, which come under the classification of “bomb shelters,” affording protection against splinters, debris, and gas, but not against direct or near hits.

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By observing the general rules set forth in this manual, students and staff will be providing themselves with as much protection as is available in other areas of the city.

General Instructions

I

In case of fire or need for police or ambulance service, dial “O,” the University Operator, and give clearly and distinctly the place of the fire, or the spot where police or ambulance is desired. The University Operator will then complete the call and summon the proper help. This is a standing rule of the University and it now becomes even more important as the very keystone of the Defense Program.

II

Except where a building is actually on fire, remain in the building in which you find yourself at the time of an air raid warning. Those who are out on the campus at such a time should go quickly to the nearest building as soon as the alarm sounds.

III

If in the open and unable to reach a building, drop to the ground and lie flat, face down. Shelter under trees or in a depression may be desirable, but maintain at least 150 feet distance from buildings in order to avoid falling debris. Automobiles must pull to the curb and stop, occupants leave the cars, and either go to the nearest building or drop to the ground as indicated above.

IV

If in a building, seek the safety area:

(a) Stay away from windows and in general from outside walls to avoid falling debris.

(b) Seek first, central corridors or rooms on the same floor you are on, with at least two walls between you and the outside.

(c) Avoid top floors.

(d) If time and space permit, seek areas in central corridors or rooms on the first floor in case of a three or four story building, or on the first or basement floor in case of a one or two story building. However, avoid basement areas in case of gas attack.

(e) Help others, especially strangers.

For certain buildings where the above general instructions are not readily applicable, further details or interpretations will be provided for the building leaders.

Classes and all other groups will proceed to designated safety areas and remain there under the direction of the instructional staff and building leaders until the all-clear signal.
Be always on the alert for fires and indications of sabotage.

In case of fire:
(a) Call the University Operator (Dial O). Then notify other occupants of the building.
(b) Leave the building in an orderly manner.
(c) In case of smoke or fumes, crawl along the floor.
(d) If outside of a building use the fire alarm box on the north side of the Oval near the southwest corner of Derby Hall.

No rubbish shall be placed or allowed to accumulate in closets, storage rooms, attics or similar enclosed spaces. Departments will survey their areas and call the Service Department (365) for the removal of all unneeded inflammable material.

Report at once to the Service Department the appearance of “suspicious-looking” persons in your building. Telephone 365.

All persons authorized to use buildings nights, Sundays, or holidays will exercise special precautions to see that no strangers are in the buildings. Lock all doors after entering and when leaving.

Take unusual precautions to prevent theft and loss of scientific and educational apparatus. Purchase of new equipment is becoming increasingly difficult because of the war emergency.

In case of blackout signal, main electric light switches will be pulled immediately in each building by designated persons of the Service Department only. Blackout will continue until the “all-clear” signals have been given.

The signal adopted for blackouts and air-raid warnings is a succession of rising and falling tones from the sirens for approximately two minutes. A forty-five-second ringing of the class bells will precede the siren signal far enough to allow time for removal of all persons to safety areas.

The beginning of the blackout period will be signalled by three rings of the class bells simultaneously with the siren, at which time all building lights shall be turned off. Lights shall remain off until the all-clear signal is given by one ring of the class bells simultaneously with one long blast of the siren.

Upon receipt of a call at the Hospital for emergency medical aid the Chief Surgical Resident will:
(a) Dispatch whatever units the situation may seem to require.
(b) Place the Hospital in readiness to care for casualties.

Two units, each composed of four doctors, four nurses, and attendants from the University Hospital, will be available for call, on campus or off. A third unit similarly composed and made up of the staff of the University Health Service, will be available for campus emergencies.

At the Hospital orderlies will be released for setting up emergency beds and equipment. Operating Room and Emergency Room nursing staffs will be augmented. If necessary, reserve beds will be placed in the classroom, second floor of clinic building, and in the lobby. Attending staff men will be called to Hospital and one will be assigned to each Operating Room, Emergency Room, and temporary bed facility. Each of these rooms will be further staffed by a resident or assistant resident, an intern, and auxiliary nurses. Medical students will give supplementary assistance when necessary.

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**Laboratory First Aid**

Laboratory Supply Stores located in the buildings listed below have trained personnel and first aid equipment for the handling of emergency situations in the laboratories of their respective buildings.

Chemistry Building: Rms. 1, Ph. 228; Rms. 193, Ph. 228; Rms. 404, Ph. 228; Rms. 193, Ph. 591; Rm. 104, Ph. 591 and 228; Rms. 201, Ph. 228.

Chemistry Building Annex: Rms. 157, Ph. 228; Control and Reagent Laboratory, Ph. 582.

Hamilton Hall: Rm. 115, Ph. 289.

Mendenhall Laboratory: Rm. 101, Ph. 280.

Men’s Physical Education Building: Rm. 90, Ph. 625.

Pharmacy and Bacteriology Building, Rms. 211, Ph. 555.

Pomerene Hall: Equipment Room, Ph. 581.

St. Francis Hospital: Pharmacy, Ph. Ma-7734.

Townsends Hall: Rms. 300A, Ph. 481.

University Hospital: Rms. A6, A7, A8, Ph. 580; Rms. O-15 and 132, (Out-Patient Wing) Ph. 391.

Veterinary Clinic: Rm. 125, Ph. 420.

Women’s Field House: Equipment Room, Ph. 440.
General Directions Concerning First Aid

These directions are given for elementary treatment only, pending the arrival of medical aid. Wherever possible all first aid treatment should be given by fully trained first aid workers or by physicians.

1. Keep the injured person lying down.
2. Do not move the injured person unless absolutely necessary.
3. Give immediate care for serious bleeding, asphyxiation or poisons.
4. Keep the victim warm and yourself cool.
5. Call or send for medical aid at once.
6. Make the victim comfortable and allay his fears.
7. Procure proper transportation.
8. Get name and address before victim becomes unconscious.

FIRST AID CARE OF WOUNDS

In cases where bleeding is not severe, follow these general rules:

1. Do not touch with hands or dirty material.
2. Do not wash with soap and water.
3. If dirty, such wounds may be washed with rubbing alcohol.
4. If greasy, such wounds may be washed with naphtha, benzine, turpentine, kerosene or ether.
5. Apply light tincture of iodine (or other antiseptic in approved first aid kit).
6. Allow antiseptic to dry completely.
7. Apply sterile dressing.
8. Call or send for medical aid, or if the condition of the victim permits, remove him to first aid post, Health Center or Hospital.

Duties of Wardens, Leaders and Aides

A. Operations for the protection of buildings and physical plant are under the direction of
   Paul H. Ellemon, Service Dept., Office Ph. 365
   Unless otherwise specifically designated, the janitors in the several buildings are the Building Wardens, who will be trained by the Service Department in the performance of their duties and responsibilities.
   SPECIFIC DUTIES OF BUILDING WARDENS
   Become acquainted with:
   1. The Building Leaders, who are members of the Faculty or Administrative Staffs, to whom you will give your best efforts and full cooperation.
   2. Location of all fire-fighting equipment so it may be found in a dark building.
   3. Proper operation of all fire equipment.
   4. Location of main electric light switch for the building.
   5. Location of the main shutoff valves in the building for all utilities, including gas, cold and hot water, and heating lines.
   6. Methods of combating incendiary bombs.
   7. Locations of fire hazards caused by certain laboratory or research projects.

   Assume responsibility for:
   1. Pulling main electric light switch during a blackout.
   2. Reporting to the Service Department any inflammable rubber in or about the building.
   3. Reporting to the Service Department, the unsafe use of inflammable liquids.
   4. Extinguishing of incendiary bombs.
   5. Opening all outside doors in case of fire.
   6. Reporting to the Service Department, any fire equipment that has been used or needs to be re-serviced.
   7. Continuous alertness for fires, saboteurs and suspicious looking persons in your building.

B. Operations for the safety of students, faculty and employees are under the direction of
   Howard Dwight Smith, Rm. 100, Brown Hall, Ph. 361
   Certain faculty and staff members have been designated as Building Leaders, listed on pages 9 and 10.
   Members of student military organizations have been appointed as Aides to these faculty members and will report to them immediately in case of alarm.
SPECIFIC DUTIES OF BUILDING LEADERS

Become acquainted with:
2. Safe areas of your building.
3. The Service Department Warden in your building, who will co-operate with you.

Assume responsibilities in your building to:
1. Transmit to faculty and employees
   a. Data from preliminary conference
   b. Additional data and instructions when received from Division Leader
2. Organize faculty and employees
   a. Where there are two or more leaders, agree upon a Chief Building Leader for liaison and organization purposes.
   b. At least one responsible person should be on duty at all times when classes are in the building.
   c. Furnish copy of schedule indicating when building leaders are on duty—and advise Division Leader of changes.
   d. Provide every staff member in the building with complete data for informing students of proper procedure in case of air-raid or blackout alarm.
3. Advise Division Leader of particular activities (such as special research projects) which will need emergency current in case of blackout.
4. Direct traffic movements of occupants as circumstances may require, in case of emergency.
5. Accept assistance from Military Aides when they report, and direct their activities in emergency.

SPECIFIC DUTIES OF MILITARY AIDES

Become acquainted with:
2. The Building Leaders of the buildings in which you have classes.
3. The safe areas of the buildings in which you have classes.
4. Names and locations of all principal campus buildings.

Assume responsibility for:
1. Reporting to the Chief Building Leader of the building in which you are located, immediately in case of alarm.
2. Standing by for Messenger service, and assistance in directing traffic in and about the building.

The Ohio State University
Civilian Defense
November 1, 1942

BUILDING LEADERS
(First named is Chief Building Leader)

Administration—Harold K. Schellenger, Rm. 106, Ph. 721; George H. Siebert, Rm. 301, Ph. 373.

Archaeological Museum—S. L. Eaton, Main office, Un. 1179; P. F. Mooney, Ph. Un. 1179; William R. Bennett, Ph. Un. 1179; Helen Mills, Ph. Un. 1179; Olive Cleverger, Ph. Un. 1179; Irene Stahl, Ph. Un. 1179; R. G. Morgan, Ph. Un. 1179; Ed. Cantrell, Ph. Un. 1179.

Arms—Major Paul Barry, Commandant’s Office, Ph. 476; 1st Lt. James R. Greenwood, Records Office, Ph. 456; Chas. Trimmer, Records Office, Ph. 456.

Arms—Jas. B. Tharp, Rm. 115, Ph. 563; John L. Clifton, Rm. 209, Ph. 538.

Botany and Zoology—Wilbur M. Todd, Rm. 105, Ph. 227; Paul J. Seyer, Rm. 107, Ph. 227; Sherman S. Humphrey, Rm. 212, Ph. 258; Fred Norris, Rm. 64-A, Ph. 260; Clarence E. Taff, Rm. 310, Ph. 646; D. F. Miller, Rm. 123, Ph. 227.

Brown—Claude Wall, Rm. 113, Ph. 405; Harry F. Reichard, Rm. 100, Ph. 361; Alfred J. Fieldy, Rm. 218, Ph. 429; George Wolfram, Rm. 4, Ph. 329.

Campbell—Florencis Osborn, Rm. 219, Ph. 209; Wilbur Stewart, Rm. 323, Ph. 281; Eve Turnbull, Rm. 111, Ph. 580.

Chemistry—J. P. McReynolds, Rm. 213, Ph. 310; H. V. Meyer, Rm. 414, Ph. 358; J. C. Bourke, Rm. 185, Ph. 436; C. W. McClintock, Rm. 104, Ph. 228-591; J. O. Pence, Rm. 263, Ph. 243; F. D. Brill, Rm. 104, Ph. 228-591; Jas. H. Kofroll, Rm. 259, Ph. 243; A. L. Henne, Rm. 312, Ph. 662; G. W. Miner, Rm. 233, Ph. 243; A. B. Garrett, Rm. 111, Ph. 436; J. R. Withrow, Rm. 180, Ph. 243; W. D. Turnbull, Rm. 120, Ph. 301-302; Noel F. Albertson, Rm. 191, Ph. 510.

Commerce—Dorsey Forrest, Rm. 115, Ph. 382; Sam Arnold, Rm. 204, Ph. 382.

Communications—E. M. Boone (Under E. E. Kimberly), Rm. 211, Ph. 631.

Derby Hall—Robert Monroe, Rm. 112, Ph. 468-411; W. R. Parker, Rm. 203, Ph. 516; Albert Capuder, Rm. 205, Ph. 655; Claude Antilbal, Rm. 315, Ph. 504-411; Walter Meidan, Rm. 250, Ph. 411; August Mahr, Rm. 212, Ph. 478; Walter B. Emerly, Rm. 205, Ph. 655.

Engineering Experiment Station—J. R. Shank, Rm. 205, Ph. 539; H. J. Hoffman, Rm. 306, Ph. 546; Frank Young, Rm. 205, Ph. 539; C. McClusky, Rm. 102, Ph. Un. 4164.

Faculty Club—Mrs. Mildred W. Holl, Ph. 363.
Field House for Women—Mrs. Mary R. Moore, Ph. 440; Mrs. Frederica Bell, Ph. 440; Frank Vari, Ph. 440; Bonnie Geddes, Ph. 440; Margaret Kaufman, Ph. 440.

Hamilton—Charles W. Stromvold, Rm. 314, Ph. 224-694; John Bernard Brown, Rm. 112, Ph. 221; Grant Ostrander Graves, Rm. 413, Ph. 203.

Hays—James R. Hopkins, Rm. 104, Ph. 360; Ervin F. Frey, Rm. 104, Ph. 350; Anthony Anderson, Rm. 104, Ph. 360.

Horticulture and Forestry—N. F. Childers, Rm. 115, Ph. 415; C. J. Willard, Rm. 103, Ph. 445; Mrs. Elizabeth Shaffer, Rm. 118, Ph. 327; Margaret Clark, Rm. 2, Ph. 270; Elizabeth Schoene, Rm. 102, Ph. 445; Mrs. R. L. Pounds, Rm. 321-Arcs, Ph. 528.

Industrial Engineering—Edgar C. Clark, Rm. 205, Ph. 503; Charles Couletiier, Rm. 100, Ph. 523; J. E. Smith, Rm. 212, Ph. 526.

Ives Hall—G. W. McCuen, Rm. 105, Ph. 235; Richard Miller, Rm. 211-A, Ph. 235; W. A. Hunnér, Rm. 214, Ph. 235.

Journalism—J. E. Pollard, Rm. 202, Ph. 527; George Glenn, Rm. 100-A, Ph. 276; Dale Lephart, Rm. 114, Ph. 470.

Kinman—Fred Shepperd, Rm. 208, Ph. 551; Jo B. Welch, Rm. 208, Ph. 551.

Library—E. N. Manchester, Rm. 206, Ph. 322; Lillian Van Horlingen, Rm. 207, Ph. 202; Gladys Coe, Rm. 105, Ph. 455; Ralph Janeway, Rm. 208, Ph. 451; Elma English, Bindery, Ph. 745; Ise Wilhemni, Rm. 104, Ph. 455; Gladys Scott, Bindery, Ph. 745; Sarah Patton, Rm. 100, Ph. 464; K. Thelma Sowers, Rm. 208, Ph. 464.

Lord Hall—J. L. Corruthers, Rm. 131, Ph. 413; Dana J. Demorest, Rm. 100, Ph. 229.

Mendenhall Laboratory and McMillen Observatory—J. B. Green, Rm. 209, Ph. 457; W. H. Shaffer, Rm. 105, Ph. 216; E. S. Manson (Observer), Ph. 246.

Music Annex—Howard S. Wilson, Rm. 202, Ph. 278; Olwen Jones, Rm. 103, Ph. 278.

Music Annex—Dale Gilliland, Rm. 3, Ph. 626-629.

Ohio Union—F. O. Tresemer, Office, Ph. 781; Horsthead Hayes, Cafetaria, Ph. 256; Lillian Ebe, Ph. 781; Martha Thome, Cafetaria, Ph. 256.

Orion—George W. White, Ph. 297.

Page—Norman D. Lottin, Rm. 204-A, Ph. 287; William B. McBride, Rm. 4, Ph. 629; Jack E. Buchen, Rm. 200, Ph. 416; Jas. A. Lants, Rm. 200, Ph. 416.

Pharmacy and Bacteriology—Charles L. Williams, Rm. 106, Ph. 558; J. M. Birkeland, Rm. 415, Ph. 554.

Physical Education for Men—Leo O. Staley, Rm. 250, Ph. 321-609; F. C. Mockey, Rm. 206, Ph. 613.

Plumb Hall and All Barns—D. J. Kays, Rm. 203-E, Ph. 701; J. S. Caffey, Rm. 203-G, Ph. 701; L. E. Kunkle, Rm. 106, Ph. 398.

Horse Barn—Robert Watson, Ph. 701.

Sheep Barn—William Franklin, Ph. 701.

Beech Barn—J. B. McCorkle, Ph. 219.

Swine Barn—A. W. Jorden, Ph. 701.

Dairy Barn—Harold Koester, Rm. 203-F, Ph. 701.

Pomerene Hall—Jennette A. Stein, Rm. 201, Ph. 483; Lucy Tingley, Rm. 201, Ph. 320; Helen Fivaz, Refectory, Ph. 282; Mary Phillips, Rm. 215, Ph. 731.

Poultry Husbandry—A. R. Winter, Rm. 209, Ph. 237; Mrs. G. L. Hedges, Rm. 108, Ph. 237.

Rehearsal—George Hardsety, Rm. 4, Ph. 595; M. R. Whitcomb, Rm. 6, Ph. 595.

Robinson Laboratory—E. E. Kimberly, Rm. 171, Ph. 330; Paul Bucher, Rm. 147, Ph. 465.

Residence Halls—

Bachelor Hall—Lowell Wrigley, Rm. 125, Ph. 496-497; Harvey M. Rice, Rm. 102, Ph. 394; Earl Cethcott, Rm. 1092, Ph. 496; Roger Kuhn, Rm. 2105, Ph. 496.

Caswell—Mrs. Grace P. Weiss, Rm. 506, Ph. 761; Florence Newman, Rm. 808, Ph. 761; Mrs. E. A. Grew, Rm. 708, Ph. 761; Frances Daniell, Rm. 608, Ph. 761; Irene Osburn, Rm. 718-B, Ph. 761; Betty Madigan, Rm. 808, Ph. 761.

Neil—Carolyn Pollock, Rm. 217, Ph. Uni. 2181; Alice Dolan, Rm. 230, Ph. Uni. 2181.

Oxley and Mack—MRS. E. E. Prout, Rm. 117, Ph. 761; Mrs. M. Cottrell, Rm. 303, Ph. 761; J. Burns, Rm. 761; Mrs. Adelaide Leonard, Rm. 218, Ph. 761; Mrs. L. M. Porter, Rm. 109, Ph. 761; Ruth Snyder, Rm. 304, Ph. 761.

Stadium Clubs—John Lewis (In Buckeye Club), Ph. 648; David Perry (In Tower Club), Ph. 605; Warren Taylor (In Stadium Club), Ph. 648; John White (In Buckeye Club), Ph. 648.

Social Administration—John A. Reimers, Rm. 103, Ph. 623; Mrs. Carroll D. Tibbals, Rm. 304, Ph. 684.

Townsend—George B. Crane, Rm. 124, Ph. 418; Emory F. Almy, Rm. 201-A, Ph. 293.

University Hall—Frederic W. Heimerger, Rm. 100, Ph. 608; Harry M. Beatty, Rm. 317; Victor Rayne, Rm. 116, Ph. 341; William H. Reith, Rm. 320, Ph. 512; John S. Harper, Rm. 204, Ph. 425; H. Schuyler Foster, Jr., Rm. 100, Ph. 508; Robert Travers, Rm. 410, Ph. 229; A. R. Chandler, Rm. 320, Ph. 512; Sidney Fisher, Rm. 211, Ph. 505; F. C. Dockery, Ph. 404, Ph. 229.

University Hospital—Louis B. Blair, Ph. 391; Henry E. Wilson, Ph. 391.

University School—Robert S. Gilchrist, Main Office, Ph. 629; Horatio Reynolds, Main Office, Ph. 629; Kenneth Ashman, Rm. 117, Ph. 629.

Veterinary Clinic—W. F. Guard, Rm. 115, Ph. 230-337; L. W. Goss, Rm. 135, Ph. 338.

Veterinary Laboratory—Walter R. Hobbs, Rm. 105, Ph. 582; R. F. Koutz, Rm. 4, Ph. 490; W. R. Harbison, Rm. 105, Ph. 582; Robert Schelbach, Rm. 106, Ph. 583.

Grace Graham Walker House—Mildred Stenswick (Campbell Hall), Rm. 209, Ph. 209; Walker House, Wo. 5711.
General Information

Should bombings occur, three types of bombs may be expected in this area, as follows:

(a) *Incendiary bombs*, with a weight range from two to 500 pounds. They are used to cause fires or illuminate targets.

(b) *Demolition bombs*, with a weight range from 100 pounds to 4000 pounds. Note: Bombs heavier than 550 pounds are unlikely to be used due to distance and weight problem.

(c) *Gas bombs*, with a weight range from 50 to 600 pounds.

The information contained on the following pages of this Manual is based upon the general regulations of the Office of Civilian Defense, and is included with the approval of, and in cooperation with The Columbus Council of Defense.

It will be of value wherever one may be at the time of an air raid.

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(A) INCENDIARY BOMBS AND THEIR EFFECT

When an incendiary bomb has penetrated a building it becomes immediately necessary to control the bomb and prevent it from burning through the floor and to subdue and extinguish the fire resulting from the bomb before it gets beyond local control. There are two general methods of dealing with an incendiary bomb:

1. The sand method and
2. The water method.

*The Sand Method:* A burning bomb may be safely approached only in a crouching or prone position and if the operator is protected by a fire fighting mask and heavy gloves. A wet blanket over the operator's back also offers protection from sputtering fragments.

About three-quarters of a bucket of sand is dumped on the floor approximately two yards from the bomb and with a long handled shovel and other tools the operator places the sand around and on top of the bomb. The bomb is then shoveled into the bucket on top of the remaining sand and covered with
sand from the floor. Using the handle of the shovel to carry the bucket, the bomb is then carried from the building to a safe place. This method cannot be used when the bomb has caused a fire of such extent as to prevent close approach.

The Water Method: Water is the best agent for controlling both the fire started by the bomb and the bomb itself. It is best applied to both in the form of a jet or solid stream, and not in the form of a spray. With a jet of water supplied by a suitable device, such as a garden hose, stirrup pump, pump tank, or other water-type extinguisher, the bomb can be quickly put out of action, leaving the operator free to deal with fires started by the bomb. The solid stream of water should be applied directly on the bomb. Do not be frightened by the momentary flash of light and scattering of metal which will occur when the jet hits a burning bomb. An instant later nothing is left but scattered fragments and an unburned part of the bomb. These, together with the fires that have been started, are easily quenched with the jet.

In dealing with fire bombs, it is important to remember that the fire started by the bomb, and not the bomb itself, is the real danger. Hence, never devote attention to the bomb at the risk of allowing the fire to get beyond control.

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**SUMMARY OF RULES**

1. Equipment for combating ordinary fire should be kept on hand at readily accessible points.

2. Anyone discovering a fire during an actual air attack should first try to put it out himself if he can reach it. Otherwise, help should be summoned at once from the nearest fire department or building wardens.

3. A fire caused by a bomb is extinguished by the same methods as any other fire.

4. Doors and windows should be kept closed. If left open, fire will be spread by the draft.

5. Upon entering a room on fire, a crouching or crawling posture should be adopted as smoke and fumes are less dense near the floor.

6. Occupants of a building on fire who are not required to assist in fire fighting should be promptly evacuated from the building.

7. Chemical extinguisher must not be used on the electron incendiary bomb.

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**Other types of Incendiary Bomb**

The incendiary bomb referred to above as an electron bomb weighs a little more than two pounds and is made of a thick-walled magnesium tube filled with a mixture of powdered aluminum and iron oxide called "Thermite."

Other materials used in incendiary bombs are petroleum, pitch, phosphorous and sodium, but thermite has proved to be the best incendiary agent.

The petroleum-filled bombs may be smothered with sand or similar material or subdued with water, but when water is used care should be exercised not to create pools upon which the burning petroleum may float, thus spreading the fire. It is better to spray the surrounding material with water until the oil burns out or can be smothered. Chemical extinguishers are effective against burning petroleum.

Fires caused by phosphorus-filled bombs are easily extinguished by sand or water but rekindle again on drying. It is therefore necessary after extinguishing a phosphorous fire with water to keep all contaminated material wet until it can be removed, and when such a fire is smothered with sand the phosphorous should be removed to a safe place and there allowed to burn out. Great care is necessary in these operations as phosphorous causes dangerous burns.

It is improbable that sodium or sodium potassium alloy-filled bombs will be encountered. The best method, however, of dealing with this type of bomb is to prevent the fire from spreading by the use of a water spray, special care being taken to keep the water away from the bomb itself and allow the bomb to burn itself out. The bomb may also be smothered with sand and removed to a safe place.

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**(B) EXPLOSIVE BOMBS AND THEIR EFFECTS**

There are three principal types of high explosive bombs in use today:

- Demolition bombs.
- General Purpose bombs.
- Fragmentation bombs.

All carry high explosive charges, varying from about 40 per cent of the total weight of the bomb, in the case of fragmentation bombs, to approximately 60 per cent in the case of the larger sized demolition bombs.
Demolition bombs are designed for demolishing targets and vary in size from 100 pounds to 4000 pounds.

General purpose bomb is a medium-cased bomb of intermediate weight and may be used with or without some element of delay in fuse action. Such bombs will penetrate the upper floors of ordinary buildings and explode, causing considerable damage inside, or demolishing unprotected buildings by their blast effect if they explode close to the building on the outside.

The Fragmentation bomb is the small bomb varying in weight from 22 pounds to 55 pounds and is designed primarily for attacks on personnel. They produce their effect primarily by fragments scattered over a wide area and have a very limited blast effect. They have only slight powers of penetration and are fitted with instantaneous fuses.

An explosive is a substance (usually a solid) which when subjected to heat or shock or both is converted almost instantly into a very much larger volume of gas at a very high temperature and pressure. It is the expansion of the compressed gas which bursts the bomb casing with a force depending upon the type of explosive used.

There are two types of explosive—low and high. A low explosive is converted to gas by a process of rapid burning, whereas a high explosive functions much more quickly in a manner known as detonation. The characteristic effect of a low explosive is that of a push whereas a high explosive shatters.

Fuses. Upon impact, a needle in the fuse of a bomb pierces a cap containing a very sensitive explosive, usually fulminate of mercury, which detonates and in turn sets off the main explosive charge of the bomb. Aircraft bomb fuses may be fitted to either or both ends of the bomb and there are two types:

1. Instantaneous, which cause immediate bursting upon impact; and
2. Delayed, which cause bursting after a pre-determined time interval.

When a bomb explodes above ground in the open, the danger zone from flying fragments varies from 200 to 2,400 feet. When a bomb bursts below the surface of the ground the crater projects the blast wave and fragments upward and for this reason even an open trench affords considerable protection from such bombs.

The general purpose bomb constitutes the most serious threat to the civil population of any type of high explosive bomb.

Many commercial buildings, such as banks, large department stores and warehouses are constructed with strongly built cellars and vaults, sometimes two or three floors below the ground level. They make excellent air raid shelters.

Generally, shelter below ground is preferable. Where there is no basement in a building, a protected room on the ground floor is usually the best location for an indoor shelter. The most favorable is a corridor or inner room without windows and, in general, rooms with small windows are preferable to those with large windows.

The safest rooms in a multi-storey steel frame or reinforced concrete building are those on the lowest floor below the ground level and those above the fourth or fifth floors but not closer to the roof than eight or ten floors. The greater the number of storeys, the safer the building as a whole, but even the larger demolition bombs will not penetrate more than eight to ten storeys before explosion.

Ninety-five per cent of the casualties in England are the result of flying fragments—principally fragments of glass. The most effective means to reduce the danger of injury from flying fragments of window glass are:

1. The pasting of tough paper, cardboard, cloth, nets or cellophane over the glass.
2. The covering of the whole window inside with wire netting.
3. The fitting of a light weight screen inside the window.

For those who must work outdoors during air raids, the only practical protection from blast and fragments are various kinds of barricades. One of the most satisfactory kinds of barricade is made of sand bags, each bag being filled to about three-fourths of its capacity.

Know and be prepared to direct others to any public air raid shelter or structures designated by the authorities as places of comparative safety during air raids.

(C) CHEMICAL WARFARE AND ITS EFFECT

There are five principal classifications of chemical agents used in warfare.

1. Lung irritants, which cause irritation and inflammation of the bronchial tubes and lungs when inhaled. Its action is limited to the respiratory tract.
2. Vesicants, which produce inflammation, burns and destruction of tissue.
3. Lacrimators, known as tear gases, which affect the eyes.
4. Irritant smokes, which cause intolerable sneezing, coughing, weeping and headache, followed by nausea and temporary physical disability.
5. Incendiaries, which are used for the setting of fires.

Characteristics of Chemicals Commonly Used in Warfare

Chlorine gas, which may be identified by its greenish-yellow color and disagreeable pungent odor. It is a lung irritant causing choking and coughing, smarting of the eyes and discomfort in the chest. A two-minute exposure in an average field concentration produces a casualty. Casualties are not necessarily fatalities—the term includes all persons incapacitated by injuries. Chlorine gas loses its strength rapidly, but being heavier than air, clings for some time in low or protected areas. It contaminates any food with which it comes in contact. A person affected by this gas should be kept quiet and warm and not allowed to walk. This gas is not usually used in aircraft attacks. Full protection is afforded by a gas mask.

Phosgene may be identified by its disagreeable pungent odor very similar to the odor of new mown hay or cut corn. When first released, it is white but soon becomes colorless. It produces symptoms similar to chlorine and its effect begins immediately. Like chlorine, it loses strength rapidly but will remain for a considerable time in low or protected areas. It also contaminates food. Its victims should not be permitted to walk and should be given heart stimulants. It can be distributed by aviation bombs but full protection is afforded by use of a gas mask.

Chloroform gas is an oily liquid which slowly changes to a colorless gas. It may be identified by its sweetish odor similar to that of fly paper. It irritates the lungs, causes weeping, coughing, nausea and vomiting. It may remain in an area from one to twelve hours, contaminates food, and anyone affected by it should be immediately removed to pure air, kept quiet and warm. Light stimulants should be administered. This gas may be used as an airplane spray but protection is afforded by gas masks.

Chloroacetophenone is tear gas, having the characteristic odor of apple blossoms. It is colorless or bluish-green and may remain effective for periods as long as several weeks. The affected parts of victims should be washed with water. Full protection is afforded by a gas mask.

Tear gas solution is a colorless liquid changing to colorless gas and giving off a sweetish odor similar to that of fly paper. It produces piercing irritation to the eyes, weeping, nausea and vomiting and remains in open areas approximately one hour, but longer in sheltered areas. It is most effective in damp cool weather and contaminates food. First aid for victims is the same as for lung irritants. It may be used in airplane bombs and as a spray from aircraft. Full protection is afforded by a gas mask.

The two principal irritant smokes are Adamsite and sneeze gas. Both of these gases have very slight odor. Adamsite is a yellow smoke cloud while sneeze gas is a greenish smoke cloud. They both produce sneezing, headache, nausea, vomiting and temporary physical debility. They poison unprotected food and water and have a persistency of from five to ten minutes in the open. Full protection is afforded by a gas mask.

Lewisite is a dark brown liquid which slowly changes to a colorless gas with the characteristic odor of geraniums. It is the most toxic of all known gases, producing severe lung irritation, systemic arsenic poisoning and vomiting. Where it contacts the skin a grayish discoloration will appear changing to blisters within one hour. It will persist for twenty-four hours in the open but is rapidly destroyed by water. First aid treatment must be given immediately. Wash with running water and soap; then with a 5 per cent aqueous solution of caustic soda followed by alcohol. Keep the patient warm and quiet. Treatment must be given immediately. This gas was developed by the United States and may not be used by any enemy.

Mustard gas is a dark brown liquid changing slowly to a colorless gas with an odor like garlic or horseradish. It is the most persistent gas and in summer time remains from four to five days in contaminated areas while in damp weather it may contaminate an area for weeks. When inhaled this gas produces a hoarse cough followed by severe chest pains and lung inflammation. It discolors, then blisters the skin. Treatment: Removal of victims to an area of pure air, removing clothing and washing continuously with running water and strong soap, then applying carbon tetrachloride saturated with chlorine or a bleach solution. Wash the eyes with boric acid or salt solution. The vapor of this gas will penetrate ordinary clothing, shoes and gloves.

Protective Devices: Most important is the gas mask. A gas mask is composed of a face piece and canister which is attached to the face piece with a hose. All air is breathed through the
canister which filters chemical agents from the inhaled air. It is vital that no moisture reach the inside of the canister, as it would greatly reduce the number of hours during which the mask gives full protection. Once the sealing agent has been removed from the canister for use, the normal life of the mask, whether or not it is used in gas concentrations, is slightly over a year. In gas concentrations the normal life of the canister used by the United States army for protection against war gases is about forty hours, providing the concentration of gas is not too heavy.

Protective Clothing must be used in connection with gas masks for full protection against vesicants like mustard gas and Lewisite. These gases will readily penetrate ordinary clothing. Oil skins and heavy rubber garments, including rubber gloves and boots, furnish the best protective clothing against vesicant agents.

In the event there is any suspicion of gas attack, it is recommended that civilians remain indoors. Ordinary rooms can easily be made sufficiently airtight to keep out the lung irritant type of gas, and even though the room is not sealed, it takes about seven minutes for enough gas to leak into the room to make the use of a mask necessary. Vesicant gases will not enter a dwelling in appreciable quantities.

The principal effect of gas is psychological. Army statistics show that while gas causes many casualties only two per cent prove fatal. If proper precautions are taken is should not be feared but it should be respected.
The signal adopted for blackouts and air-raid warnings is a succession of rising and falling tones from the sirens for approximately two minutes. A forty-five-second ringing of the class bells will precede the siren signal far enough to allow time for removal of all persons to safety areas.

The beginning of the blackout period will be signalled by three rings of the class bells simultaneously with the siren, at which time all building lights shall be turned off. Lights shall remain off until the all-clear signal is given by one ring of the class bells simultaneously with one long blast of the siren.

—Rule XII

Classes and all other groups will proceed to designated safety areas and remain there under the direction of the instructional staff and building leaders until the all-clear signal.

—Rule IV